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Factors Which Influence Adult African Americans' Asthma Self-Management

James Holland

ACCEPTANCE

This dissertation, FACTORS WHICH INFLUENCE ADULT AFRICAN AMERICANS' ASTHMA SELF-MANAGEMENT, by James D. Holland, was prepared under the direction of the candidate's dissertation committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing in the School of Nursing in the Byrdine F. Lewis School of Nursing and Health Professions, Georgia State University.

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ABSTRACT

FACTORS WHICH INFLUENCE ADULT AFRICAN AMERICANS' ASTHMA SELF-MANAGEMENT

by

JAMES D. HOLLAND

There are approximately 22.2 million Americans' who are living with asthma and of those 18.4 million are adults. African Americans' are more likely to be diagnosed with asthma compared to Caucasians, and experience more asthma attacks. In this study, the Social Cognitive Theory was used to examine the relationships among personal characteristics, environmental factors, asthma self-efficacy, self-management behaviors, and quality of life (QOL) in African American adults with asthma.

A correlational design was used. Data were collected from a non-random sample of adult African Americans' with asthma (N = 39) using the following self-report questionnaires: the Knowledge, Attitude, and Self-Efficacy of Asthma Questionnaire (KASE), the short form of the Rapid Estimate of Adult Literacy in Medicine (REALM-SF), the Medical Outcomes Study (MOS) for social support, the Asthma Trigger Inventory (ATI), the Morisky Medication Adherence Questionnaire, Asthma Self-Management Questionnaire (ASMQ), the Modified Pittsburgh Sleep Quality Index (PSQI), the Asthma Control Test (ACT), and the Asthma Quality of Life Standardized (AQLQ-S). Data analyses included descriptive statistics, Pearson Product correlations, and hierarchical multiple regression.

On average, participants (N = 39) were middle aged (M = 55.9 ± 7.9) years, female (65%), did not smoke (87%), did not use a peak flow meter (PEFR) to self-

manage their asthma (72%), and were obese (M = 34.06, SD = 10.78). Participants reported high confidence in asthma self-management; however, had low medication adherence and scores indicating uncontrolled asthma (M = 16.10, SD = 4.29). More than half (67%) of the participants reported poor sleep quality (PSQI). BMI and sleep quality accounted for significant variance (38%) in asthma QOL ($F(2, 38) = 7.08$, $p = .001$). Social support was an independent predictor of asthma self-efficacy ($F(2, 38) = 5.65$, $p = .02$).

Better control of weight and asthma symptoms may improve sleep quality. Health care providers need to address the ongoing challenges of asthma self-management and monitor sleep quality. Encouraging the use of peak flow meters, which have been shown to improve self-management and asthma control, may result in better quality of life for African Americans' with asthma.

FACTORS WHICH INFLUENCE ADULT AFRICAN AMERICANS' ASTHMA SELF-MANAGEMENT

by

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A DISSERTATION

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I would also like to thank my family for their encouragement and love. You cheered me on and wondered how much longer. I am blessed to have family and friends and I love you all.

This study would not have been possible without the participants who agreed to participate in this study. I am honored that you shared your experiences with asthma to me, I thank you. I hope this study will make a difference in the care for African Americans' with asthma.

Finally, I dedicate my dissertation to my partner, James. I would like to thank you for being by my side through this journey. Your encouragement, patience, understanding, and support has been unlimited and I could not have done this without you. I love you.

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LIST OF ABBREVIATIONS

ACT	Asthma Control Test
ACD	Asthma Control Diary
ALA	American Lung Association
AQLQ-S	Asthma Quality of Life Standardized
ASE	Asthma Self-efficacy
ASMQ	Asthma Self-Management Questionnaire
ATI	Asthma Trigger Inventory
BMI	Body Mass Index
CDC	Centers for Disease Control
GINA	Global Initiative for Asthma
HRQOL	Health Related Quality of Life
ICS	Inhaled Corticosteroid
IRB	Institutional Review Board
KASE-AQ	Knowledge, Attitude, and Self-efficacy Asthma Questionnaire
Morisky	Medication Adherence
MOS	Medical Outcome Study Social Support Survey
NHBLI	National Heart, Lung and Blood Institute
NIH	National Institute of Health
PEFR	Peak Expiratory Flow Meter
PI	Principal Investigator
PSQI	Modified Pittsburgh Sleep Quality Index
REALM-SF	Rapid Estimate of Adult Literacy in Medicine

QOL	Quality of Life
RCT	Randomized Control Trial
SABA	Short Acting Beta Agonist
SCT	Social Cognitive Theory

CHAPTER I

INTRODUCTION

According to the American Lung Association (ALA) there are approximately 22.2 million Americans' who are living with asthma and of those 18.4 million are adults (American Lung Association, 2011). The Centers for Disease Control (CDC) documented an increase of 75% in asthma prevalence in the general population between 1980 and 1994 which then stabilized between 1997 and 2001. However, from 2001 until 2009, there was an annual percentage increase of 1.2% in the general population (Centers for Disease Control, 2014). African Americans' are more likely to be diagnosed with asthma in their lifetime when compared to Caucasians (American Lung Association, 2011). In 2009, the prevalence rate for asthma was higher in African Americans' (27.9%) compared to Caucasians (American Lung Association, 2011). The asthma attack prevalence rate is also significant for African Americans' (40%) than for Caucasians (American Lung Association, 2011). African Americans' are often not well represented in studies; therefore, the focus of this study was to examine African American Adults in rural South Georgia from ages 20 to 70 who are living with asthma.

The mortality rate of asthma began declining in 2004 from 3,780 to 3,447 in 2007 (American Lung Association, 2011). The majority of the deaths occurred in the females with the age adjusted rate reported as 33% higher than males (American Lung Association, 2011). Although the death rate average for asthma patients overall is

decreasing, African Americans' have more than double deaths compared to Caucasians (American Lung Association, 2011; Gelfand, 2008).

Furthermore, African American females had the highest age-adjusted mortality rate in 2007 (American Lung Association, 2011). Annually there are 500,000 hospitalizations, around 1.7 million emergency department visits, 10.6 million visits to a physician's office, and 1.2 million hospital outpatient visits attributed to asthma (American Lung Association, 2011). Asthma resulted in 14.2 million lost workdays in the United States in 2009 (American Lung Association, 2011). The cost for direct asthma care was $50.1 billion and the indirect cost with loss of productivity was $5.9 billion for a total cost of $56 billion dollars (American Lung Association, 2011). The single largest direct asthma related cost was for prescription drugs at $6.2 billion dollars (American Lung Association, 2007). Thus, there is strong evidence that asthma is not only is a deadly disease but a costly one as well.

Asthma is a serious chronic lung disease defined by the ALA (American Lung Association, 2007; Joshi et al., 2006) as a continuously inflamed breathing airway which reacts to specific triggers with increased inflammation resulting in episodes or attacks. The episodes and attacks cause breathing to become difficult, and in severe cases, emergent medical attention is required (American Lung Association, 2007). Managing asthma requires multiple strategies. To date, asthma research has been conducted in children, adolescents and their caregivers. Findings from The National Health Survey completed in 2003 were that more youth received asthma self-management education than adults (Mannino, Homa, Akinbami, Ford, & Redd, 2001; National Heart, Lung, and Blood Institute, 2007b).

The diagnosis of adult asthma typically occurs during childhood or later in life by a combination of history of breathing problems, physical symptoms, and spirometry (National Heart, Lung, and Blood Institute, 2007a). Pulmonary function tests are needed (e.g., pre and post bronchodilator) to determine reversibility of the obstructive disease and symptoms (National Heart, Lung, and Blood Institute, 2007a). The disease is classified into different types of asthma categories based on daytime symptoms, nighttime awakenings, the use of short acting beta-2 agonists, interference with normal activity, and lung function. The classifications are intermittent, mild persistent, moderate persistent, and severe persistent asthma (National Heart, Lung, and Blood Institute, 2007a) (see Table 1).

The Global Initiative for Asthma (GINA) group in 2006 revised and distributed guidelines for nurses and physicians to manage and help to prevent asthma. GINA described asthma as episodic recurrence of wheezing, tightness in the chest, coughing, and breathlessness, with its most frequent occurrence in the early morning or at night. The chronic inflammation causes the airways to be hyper-responsive, to obstruct, and limit airflow. When airways are exposed to risk factors, referred to as allergens and triggers, this causes the bronchi to narrow and constrict, mucus plugs form, and further inflammation of the lungs occur. GINA (2006) described the most common triggers which were: dust mites, animal fur, cockroaches, pollen, molds, occupational irritants, tobacco smoke, respiratory infections, exercise, strong emotional expression, chemical irritants, and drugs (aspirin and beta blockers). GINA classified asthma by level of control and suggested that using level of asthma control is more relevant and useful because asthma changes over months and/or years. The three classifications identified:

controlled, partly controlled, and uncontrolled (see Table 3) (National Heart, Lung, and Blood Institute, 2007a). Patients with persistent asthma should be assessed at one to six month intervals and medications should be adjusted based on the asthma control level (National Heart, Lung, and Blood Institute, 2007a). If patients are well controlled for three consecutive months, then one step down on the EP-3 Stepwise Approach should be considered (National Heart, Lung, and Blood Institute, 2007a).

Table 1

National Asthma Education and Prevention Program Expert Panel 3 Step Classification of Asthma Severity, >12 years old

Components of Severity		Classification of Asthma Severity (Youths ≥12 years of age and adults)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8-19 yr 85% 20-39 yr 80% 40-59 yr 75% 60-80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not >1x/day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 ≥80% predicted • FEV_1/FVC normal	• FEV_1 ≥80% predicted • FEV_1/FVC normal	• FEV_1 >60% but <80% predicted • FEV_1/FVC reduced 5%	• FEV_1 <60% predicted • FEV_1/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year	≥2/year →		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. →			
		Relative annual risk of exacerbations may be related to FEV_1			

Note: Adapted from the National Heart, Lung, and Blood Institute Guidelines for the Diagnosis and Management of Asthma (2007a).

GINA (2006) addresses the four components of asthma care: (a) Develop a patient/doctor partnership, (b) Identify and reduce exposure to risk factors, (c) Assess,

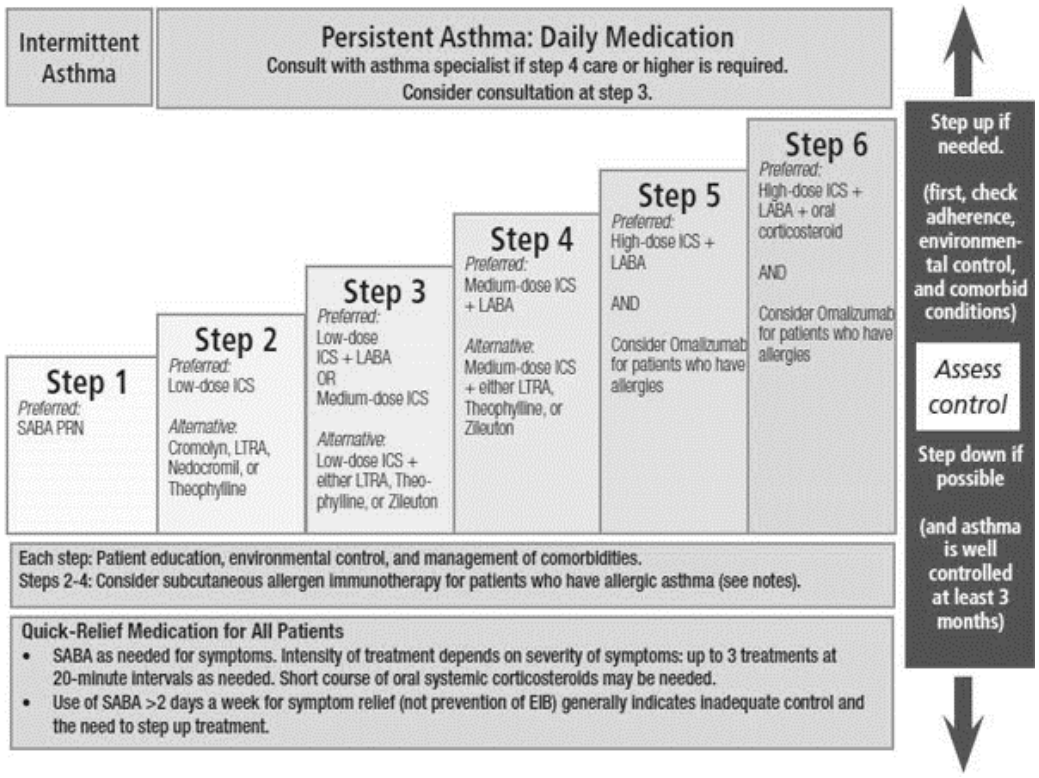
treat, and monitor asthma, and (d) Manage asthma exacerbations. With a partnership between the person with asthma and the health care team, patients can learn to: avoid risk factors, learn the correct way to take medications, delineate between "controller" and "reliever" medications, monitor their lung function with the peak expiratory flow meter (PEF), identify that their asthma is worsening and take action with an action plan, and finally, seek medical attention when appropriate.

Similarly, the National Heart, Lung, and Blood Institute (NHLBI) (Institute, 2007b) (National Heart, Lung, and Blood Institute, 2007a) released an update of national asthma guidelines. The NHLBI discussed four key components of asthma care which included: (a) assessment and monitoring, (b) patient education, (c) control of environmental factors and other conditions that can affect asthma, and (d) medications. The goal in the treatment of asthma is to maintain long-term control with normal lung function with the least amount of medication possible. With the use of the stepwise approach (see Table 2) the goal of using the least amount of medication can be achieved (National Heart, Lung, and Blood Institute, 2007a). The use of a daily inhaled corticosteroid (ICS) is the first-line controller medication. Adults with mild persistent asthma should be on a low dose ICS and those with moderate to severe persistent asthma require higher doses of ICS. The stepwise approach to treatment should provide long term control for the patients. Leukotriene modifiers and Theophylline are not preferred for initial controller medications (National Heart, Lung, and Blood Institute, 2007a). Oral corticosteroids are prescribed for rapid control of moderate to severe asthma exacerbations. Short acting bronchodilators (SABA) should be prescribed for all patients with asthma. The bronchodilator can be used for fast treatment of acute symptoms and in

conjunction with controller medications for patients with persistent asthma (National Heart, Lung, and Blood Institute, 2007a).

Table 2

EPR-3 Stepwise Approach > 12 years old



Note: Adapted from the National Heart, Lung, and Blood Institute Guidelines for the Diagnosis and Management of Asthma (2007a).

Even though there are many readily available asthma guidelines from the NIH, and GINA (Institute, 2007b), adult asthma remains inadequately managed (Schaffer & Yarandi, 2007) and many people with asthma don not receive optimal treatment (Adams, Appleton, Hill, Ruffin, & Wilson, 2009; Hartmann et al., 2007). Some of the common problems have included: the lack of use of effective medication, lack or gaps in the communication with healthcare providers (HCP) s and suboptimal self-management of asthma. These are all associated with asthma morbidity (Stoloff, 2008). The morbidity of adult asthma is considerable with an increasing number of outpatient and emergency

department visits, and absenteeism from work because of exacerbations of asthma (Mannino et al., 2001). Some of the noted reasons for the increase in asthma morbidity are: poor understanding of the disease process, and inappropriate medication use (Horne, 2006). Asthma is one of the chronic diseases that is addressed and targeted for improvement in the Healthy People 2020 goals (Health and Human Services, 2011). One of the main asthma goals of Healthy People 2020 is to reduce deaths from the disease. Other goals include a reduction of hospitalizations and emergency department visits caused by asthma occurrences and a reduction in missed work days resulting from asthma.

Table 3

Assessing Asthma Control

Components of Control		Classification of Asthma Control (≥12 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	≤2x/month	1-3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta$_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV_1 or peak flow	>80% predicted/ personal best	60-80% predicted/ personal best	<60% predicted/ personal best
	Validated Questionnaires ATAQ ACQ ACT	0 ≤0.75 ≥20	1-2 ≥1.5 16-19	3-4 N/A ≤15
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year	≥2/year	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term follow-up care		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.		
Recommended Action for Treatment		• Maintain current step. • Regular follow-ups every 1-6 months to maintain control. • Consider step down if well controlled for at least 3 months.	• Step up 1 step and • Reevaluate in 2-6 weeks. • For side effects, consider alternative treatment options.	• Consider short course of oral systemic corticosteroids. • Step up 1-2 steps, and • Reevaluate in 2 weeks • For side effects, consider alternative treatment options.

Note: Adapted from the National Heart, Lung, and Blood Institute Guidelines for the Diagnosis and Management of Asthma (2007a).

Short term and long term positive asthma outcomes are to decrease work place disability, decrease emergency department visits, decrease hospitalizations, and increase health quality of life (Gelfand, 2008). Meeting these goals will likely reduce the economic burden of asthma. More importantly, are the goals of improvements in physical, psychological, and social functioning in persons with asthma (Joshi et al., 2006).

Statement of Purpose

The purpose of the proposed study was to use a theoretical framework of Social Cognitive Theory (SCT) of asthma self-management to guide the examination of the relationships among personal characteristics, environmental factors, asthma self-efficacy, self- management behaviors, and quality of life in African American adults with asthma. The specific aims for this descriptive, correlational design type study were:

1. To explore the impact of personal factors, environmental factors, asthma self-efficacy, self-management behaviors as it relates to African American adults with asthma QOL.
2. To explore the usage of an asthma diary in the African American adult population.
3. To explore the impact of sleep quality on African Americans' adults with asthma.

The factors examined included personal factors (asthma knowledge and health literacy), environmental factors (social support and asthma triggers) and their influence on asthma self-efficacy in managing asthma and, self-management behaviors (asthma

self-management, medication adherence, asthma control, and sleep quality), and resulting asthma QOL.

Statement of the Study

This research expands the body of knowledge in adult African American asthma self-management and will contribute to better understanding the impact of personal factors, environmental factors, and self-efficacy on asthma self-management behavior and asthma quality of life. Identification of the influence of personal factors and environmental factors on behaviors and asthma quality of life will facilitate clinicians and researchers to find ways to help African Americans' with asthma manage their illness and ultimately improve their quality of life and decrease asthma related deaths.

Theoretical Framework

Social Cognitive Theory (SCT) (Bandura, 1986) was developed originally by Albert Bandura in 1986. An adapted model of the Social Cognitive Theory (SCT) was used to guide this study. Social Cognitive Theory (SCT) is a well-developed theory that may be beneficial to the study of asthma in particular African American adults' asthma self-management. Use of SCT in the context of asthma self-management in adults is illustrated in Figure 1. The SCT explains human social behavior by a triadic, dynamic, and reciprocal model in which the three factors of person, environment, and behavior interact. The adaptation of the SCT is in Figure 1 with components of personal, behavior, and environment, asthma self-efficacy, and asthma QOL and will include explanations and rationales.

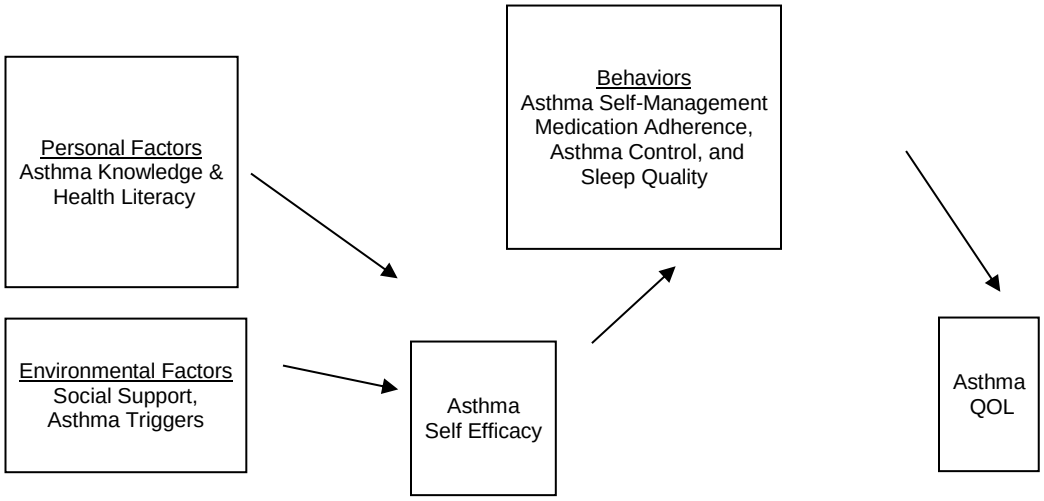


Figure 1. *Use of Social Cognitive Theory in asthma self-management.*

Personal Factors

Personal factors included asthma knowledge and health literacy. These are individual characteristics, some of which are non-modifiable or less easily modified (e.g., health literacy) and others which are more easily modifiable (e.g., asthma knowledge).

Environmental Factors

Environment was defined as everything external to the individual (Glanz, 2002). The environment can be anything within the social surroundings including family, friends, and peers which can affect behavioral outcomes as well as asthma triggers. For the proposed study, the environmental factors of interest are social support and asthma triggers. Social support is defined as a group or persons to whom one can turn to for help in difficult life situations. Higher social support has been associated with improved self-care behaviors in persons with asthma (Huang, 2007; Knight, 2005; Mankinen, Suominen, & Mauri, 2000). Social support has not been studied extensively in the African American adults with asthma. Asthma triggers were defined as things that trigger

asthma and made the person experience asthma symptoms(Ritz, Steptoe, Bobb, Harris, & Edwards, 2006).

Self-efficacy

Self-efficacy was defined as an individuals' belief in his or her ability to succeed in a particular situation. In the context of asthma self-management, self-efficacy was defined as one's confidence to manage his or her asthma (Lavoie et al., 2008; Ngamvitroj & Kang, 2007).

Behaviors

Behaviors were transmission and processing of information in neural pathways, interpretation in the cerebral cortex, and acknowledgment by the patient (Banzett, Dempsey, O'Donnell, & Wamboldt, 2000). Sleep was defined as the natural suspension of consciousness during which the powers of the body are restored. Sleep has been associated with asthma control and QOL (King, Kenny, & Marks, 2009; Mastronarde et al., 2008; Sundberg et al., 2010).

Asthma Quality of Life (QOL)

The asthma QOL was used as the outcome variable and was defined as the health-related asthma QOL, such as its effects on activity, symptoms, emotional function, and exposure to the environment. The QOL instrument was to measure to activity limitations, symptoms, emotional function, and exposure to environmental stimuli.

Research Hypotheses

With the stated purpose and aims of this study, supporting literature, and theoretical framework, the following research hypotheses and research questions were proposed for a sample of Adult African Americans' with asthma.

1. Higher asthma knowledge, higher health literacy, higher perceived social support, and lower perceived asthma triggers will all contribute significant variance to better self-efficacy.
2. Higher self-efficacy will be associated with better asthma self-management, better medication adherence, and better asthma control.

The research questions for this study were:

1. Which personal factors-asthma knowledge, health literacy, environmental factors-perceived social support, perceived asthma triggers, asthma self-efficacy, behaviors-asthma self-management, asthma medication adherence, and asthma control, contribute the most variance to asthma QOL?
2. What are the relationships among daily asthma symptoms, sleep quality and asthma QOL?
3. Does sleep quality contribute significantly to asthma QOL more than personal factors (asthma knowledge, health literacy), environmental factors (perceived social support and asthma triggers), and asthma self-efficacy, behaviors (asthma self-management, medication adherence, and asthma control)?
4. What are the common symptoms experienced by adult African Americans' with asthma and their responses to the symptoms?

Summary

The purposes of this study were to use the Social Cognitive Theory to examine the impact of personal factors (asthma knowledge, self-efficacy, health literacy), and environmental factors (social support and asthma triggers), on behavior (medication adherence, asthma control, and sleep quality), and ultimately asthma QOL in African

American adults with asthma. This study was based on an adapted model titled “Use of the Social Cognitive Theory with Asthma Self-Management.”

CHAPTER II

LITERATURE REVIEW

This chapter will focus on the review of literature related to the relationships of the personal factors (asthma knowledge and health literacy), environmental factors (social support and asthma triggers), asthma self-efficacy, resulting in behaviors (asthma self-management, medication adherence, asthma control, and sleep quality), and their influence on asthma QOL. Furthermore, this review has a special focus on the African Americans' with asthma population which has not been studied adequately to this date. The search engines used in this review were ProQuest, PsychInfo, CINAHL, Medline, and Google.

The Personal Factors

Asthma Knowledge and Management of Adult Asthma

The past two decades have seen an extensive study of asthma, and its management practices and how this affects the disease (Ngamvitroj & Kang, 2007). There is empirical support that asthma knowledge improves with educational intervention sessions (Pink, Pink, & Elwyn, 2009); however, no articles were found that demonstrated asthma knowledge is sustained over time and the need for follow-up knowledge training has been suggested to enhance long-term self-management of asthma over time (Durna & Ozcan, 2003; Huang, 2007; Mancuso, Sayles, & Allegrante, 2008).

Asthma educational sessions alone have not been associated with improvement in adherence to peak expiratory flow rate (PEF) self-monitoring one reason may be because

the educational sessions were weighted heavily on general asthma knowledge and not specifically on PEF and the benefits of it (Abramson et al., 2003). Asthma knowledge has been measured in numerous studies to evaluate the effectiveness of the educational intervention (Sun et al., 2010).

In a sample of 200 adults with asthma, more asthma knowledge was related to better self-management of the disease as measured by fewer physician visits, improved lung, and improved symptom scores (Sin, Kang, & Weaver, 2005; van der Meer et al., 2009). The initial step in improving asthma management is having adequate and appropriate asthma knowledge (Huang, 2007). Patients with lower asthma knowledge scores showed less asthma management skills such as following their asthma action plans as well as using a PEFR (Abdulwadud, Abramson, Forbes, & Walters, 2001). Therefore, asthma knowledge is an important variable to consider in self-management of asthma (Schaffer & Yarandi, 2007). Researchers have suggested that health care professionals need to tailor asthma education to the need of individuals with asthma and assess whether the education was effective and improved asthma knowledge (Freeman & Welton, 2005; Kritikos, Krass, Chan, & Bosnic-Anticevich, 2005). A pilot study of 70 adults (majority women 53) examined the effects of imagery, critical thinking, and asthma education on symptoms and mood state in asthma (Freeman & Welton, 2005). They found that imagery (mind-body biologically targeted) significantly improved symptoms and asthma management better than critical thinking as well as an increase in asthma knowledge (Freeman & Welton, 2005). The researchers followed the participants for 12 weeks and did not report participants' ethnicity (Freeman & Welton, 2005).

In a study of 29 adults that measured asthma knowledge, attitudes, self-efficacy and compliance with medical regimen, number of emergency department visits, and hospitalizations in adults with asthma (Scherer & Bruce, 2001) knowledge was significantly related to more positive attitudes towards asthma and self-efficacy in managing asthma. They concluded that the patients who scored low could be referred into programs to improve self-management. In a one-group quasi-experimental design with repeated measures in 101 adults in Korea (Choi & Cho Chung, 2011) researchers found that asthma knowledge was not improved after the educational intervention (Choi & Cho Chung, 2011; Ho et al., 2003). However, they confirmed the importance of education for persons with asthma and the benefits in the management although it was not statistically significant (Choi & Cho Chung, 2011).

Asthma knowledge has been well studied but asthma knowledge has not been documented to be sustained over long periods of time. The studies reviewed had low populations and most of the studies only collected data at one point in time. Of the studies that collected data more than once, only a few studies collected data over a two-month period. Asthma knowledge is the standard of evaluating the effectiveness of asthma self-management education programs. Persons with asthma who had higher asthma knowledge were shown to visit their health care provider less, have better lung function, and better symptoms scores. Asthma knowledge is an important variable when evaluating factors that influence asthma self-management and QOL.

Health Literacy and Management of Adult Asthma

Health literacy is defined by Healthy People 2010 Program as “the degree to which individuals have the capacity to obtain, process, and understand basic health

information and services needed to make appropriate health decisions" (Paasche-Orlow & Wolf, 2007). Health literacy has been primarily measured by reading comprehension of health and medical information (Paasche-Orlow et al., 2005). Health literacy has been evaluated with asthma education and has been shown to improve with a tailored education program. Asthma educational programs have shown improvement in self-management of asthma even for those with low health literacy (Paasche-Orlow et al., 2005). In a longitudinal study (Mancuso & Rincon, 2006) with a sample of 175 adult persons with asthma who required daily medications, the relationship of health literacy was examined with asthma QOL, health function, and emergency department utilization. Health literacy was measured by the Test of Functional Health Literacy in Adults (TOFHLA). Low health literacy was associated with worse QOL, worse physical function, being less likely to participate in health care decisions and higher emergency department utilization for a two-year period (Mancuso & Rincon, 2006) as well as low asthma knowledge and low self-management skills (Dewalt, 2007). Patients with lower health literacy were less likely to consider an asthma attack potentially harmful and this included being aware of the warning signs and knowing how to monitor lung function to obtain early treatment (Mancuso & Rincon, 2006).

Apter et al. (2006) found that low numeracy and low health literacy were associated with more hospitalizations for asthmatics (Apter et al., 2009). Health literacy has also been studied in other chronic diseases with variables of self-efficacy, trust, and participation in medical decision making. In a sample of persons with diabetes, lower health literacy was associated with less desire to participate in medical decision making (Dewalt, Dilling, Rosenthal, & Pigonone, 2007). Lower health literacy has been

associated with worse health status, higher rates of hospitalization from patient populations such as the elderly and those with chronic diseases such as diabetes, HIV, and asthma (Baker et al., 2002; Kalichman & Rompa, 2000; Paasche-Orlow et al., 2005; Schilling, 2002).

Health literacy has been well documented with adults with asthma to be related to more hospitalizations, more ED visits, worse physical function, worse QOL, and lower medical decision making. Low health literacy associated with poor asthma self-management needs to be studied further. These findings support the need to evaluate health literacy when examining self-management behaviors of adults with asthma.

Environmental Factors

Social Support and Management of Adult Asthma

Gallant (2003) suggested that social support is an important factor in disease management. There are several types of social support which include emotional, instrumental, informational, appraisal support and the social network which have been measured in several ways (Butler & Heaney, 2006; Ngamvitroj & Kang, 2007). Social support can come from family, friends, work, and community (Ngamvitroj & Kang, 2007). Women were shown to cope better in the social area of self-care as compared to men (Mankinen, 2000). Schwarzer and colleagues (Schwarzer & Knoll, 2007) suggested that the type of social support does not matter but the perceived level of satisfaction by the recipient is the most important aspect. Social support has been examined in other chronic illness groups such as human immunodeficiency virus (HIV) in which it was associated with better adherence to medication and self-monitoring (Safren et al., 2001). Adult asthma adherence to PEF self-monitoring and perceived satisfaction with social

support has not adequately been studied (Clark, Gong, & Kaciroti, 2001; Keeling, Price, Jones, & Harding, 1996).

Higher levels of social support have been associated with improved self-care behaviors in persons with asthma (Huang, 2007; Knight, 2005; Mankinen, Suominen, & Mauri, 2000). Social support in these studies was typically measured as the quality of the support from significant others, coping with social self-care, and social support of relational functions (Gorman & Asaithambi, 2008). Social support was significant in fighting the sense of powerlessness in persons with asthma (Mankinen, 2000). In a study that examined adults with asthma on physical, psychological, and social area of asthma treatment, 130 adults answered questionnaires from a deductive perspective and data were collected data about self-care of asthma and coping. They found that women coped better than men, and in this population persons with asthma talking with other persons with asthma about their experiences was helpful in coping with problems associated with asthma (Mankinen, 2000). The researchers did not report ethnicity of participants in their study.

Social support has been related to improved self-care behaviors in persons with asthma, however, the impact on PEF has not been adequately studied. There have been several instruments used to measure social support with persons with asthma and one has not been shown to be more effective than another. In summary, the influence of social support on asthma self-management needs further exploration.

Asthma Triggers and Management of Adult Asthma

Asthma triggers are a variety of factors that aggravate and trigger episodes of inflammation that may lead to obstruction in asthma (Ritz, Steptoe, Bobb, Harris, &

Edwards, 2006). Asthma triggers have been discussed in a number of ways throughout the literature. A study of 102 poorly controlled asthmatics (61% female, mean age 22, 65% Caucasian, and 7% African American) on trigger inquiry found that the most common documented trigger inquiry was infection (47%). The researchers also found that more triggers were identified during emergency visits as opposed to nonemergency visits ($p = 0.05$) (Rank, Wollan, Li, & Yawn, 2010). Furthermore, they also found a weakness in trigger avoidance advice and the documenting of it. The researchers discussed ways to incorporate asthma triggers into the care of asthmatics which included the use of a written asthma action plan, and the use of the Asthma TriggerIinventory for identification of triggers.

Shedd and colleagues (2007) completed a study comparing the relationship of home-based triggers, asthma symptoms, and QOL with data from 177 adult and pediatric patients. They found that the absence of roaches and dust mite covers were positively associated with QOL. Also, frequent bed sheet washing was associated with increased symptoms and decreased QOL in adults caring for children with asthma. The adults in the study were caregivers to the children with asthma. This study gave valuable information related to asthma triggers, symptoms, and QOL but more research is needed to understand the impact of these variables on adults with asthma and more specifically African Americans' with asthma.

The asthma trigger inventory (ATI) (Ritz et al., 2006) a common measure used in research and clinical, was validated for perceived triggers of asthma with 247 adult asthmatics. The researcher did not report on the ethnicity of participants, however the majority (52.6%) of the population was male. The findings of the psychometric study

supported the instrument as reliable and valid. This instrument has been useful to health care providers as well as persons with asthma to reflect actual reactivity to specific trigger factors. Furthermore, the ATI is a self-report instrument which can be used with asthma research.

A qualitative study (Barrett, Gallien, Dunkin, & Ryan, 2001) was conducted to comprehend the rural family in managing asthma by interviewing five mothers (three African Americans' and two Caucasians). One of the questions that the researchers asked was about any education about allergens and irritants the family had received. The researchers did not find a lack of knowledge concerning triggers of asthma. They concluded that the cost of asthma regimens and school policies about medications were major barriers to better asthma control (Barrett, Gallien, Dunkin, & Ryan, 2001). The qualitative study gave insight from pediatric caregivers and how families managed asthma in a rural area.

Asthma triggers have evolved overtime and the methods of assessing them have evolved as well. There is still no consistent way to measure asthma triggers. Of the literature discussed, only one study about triggers was conducted with adult persons with asthma. Most of the existing studies have focused on the family with attention to the pediatric patient and their caregiver. More research is needed to understand the impact of asthma triggers in the African American with asthma.

Asthma Self-efficacy and Management of Adult Asthma

Self-efficacy is the degree of confidence persons have that they can successfully execute specific behaviors to produce certain outcomes (e.g., asthma self-management-PEF, and medication adherence) (Bandura, 1986). In a study of 80 persons with asthma,

higher self-efficacy was associated with better adherence to a medical regimen, specifically with the adherence to inhaled medication for asthma and other chronic diseases as well (Apter et al., 2009). In a large study of 557 adult with asthma, higher asthma self-efficacy was associated with improved asthma control and better asthma QOL (Lavoie et al., 2008). Lavoie and colleagues (Lavoie et al., 2008) had a large sample size of 557 but lacked diversity as the majority of the sample was Caucasian (93%) and female (61%).

Higher patients' self-efficacy (confidence of their ability to contribute to the management of the illness) and more positive attitudes towards their asthma were significantly associated with fewer number of emergency department (ED) visits and hospitalizations (Scherer & Bruce, 2001) where as asthma knowledge was not (Apter et al., 2009). Self-efficacy of asthma with asthma self-management programs have been influential and beneficial (Bodenheimer, Lorig, Holman, & Grumbach, 2002; Huang, Li, & Wang, 2009; Mancuso & Rincon, 2006). However, self-efficacy was not readily changed over a short period or with a relatively short-term intervention designed to improve self-management of persons with asthma (Kuijer et al., 2007; Ngamvitroj & Kang, 2007).

Self-efficacy was shown to be related a better QOL, better asthma control, and improved medication adherence (Apter et al., 2009; Scherer & Bruce, 2001). In the studies about asthma self-efficacy, the range of participants was small to large, but lacked diversity in race and gender. The use of self-efficacy has been beneficial in asthma management and further study is needed to evaluate its impact on asthma self-management in African American adults with asthma.

Behaviors

Asthma Self-Management and Management of Adult Asthma

Self-management of asthma is a concept where the affected person can identify symptoms and perform simple self-help treatments to relieve these symptoms and avoid expensive medical treatments performed by professionals (Jones, 2008; Kuijer et al., 2007; van der Meer et al., 2009). The concept of self-management is dependent on several important factors which include: compliance with medication, seeking help when needed, avoiding allergens, and modifying activity levels (American Lung Association, 2007; Bender et al., 2010; Fish & Lung, 2001; Roy & Milgrom, 2003; Tousman, Zeitz, Bristol, & Taylor, 2006; Wraight, Cowan, Flannery, Town, & Taylor, 2002). An effective educational program has been shown to be very important in self-management of asthma and can improve patient's ability to comply with regimens and assist with the adjustment to the illness (Durna & Ozcan, 2003; Mancuso et al., 2008). This link was found in a study that evaluated the needs of 42 adult with asthma for self-management education and elaborated on supportive education programs. The participants were taught for 120 minutes by doctors and nurses using an educational slide series from the National Thorax Association, additional topics included training on usage of inhalers, establishing the importance of a diary, self-monitoring, and medical control (Durna & Ozcan, 2003). The educational program also provided general information about the disease, risk factors/triggers, medications, peak flow meter, and the importance of exercise (Durna & Ozcan, 2003). The majority of the participants were female (78.6%), average age was 42.12 years, average length of time with asthma was 5.79 years, 90.2% were insured. Researchers did not report the ethnicity of this sample (Durna &Ozcan, 2003). The

educational program showed an increase in patients' health perception score ($p = 0.04$), an increase in patients' faith in the effectiveness of treatment ($p < 0.0001$), decreased symptom scores, and an improved QOL were reported.

Until recently, asthma self-management was measured by an increase in asthma knowledge score (Mancuso et al., 2008). Asthma self-management is not only the knowledge about asthma, but is a behavior leading to self-management that needs to be evaluated and measured. Other ways that researchers have evaluated asthma self-management in the past were the amount of reported emergency department visits, reported hospitalizations, asthma control, and lung function (van der Meer et al., 2009). Researchers have also used asthma guidelines in the development of instruments to measure asthma self-management (Mancuso, Sayles, & Allegrante, 2010; Shelledy, Legrand, Gardner, & Peters, 2009). The literature has not used the term self-management consistently until recently, and the term self-care has been used interchangeably in the past (Huang, 2007; Huang & Wang, 2009). Regardless of the term used, both reflect behaviors the person takes to manage their asthma.

Self-management has been supported by policymakers and has been shown to decrease the cost of healthcare and empower asthma patients to access healthcare less frequently (Gibson & Powell, 2004; Holt, Masoli, & Beasley, 2004; Schäper et al., 2010). Educational interventions have been shown to increase compliance with asthma management (Brown, 2008) and tailored interventions have shown more positive outcomes than the generic education programs (Huang & Wang, 2009; Larson et al., 2010; Schaffer & Yarandi, 2007). Although educational programs have been effective, there is evidence that adult with asthma are not following the guided self-management

plans and are not interested in following the education and instructions outlined by the provider (Thoonen & van Weel, 2000). It has also been shown that the improvement resulting from an educational programs were not sustained over time (Wilson et al., 2010).

Self-management enables the individual to minimize pain, to work well with collaborative sharing of decision making with treatment; to increase a sense of control over their lives (Koch, Jenkin, & Kralik, 2004; Ratanachadawan, 2005) to decrease visits to the HCP (HCP), and to increase QOL (Mancuso & Rincon, 2006). Despite data showing the cost-benefits and increases in health outcomes for individuals who participate in these programs, they are only reached by a small number of people with chronic illness (Huang et al., 2009). Some argue that the inherent complexity with asthma self-management education programs may not be effective enough to improve outcomes significantly (Hartmann et al., 2007). Suggestions of simplified therapeutic options may help and be more innovative. Multidimensional approaches should be developed and evaluated for significance (Hartmann et al., 2007). Another researcher believes that health care providers should work with patients to improve health literacy and to improve asthma outcomes by helping them build skills to learn, understand, and implement effective self-management (Mancuso & Rincon, 2006; Paasche-Orlow et al., 2005).

One approach that may be more cost-effective and reach more people is the use of the Internet. An Internet self-management education program for asthma was tested using a two group, randomized design. Asthma control was significantly better in the group that received the intervention via the Internet when compared to the usual care group (van der Meer et al., 2009).

Asthma self-management has been measured in various ways. Self-Management has demonstrated to be a very important and an effective instrument in the management of asthma in adults. It has been shown to decrease ED visits, reduce hospitalizations, reduce the cost of healthcare, and improve QOL and health outcomes.

Medication Adherence and Management of Adult Asthma

Adherence to medication on self-management plans may be influenced by health beliefs, psychosocial, and economic factors (Wrench & Morice, 2003). Reasons found in the literature about non-adherence to medication included personal perceptions of the medication, and social circumstances which are crucial in the decision for an individual to comply with the prescribed treatments in chronic illness (Schneider, Wensing, Quinzler, Bieber, & Szecsenyi, 2007). Joshi et al. (2006) concluded that asthma physicians and their patients need to know the importance of medication adherence and its impact on QOL (Joshi et al., 2006). In a study of 385 patients, worse QOL was related to losses in workplace productivity and decrease in presenteeism per enrollee per year (Joshi et al., 2006). The efficacy of a medication and adherence to the regimen influences the effectiveness of treatment (Epstein et al., 2004). Non-adherence of medication is common with asthma patients and often leads to asthma exacerbations (Fish & Lung, 2001; Horne, 2006) and increased asthma symptoms, more frequent emergency department visits and hospitalizations and the need for oral steroids (Borrelli, Riekert, Weinstein, & Rathier, 2007). The use of motivational interviewing by health care providers improved asthma management by supporting self-management strategies to improve medication adherence(Borrelli et al., 2007).

Medication adherence in asthma has no standard for measurement even though there are various measurements which have been used (Bender et al., 2010). In some studies medication adherence has been measured by multiple methods such as: self-reporting, prescription filling, electronic measurement devices, continuous medication acquisition (CMA), tablet counts, canister weights, clinical outcome measures, and serum or urine drug levels (Bender et al., 2010; Wilson, 2010). The use of self-reported adherence has not been reliable because the individuals report higher rates of adherence with asthma medication than actual usage (Bender et al., 2010). However, self-reporting of non-adherence is generally accurate (Prabhakaran, Lim, Abisheganaden, Chee, & Choo, 2006). Short-term improvements in medication adherence reduced asthma symptoms and lessened beta agonists use (Borrelli et al., 2007; Ulrik et al., 2006). In a study of 509 adults which examined adherence to asthma medication found that adherence was associated with a fixed daily routine and following the advice from their physician. Non-adherence was associated with increasing disagreement with effectiveness of the medication ($p < 0.04$) as well as using it as an essential part of therapy ($p < 0.002$) (Ulrik et al., 2006). In a study of 97 adults, a multiple regression analyses showed that years with asthma, illness identity, and peak flow variability were all significantly explanatory variables for symptom perceptual accuracy (Ohm & Aaronson, 2006). The Ohm and Aaronson study in 2006 had 75% of the sample was women, 83.5% Caucasian, 10.3% Hispanic 3.1%, and other ethnic or racial group was 3.1% (Ohm& Aaronson, 2006).

Schneider and colleagues (Schneider et al., 2007) studied 185 patients regarding higher preference in treatment decisions and its association to medication adherence

(Schneider et al., 2007). There were more females 64% and ages ranged from 16 to 92, ethnicity of the sample was not reported. Researchers found that participation preference in self-management was low and higher preference for self-management may indicate more motivation for self-management but also low medication adherence. The conclusions were that higher preference in treatment decision and medication adherence may occur because of an internal negotiation process that accepts the potentially lifelong demands of the disease. Significant results were found with individual items on the Morisky medication adherence scale such as question 3 (When you feel better do you sometimes stop taking your medicine?) ($p = 0.01$), and question 4 (Sometimes if you feel worse when you take the medicine, do you stop taking it?) ($p = 0.05$), which indicated an increase in medication adherence. There were no associations between asthma knowledge and treatment adherence (Ho et al., 2003). The way to promote medication adherence entails the building of a strong relationship between the patient and health care provider which is personal, realistic, and which is available for repeated education as needed (Fish & Lung, 2001).

In a randomized controlled trial study of 612 participants in three groups (usual care, clinical decision making, and shared decision making). Data were collected on the outcome variables of QOL, health care use, rescue medication use, asthma control, and lung function. Shared decision making was significantly better in adherence to controller inhaler ($p = 0.03$) (Wilson et. al., 2010). Higher cumulative controller medication was shown with the shared decision making group compared to the usual care group ($p < 0.0001$) (Wilson et. al,, 2010).

Medication adherence in asthma has been measured using different instruments. Medication adherence has been related to a decrease in asthma symptoms and lessens beta agonist's usage. The necessary traits of optimal medication adherence include a strong relationship between the patient and HCP that is personal, realistic and which is available as needed. Medication adherence is an important aspect of self-management in adults with asthma.

Asthma Control and Management of Adult Asthma

The relationship of asthma control with QOL has received attention in the asthma literature. A correlation study examined the relationship of asthma control to asthma-related versus health-related quality of life (HRQOL) and asthma control was more strongly associated with asthma related QOL (Huang, 2007; Huang et al., 2009; King et al., 2009; Lavoie et al., 2008). In a study of 213 people age 16 to 75, longitudinal data were analyzed on asthma control and QOL. There was a relationship between better asthma control and better QOL (King et al., 2009).

Factors of non-adherence contribute to less than optimal asthma control (Baiardini et al., 2006; Janson, Earnest, Wong, & Blanc, 2008). There have been inconsistent findings related to gender and asthma control. Females with asthma have reported more healthcare usage, worse asthma control, and had more allergic signs than men (Haselkorn et al., 2009). Another study that compared genders on asthma control found no difference in asthma control (Sundberg et al., 2010). An Internet based self-management study resulted in more asthma control and better lung function but did not show a reduction in exacerbations (van der Meer et al., 2009). Repetitive education and innovative education

methods are suggested to maintain pulmonary function and symptom control (Choi & Cho Chung, 2011).

In a study of 557 adults, asthma control and asthma QOL were associated with asthma self-efficacy. This study was part of a larger cohort tertiary study. The participants had a mean age of 49.4 years, the majority were Caucasian (93%), had average education level of 13 years and the majority of the participants were employed (61%). Results showed that higher self-efficacy and better asthma control were associated with better asthma QOL (Lavoie et al., 2008).

Asthma control has been studied with and associated with asthma self-efficacy and QOL. Asthma control and gender comparison have inconsistent findings. More asthma control and better lung function did not always reduce exacerbations. Asthma control is an important variable which needs more study and research to understand and resolve the inconsistencies and conflicting results on asthma control.

Sleep Quality and Management of Adult Asthma

Sleep has been measured in various ways in asthma research. Nights waking in persons with asthma were associated with impaired QOL (Menzies et al., 2006; Osman et al., 2001). Less symptom interference with sleep was associated with better asthma QOL (Everhart, Smyth, Santuzzi, & Fiese, 2010).

In a study examining asthma control and QOL results indicated that sleep disturbance and medication use, reduction of sleep disturbance and addition of short acting Beta Agonist were more effective in improving asthma control and QOL (King et al., 2009). In another study, anxiety, insomnia, and daytime sleepiness were more prevalent in women with asthma than men (D'Ambrosio & Mohsenin, 1998; Lewis,

2001; Sundberg et al., 2010). Female gender and anxiety were independent risk factors for both insomnia and daytime sleepiness in 470 subjects with asthma (King et al., 2009). Sleep quality was impaired substantially in mild-moderate asthmatics and sleep quality was associated with asthma control and asthma related QOL (Mastronarde et al., 2008). In a large prospective clinical trial study of 487 adults with asthma, sleep quality was measured (Mastronarde et al., 2008) with two instruments: the Pittsburgh sleep quality questionnaire and the Epworth Sleepiness scale. No difference between the three groups were found, but improvement in sleep quality with improved asthma control and better QOL was noted (Mastronarde et al., 2008). The better asthma control was associated with better sleep quality. A clinically significant proportion (44%) of subjects reported daytime sleepiness (Krouse, Yarandi, McIntosh, Cowen, & Selim, 2008). Poorly controlled asthma patients have been found to sleep less and have lower sleep efficiency than patients that are better controlled (Babcock, Krouse, & Helene, 2010). A study of 212 adults, measured sleep disturbance and short acting beta agonists (SABA) use on asthma control and QOL (King et al., 2009). Sleep disturbance and SABA were the main contributors to the within-person variation measures of asthma control and QOL (King et al., 2009).

Sleep quality has been measured with several instruments with the most common one being PSQI. Fewer symptoms of sleep interference were associated with better asthma QOL. Sleep quality has also been associated with better asthma control. Insomnia and daytime sleepiness are more prevalent in females than males with asthma. Sleep quality was substantially impaired in mild-to-moderate asthmatics. Sleep quality is an important variable for measurement of self-management.

Asthma Quality of Life and Management of Adult Asthma

Asthma is a disease that has an impact on the QOL (Gelfand, 2008). Satisfaction in QOL can be a measure of or an outcome of effective self-management in adult asthma management (Shelledy et al., 2009; Tousman et al., 2006). Olajos-Clow and colleagues (2005) defined QOL as an overall satisfaction with physical, emotional, social, and cognitive functioning (Olajos-Clow, Costello, & Lougheed, 2005). Factors that impact health QOL are asthma or asthma related symptoms such as: episodes of coughing, shortness of breath, wheezing, and chest tightness (Szende, Svensson, Stahl, Meszaros, & Berta, 2004). The Asthma QOL instrument assesses four domains: symptoms, activity limitations, emotional function, and environmental stimuli (Apter et al., 2009). Even though there have been several studies that examined health related QOL, the methodology and measurements have not moved forward (Juniper, Svensson, Mork, & Stahl, 2004). Generally these asthma health-related QOL instruments reflect that better symptom control and asthma management contribute to better health-related QOL (van der Meer et al., 2009).

In an experimental study, asthma QOL was an outcome (Wilson et al., 2010). The intervention included facts about asthma, medication management, and decision making (Wilson et al., 2010). The experimental group had a significantly higher health-related QOL compared to the control group ($p = 0.0003$) (Wilson et al., 2010) In yet another randomized controlled trial (RCT), that evaluated asthma control, QOL, and beliefs about medications questionnaire on one of three electronic tracking devices (Bender et al., 2010), the participants were diverse in the treatment group of 25 (56% White, 24% Hispanic, 20% Black, and 0% Asian) and in the control group of 25 (60% White, 12%

Hispanic, 20% Black, and 8% Asian). Better medication adherence was related to the group receiving the interactive voice responder and no other differences emerged with other measures of QOL or asthma control measured by the Asthma Control Test (Bender et al., 2010). The use of asthma symptoms, mood, sleep interference, and activity restrictions has been used to predict QOL (Everhart et al., 2010). In a gender specific study, a specific asthma management intervention (Clark et al., 2010), the female persons with asthma had a significant increase in QOL.

In recent years, there has been a surge of studies measuring health-related QOL and how QOL is influenced by asthma symptoms (Chen et al., 2007; Kuijer et al., 2007; Lavoie et al., 2008), functioning (Adams et al., 2009; Matheson et al., 2002), health status (Juniper et al., 2004; Metz et al., 2006) and workplace productivity (Joshi et al., 2006). There are several factors that affect the overall QOL such as disease control, symptom distress, and functioning (Geum, 2008; Huang & Wang, 2009). Symptom distress and control of asthma symptoms have been indirectly related to QOL and functioning directly related to QOL(Geum, 2008). In a study of 175 patients, lower health literacy was significantly associated with worse QOL ($p = 0.009$) (Mancuso & Rincon, 2006). Education is important in the management of symptoms in adult with asthma and support QOL (Choi & Cho Chung, 2011).

African American and Management of Adult Asthma

Grammer and colleagues studied a large urban area in Chicago on obesity and asthma morbidity (Grammer et al., 2010). Body mass index (BMI) was used to examine as a predictor of QOL but was not found to be a predictor of QOL. Obese patients were more likely to have Emergency Department/urgent care for asthma than non-obese

subjects. There were 352 subjects in the study with the mean age for the non-obese were 30 and obese mean age was 31.7, majority were female, majority were African American (47.8 non-obese, and 66.5 obese) (Grammer et al., 2010).

Hardie and colleagues conducted a study on ethnic differences in Methacholine responsiveness and word descriptors in various groups. They found that ethnic word differences which are shared by the entire sample indicated a shared language of symptoms. The identified language was a new language of breathlessness that incorporates cultural and ethnic differences and is much needed to address the current disparity in the management of asthma symptoms (Hardie, Liu, Darden, & Gold, 2010).

Hickson and colleagues investigated the prevalence and risk factors associated with asthma of patients in the Jackson Heart Study. There were 4,098 participants in the study who completed a respiratory symptom survey. Only 9.4% reported asthma during their lifetime with 9.8% currently still having asthma. The majority of the sample reporting asthma was female (6.8%). They also found that 60% of the patients who reported current asthma used asthma medications. Decreased serum cortisol, hypertension medication uses, and impairment in lung function were all associated with the population reporting asthma. Even though this study did not collect data to better understand the self-management of asthma within this participants, more insight was gained in variables associated to asthma in this sample (Hickson, Wilhite, Petrini, White, & Burchfiel, 2009).

A study of 318 Latino and African American asthmatic adults was conducted to test the factorial and measurement invariance of the Mini Asthma Quality of Life Questionnaire. They found that the questionnaire needs to be reassessed. Furthermore, the

future research needs to be done with the Mini Asthma Quality of Life to eliminate and/or add new items. The study was important to evaluate the usefulness of the instrument in asthma research. More research is needed to develop reliable and valid questionnaire to measure QOL that is appropriate to the target population of interest (Mora et al., 2009).

Okelo and colleagues (2007) found in their study that African Americans' (13%) were significantly more likely than White patients to have their asthma severity underestimated. In another study, researchers found that in a group of 875 participants with 216 African Americans', with 365 being Puerto Ricans, and 294 being Mexicans, all with asthma, responded differently to bronchodilator therapy and this was important for asthma management (Naqvi et al., 2007).

Sobel and colleagues studied low literacy multimedia tools to educate African Americans' with asthma (Sobel et al., 2009). The multimedia tool was developed by 10 experts and 30 participants were studied using a pre- and post-test evaluation. They found that the knowledge scores were significantly improved after the presentation. They concluded that outcomes were positive feedback for the development of the tool. However, there was a small sample size.

Trochtenberg and colleagues studied differing reports of asthma symptoms in African Americans' and Caucasians and found that there were clinically significant differences between the groups (Trochtenberg, BeLue, Piphus, & Washington, 2008). Trochtenberg and colleagues found that the common symptoms reported in African Americans' were chest tightness, "breathing problems", and wheezing compared to the White patients who reported normal breath sounds. This study provided insight into the

descriptors of the disease by the specific group and could be useful in the care of those individuals (Trochtenberg & BeLue, 2007).

Self and colleagues reviewed 15 years of Emergency Department (ED) visits and hospitalizations of African Americans' and Hispanics with asthma (Self, Chrisman, Mason, & Rumbak, 2005). They found a decrease in ED visits and hospitalizations in their study. They explained that this relationship to a collaborative effort with various HCPs/nurses/physicians to achieve this goal. Another key feature of this finding was the use of early education and written action plans which included the use of corticosteroids. The use of the asthma guidelines within this study had a significant outcome of decreased acute care visits.

Bonner and colleagues (2002) studied families of pediatric asthmatics on an intervention to improve asthma management. This randomized controlled trial study was done on Latino and African American families, 56 families were in the control group, and 63 families were in the intervention group. The intervention group received an intensive three-month pediatric intervention to improve asthma. The results showed significant improvements by the intervention group on measures of knowledge, health beliefs, self-efficacy, self-regulatory skill, adherence, decrease in symptom persistence, activity restriction, and increased prescription of steroids (Bonner et al., 2002). Even though this study does not focus on adult African Americans' with asthma, it supports the efficacy of the asthma self-management program in families.

Blixen and colleagues (2001) studied 28 African Americans' with asthma to evaluate the feasibility of a nurse-run asthma education program for urban African Americans'. The researchers did not find any statistically significant differences from

baseline or changing trends in frequency of asthma symptoms, self-management behaviors, and health care resources use between the intervention and control groups at 3 or 6 months. The researchers did find a greater average increase in asthma QOL and greater average decrease in depression in the intervention compared to the control group. Some feasibility issues reported were shortened length of stay which necessitated conducting the entire self-management training all in the same visit. Other issues were multiple interruptions during the training sessions and retention issues at 3 and 6 months. This study was older than five years but was included in the review because this was a study conducted with the African American population. The results of a small study provide preliminary evidence that research is needed with the African American population to understand this disease and its effects.

African American studies have been limited for the most part with families and caregivers of pediatric asthma. Of the studies reviewed, the sample sizes were small and retention issues were a concern. African Americans' have been studied as related to asthma considerably less than the Caucasian population, even though they are disproportionally affected by the health problem. African American adults with asthma need to be included in research so they can benefit from findings to improve outcomes.

Summary

Adult asthma self-management is a complex and multidimensional variable that is not clearly understood. In recent decades, great strides have been made in adult asthma self-management and variables included in the research include asthma knowledge, health literacy, social support, asthma triggers, asthma self-efficacy, asthma self-management, medication adherence, asthma control, sleep quality, and asthma QOL.

In the personal factors, asthma knowledge has not been found to be sustained overtime and the need for follow-up training is important to enhance long-term self-management. Health literacy has been measured primarily by reading comprehension and has been shown to improve with a tailored education program.

In the environmental factors, social support encompasses emotional, instrumental, informational, appraisal, and social network. Women have been shown to cope better in the social area of self-care than men. Asthma triggers, which are a variety of factors which aggravate and trigger episodes of inflammation that leads to obstruction in asthma, and the most common triggers, have been identified. To date, there has not been a consistent measure of asthma triggers. Asthma self-efficacy has been shown to be the degree of confidence persons have, whereby, they can successfully execute specific behaviors to produce certain outcomes (self-management, PEF, and medication adherence).

Asthma behaviors are conceptualized as self-management, is a concept which denotes where the affected person can identify symptoms and perform simple self-help treatments to relieve those symptoms to avoid expensive medical treatments performed by professionals. Medication adherence may be influenced by health beliefs, psychosocial, and economic factors. Non-adherence of medications is common to asthma patients and often leads to exacerbations. Medication adherence has been measured using a variety of instruments but there is no standard for measurement. Asthma control has been directly related to asthma QOL. Repetitive education and innovative education methods were suggested to maintain pulmonary function and symptom control. Asthma control is one of the most important variables that need to be included in studies about

asthma self-management. Sleep quality has been measured in various ways. Night waking was associated with impaired QOL. Less symptom interference with sleep was associated with better asthma QOL. Poorly controlled asthma patients sleep less and have lower sleep efficiency than better controlled patients. Sleep disturbance and short acting beta agonists were the main contributors to the within-person variation measures of asthma control and asthma QOL.

Asthma QOL could be measured as an outcome of effective self-management in adult asthma management. Even though there have been several studies which examined health related QOL, the methodology and measurements have not moved forward. In recent research, most sample sizes were small and lacked ethnic diversity, therefore the results could not be generalized to the larger population.

Research focused on African Americans' with asthma has for the most part been families/caregivers of pediatric patients with asthma. In the study of adult African Americans', the sample size was small and retention was a major concern concerning feasibility. African Americans' were found to be significantly more likely than Caucasian patients to have their asthma severely underestimated.

The existing studies about self-management of adults with asthma have methodological limitations that limit their usefulness. Most of the sample sizes were small (Durna & Ozcan, 2003; Freeman & Welton, 2005; Ngamvitroj & Kang, 2007) which resulted in the inability to generalize the results to the general population including all ethnic groups. The studies did not have participants from diverse ethnic backgrounds (Choi & Cho Chung, 2011; Durna & Ozcan, 2003). Only a few followed the participants over a long period of more than six months (Bender et. al., 2010; Choi & Cho Chung,

2011; Durna & Ozcan, 2003; Freeman & Welton, 2005; Ngamvitroj & Kang, 2007). Only a few had a theoretical basis (Durna & Ozcan, 2003; Ngamvitroj & Kang, 2007). Research has not addressed the complexity of African American adult asthma self-management thoroughly and the factors which influence it. In general, asthma QOL has been understudied and not included as an outcome variable. To move the science forward, the current study evaluated the impact of asthma knowledge, health literacy, social support, asthma triggers, asthma self-efficacy, asthma self-management, medication adherence, asthma control, and sleeps quality, has on the outcome variable of asthma QOL, specifically in an adult African-American sample.

CHAPTER III

METHODOLOGY

This chapter describes the methods to determine the personal, environmental, self-efficacy and behavioral factors of QOL in African American adults with asthma QOL. The following sections include: research design, setting, methods used to protect human subjects, instruments to measure the study variables, data collection procedures, and data analysis strategies.

Research Design

A descriptive, correlational design was used to examine the influence of personal factors (asthma knowledge and health literacy), environmental factors (social support and asthma triggers), self-efficacy, behaviors (self-management, medication adherence, asthma control, and sleep quality) on QOL of African American adults with asthma. Data were collected data via a seven-day asthma diary and self-report, paper-pencil questionnaires that were completed after the diary. The diary was completed by the participant in the morning and at bedtime for seven days. The questionnaires addressed: asthma knowledge, health literacy, social support, asthma triggers, asthma self-efficacy, asthma self-management, medication adherence, asthma control, sleep quality, and asthma quality of life.

Setting

Participants were recruited from a community college and a regional university in South Georgia, as well as a free public health clinic in rural South Georgia. The community college has an enrollment of 3,800 students with about 3,500 receiving health services from the campus student health center. Recent estimates indicate approximately 5% of those students have been diagnosed with asthma. The regional university has 12,898 students, and of those, 3,949 are African American and also a total 1,677 university faculty and staff with 263 of these individuals being African American. The researcher recruited participants from the community by advertising in local newspapers and using flyers in areas frequented by the targeted population.

Sample

The sample was a nonrandom sample of African American adults with a diagnosis of asthma. The inclusion criteria were: (a) diagnosis of asthma by self-report and taking bronchodilators of greater than 2 times per week (at least mild persistent asthma), (b) able to read, write, and speak English, (c) self-identified as of African American ethnicity, and, (d) ages from 20 to 70. Exclusion criteria were: (a) report of experiencing an acute exacerbation or infection in the last six weeks, and (b) diagnosed with a cognitive deficit problem, or severe psychopathology (e. g., schizophrenia, depression). The participant's medication list was assessed for drugs that would determine a condition that met the exclusion criteria (e. g., Aricept).

Sample Size

Calculations to estimate sample size were conducted by a power analysis calculator at danielsoper.com (Soper, 2011). In general, based on calculations using an

alpha of 0.05, a minimum power of 0.80, a medium effect size of 0.15, and eight predicting variables, a sample size of 108 participants was determined to be adequate to address the study aims. Because of feasibility issues, the enrollment goal was 50 participants, but only 39 participants were recruited.

Instruments

This section describes the psychometric properties all the instruments which were used to measure the selected predictors and outcome variables.

Predictors

Asthma Knowledge - Asthma knowledge measured by using subscales of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ) (Wigal et al., 1993). The KASE-AQ is a 60-item questionnaire with three subscales those being knowledge, attitude, and self-efficacy. The attitude subscale was not used. Asthma knowledge was measured by using 18 items from the knowledge subscale. Two outdated items were dropped that addressed Theophylline and another medication that is no longer used for asthma treatment. The knowledge subscale items addressed the prevalence of asthma, what may set off an asthma attack, anatomy of physiology of the respiratory system, and what happens during an asthma attack. The items on the knowledge subscale had a multiple choice items response with one correct answer. Participants were asked to select the best answer for each knowledge item, with "0" for an incorrect response and a "1" for the correct response resulting in the total scores ranging from 0 to 18. Higher scores represented higher asthma knowledge.

In early development of the KASE-AQ, it was administered to the same 15 persons with asthma on three separate occasions with elimination of 30 items following

the initial administration. After the completion of the third administration of the questionnaire the participants viewed a two-part asthma education and self-management video (Wigal et al., 1993). The knowledge scores increased on average of 5.82 points (Wigal et al., 1993). Items for asthma knowledge, attitudes about asthma and self-efficacy of asthma self-management were generated based on existing asthma education and self-management programs developed by clinical experts (Wigal et al., 1993). Cronbach's alpha coefficients for asthma knowledge subscale are adequate and have ranged from 0.82 to 0.92 in adults (Scherer & Bruce, 2001; Ngamvitroj & Kang 2007, Pink et al., 2009).

Health Literacy - Health literacy was measured with the Short Form of Rapid Estimate of Adult Literacy in Medicine (REALM-SF) (Arozullah et al., 2007). The REALM-SF is a test of pronouncing seven words. Participants are handed a laminated copy of the words and they are told to pronounce every word. The participant receives a point for every correctly pronounced word. The total score ranges from 0 to 7. For the REALM-SF, participants read a list of seven common medical terms. Each correct answer results in a score of one point, and scores are converted to grade reading levels. A score of zero indicates that the person will not be able to read most low literacy materials, while a score of 1 to 3 indicates a fourth to sixth grade reading level, while a score of 4 to 6 reflects a seventh to eighth grade reading level. A perfect score (i.e., 7) indicates a high school level of reading. Those with a score of < 6 are considered at risk for poor literacy. The REALM-SF was developed from the original REALM which was 66 items. There was excellent agreement between the REALM-SF and the original REALM ($r = 0.95$, $p < 0.001$) and ($r = 0.94$, $p < 0.001$) (Arozullah et al., 2007). The REALM-SF has been

used with persons with asthma and other chronic diseases such as diabetes (Kirk et al., 2012a).

Social Support -MOS social support survey - The MOS social support survey was used to measure social support (Sherbourne & Stewart, 1991). The MOS social support survey is a total of 19 items to measure emotional, informational, tangible, affectionate support, and positive social interaction. This survey was developed to assess the perceptions of the availability of different functional aspects of support (Sherbourne & Stewart, 1991). Emotional support contains four items: measuring the expression of positive affect, empathetic understanding, and encouragement feeling expressions. Information support contains four items measuring the provisions of advice, information, guidance or feedback. Tangible support contains four items measuring the offering of material aid or behavioral assistance. Affectionate support contains three items measuring the expressions of love and affection. Positive social interaction contains four items measuring the availability of other persons to do fun things with you. For each item, the respondent was asked to indicate how often someone was available to them if they needed support. Response options ranged from: (1) none of the time to, (5) all of the time. For each scale, simple algebraic sums were computed, and then the raw scale scores were transformed into a scale of 0 to 95. The higher the score, the better the perception of social support. The reliability and validity of the MOS in an American population of adults with chronic illness has been established with the Cronbach alphas 0.91 to 0.97 for all subscales, and validity was established by item-scale correlation and by a correlation with their own scale than with any other social support scale (Schwartz & Gronemann, 2009; Sherbourne & Stewart, 1991; Westaway, Seager, Rheeder, & Van Zly, 2005 .

Asthma Triggers - Asthma triggers was measured by using the Asthma Trigger Inventory (ATI) (Ritz et al., 2006). The ATI a 32-item self-report inventory with six subscales. The participants were asked to indicate for each of the listed triggers how often the trigger was involved when they experience symptoms of asthma. Participants rated each trigger on the inventory from 0 to 4 (0 = never, 1 = rarely, 2 = sometimes, 3 = most of the time, and 4 = always). The inventory has six subscales (psychological, allergens (animals), allergens (pollen), exercise, air pollution/irritants, and infection. A total mean score (range 0 to 4) was obtained and higher scores indicate more triggers. The ATI has adequate internal consistency reliability with Cronbach' s alpha ranging from 0.81 to 0.94 on the subscales in a sample of 247 subjects (Ritz et al., 2006). Content validity was established by asthma experts of three general practitioners and one nurse practitioner (Ritz et al., 2006).

Asthma Diary - A diary will be used to capture participants' daily experience with symptoms and their response to symptoms. The asthma diary (Juniper, O'byrne, Ferrie, King, & Roberts, 2000) is a daily diary that the participant will complete in the morning and at bedtime. The diary will have questions to rate symptoms (awakened at night by symptoms, waking in the morning with symptoms, activity limitation, shortness of breath and wheeze). It will also ask about daily rescue medication use as well as daily PEF. The asthma diary is known as the asthma control diary (ACD) (Juniper et al., 2000) and it was validated by comparing it to the asthma control questionnaire. The diary is scored by adding the responses for each of the daily seven questions for the week and dividing the total score by 42 (the possible score for each response is 0 = good control to 6 = poor control (Juniper et al., 2000).

Asthma Self-efficacy - Asthma self-efficacy was be measured using the Self-efficacy subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ) (Wigal et al., 1993) as described earlier. The Self-efficacy subscale includes items about persons' confidence in managing their asthma. The 20 items asthma self-efficacy subscale which has a 5-point response format (1 to 5), resulting in total scores ranging from 20 to 100 (Wigal et al., 1993). Higher scores indicate more confidence in managing one's asthma. The KASE-AQ development and reliability and validity were discussed earlier in this chapter under the asthma knowledge measure. Cronbach' s alpha coefficients for asthma self-efficacy subscale have ranged from 0.82 to 0.92 (Ngamvitroj & Kang, 2007; Pink et al., 2009; Scherer & Bruce, 2001;) indicating adequate internal consistency.

Asthma Self-management - The behavior of asthma self-management is defined as strategies to manage asthma daily as well as during acute episodes and to enable persons to perform activities of daily living and was measured by the Asthma Self-Management Questionnaire (ASMQ) (Mancuso et al., 2010). The ASMQ is a 16-item, multiple choice questionnaire that measures self-management strategies for asthma. There is only one correct response and total scores range from 0 to 16. The ASMQ measures management using preventive strategies, inhaler use, differences between maintenance and rescue medications, and use of peak flow meters. A score of 0 to 100 is calculated, with higher scores indicating higher knowledge of asthma self-management. The score was obtained by this formula (raw score/16) x 100. Construct validity was established by a significant relationship of the ASMQ to the KASE-AQ (Mancuso et al., 2010) (r = 0.58). Adequate internal consistency reliability has been demonstrated with a Cronbach α of 0.71 and test-

retest reliability was established with a correlations of 0.78 (Mancuso et al., 2010) and the intraclass correlation coefficient was 0.58. Validity was evaluated by comparing the ASMQ with the knowledge subscale of the Knowledge, Attitude, and Self-efficacy Asthma Questionnaire (KASE-AQ). Additionally, the ASMQ has a Flesch-Kincaid reading level of 6.8 (Mancuso et al., 2010).

Medication Adherence - Medication adherence was measured by the Morisky adherence scale which is an 8-item questionnaire, and which is a valid measure of self-reported adherence (Morisky, Green, & Levine, 1986). It has been used to measure medication adherence in other chronic conditions such as hypertension (Haafkens, Beune, Moll van Charante, & Agyemang, 2009; Trivedi, Ayotte, Edelman, & Bosworth, 2008), HIV (Corless et al., 2005; Corless et al., 2009), as well as asthma (Choi, Westermann, Sayles, Mancuso, & Charlson, 2008; Schneider et al., 2007). Total scores range from 0 to 4, where 0 indicates high adherence, and 4 indicates non adherence. Patients responding with a score of "0" are classified as "high adherent"; patients having scores from 1 to 2 are classified as "medium adherent"; and patients having scores greater than 2 (3-8) are classified as "low adherent". This instrument has adequate internal consistency reliability with a Cronbach alpha coefficient of 0.80 and concurrent and predictive validity have been established (Morisky, Ang, Krousel-Wood, & Ward, 2008).

Asthma Control - Asthma control was measured by the Asthma Control Test (ACT) (Quality Metric Incorporated, Lincoln, RI). The ACT is a concise 5-item instrument in which participants recall their asthma control over the past four weeks. The questions are related to how asthma keeps participants from work, school, or home; how many times they were short of breath; how many times did asthma symptoms cause

nighttime waking, how many times did you use your rescue short-acting ß2-agonist use, and also rate their asthma control. The five items were answered on a 5-point Likert-type response scale where 0 refers to "less control" and 5 refers to "completely controlled". The total score was calculated by summing the five items with a possible range from 1 to 25. An ACT score of less than 20 is considered not under control. ACT is a valid and reliable instrument that has been used to measure the control of asthma in both research as well the clinical settings (Thorsteinsdottir et al., 2008). The criterion and convergent validity were adequate with the ICC ranging from 0.89 to 0.94 and the ACT has been correlated with other measures of asthma control (e. g., Asthma Control Questionnaire (Schatz et al., 2006) and is reliable with ICC scores ranging from 0.84 to 0.85 (Nathan et al., 2004; Schatz et al., 2006; Schatz et al., 2007b).

Sleep Quality - Sleep quality was measured by the Modified Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) which details sleep quality and disturbances over the past month. The instrument measures different components of sleep: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each of the components is scored from 0 to 3. The sum of the seven components results in a possible total score from 0 to 21. A total score ≤ 5 is associated with good sleep quality and a total score of > 5 is associated with poor sleep quality (Buysse et al., 1989). The PSQI is valid via a comparison of sleep studies and has adequate reliability with a Cronbach alpha of 0.74 to 0.87 (Junghanns, Broocks, Riemann, & Hohagen, 2002; Bower, Bylsma, Morris, & Rottenberg, 2010; Buysse et al., 1989; Backhaus). The PSQI has been used in the asthma population; however, the reliability coefficient was not

reported (Mastronarde et al., 2008). Content validity was demonstrated with high correlations between PSQI and sleep log data and lower correlations but significant with polysomnography data (Backhaus et al., 2002).

Asthma Quality of Life - Asthma QOL was measured by the Asthma Quality of life Standardized (AQLQ-S) instrument (Juniper, Buist, Cox, Ferrie, & King, 1999). The participants completed the standardized 32-item version of the AQLQ-S with 4 domains: activity limitations (11 items), symptoms (12 items), emotional function (5 items), and exposure to environmental stimuli (4 items). The AQLQ-S items have different responses on a 7-point Likert scale: items range from "all of the time (1)" to "none of the time (7)", other responses are from "totally limited (1)", or "to not limited at all (7)". For all items, a lower score reflects more impairment. Thus, higher scores of 6 to 7 indicate fewer symptoms, fewer activity limitations, and less emotional dysfunction than lower scores. The AQLQ-S was validated with the original AQLQ (Juniper et al., 2005). The AQLQ-S has adequate internal consistency reliability with a Cronbach' s alpha of 0.78 to 0.90 (Everhart et al., 2010; Grammatopoulou, Skordilis, Koutsouki, & Baltopoulos, 2008; Lavoie, Joseph, & Bacon, 2009).

Participant characteristics included demographic and clinical characteristics and were obtained using an investigator developed questionnaire. The participants' age, gender, race, educational level, work status were collected to describe the characteristics of the sample as well as other clinical characteristics related to their health. Clinical characteristics such as length of time diagnosed with asthma, asthma and other medications, other major illnesses, smoking history, usage of peak flow meter, and number of visits to an emergency department for asthma in the past year were obtained.

Data Collection Procedures

Approval of the study protocol was obtained from the Georgia State University Institutional Review Board (IRB), Valdosta State University IRB, and any clinical recruitment site that had an IRB. The researcher obtained written documentation to collect data from health clinics, college and university student health centers. The student principal investigator (PI) met with the contact person(s) from each site where recruitment took place. The staff from the various agencies received a copy of the research packet with a cover letter explaining the purpose of the study and criteria for identification and recruitment of potential participants. The researcher used flyers, newspaper advertisements, email advertisements, and a referral process to recruit participants into the study. The process differed slightly, if the potential participant was met face to face by the student PI or if the participant contacted the student PI by telephone or email. Regardless of the first contact, once a person indicates interest in the study, the study was explained by the student PI and the person was screened for eligibility criteria. If the person was eligible and interested in participating, written informed consent was obtained. A time to meet and obtain written informed consent and to respond to the study questionnaires was set at the convenience of participant. After completion of the questionnaires, the participant received a ten dollar department store gift card and a packet of information about asthma management from the National Asthma Control Initiative developed by the National Heart Lung and Blood Institute (NHLBI, 2007).

Protection of Human Subjects

Before recruiting participants, the study protocol was approved by IRB's at Georgia State University, Valdosta State University, and written permission to recruit from other agencies. The study protocol included a statement of problem, procedures, risks and discomforts, benefits, alternatives, time and duration of study, compensation, and a statement of confidentiality. The participants were assured that participation was voluntary and participants may withdraw from the study at any time. The potential participants were assured that participation in the study would not have any influence on their medical care. Written informed consent was obtained from each potential participant before enrolling in the study. The participants did not incur any costs except their time to complete questionnaires.

No foreseeable risks to participate in this study were identified other than the possibility of fatigue. If participants expressed fatigue, they were to receive a respite while completing the questionnaires by taking a break. The burden of completing the questionnaires was assessed by the first ten participants to complete the questionnaires including the diary. A one-item Likert-type scale was used to determine whether completing the questionnaires was 0 (not burdensome) to 5 (too burdensome to complete). The plan was if the participant becomes distressed after discussing his/her illness, a referral was to be made to their local health care provider. No participants expressed any distress to the student PI.

Unique identification codes were assigned to each participant record in order to maintain confidentiality. The research team had access to the roster of participant names, identification numbers, and an acknowledgement of receiving the incentive gift card. The

participant roster, identification numbers, and acknowledgement of receiving the incentive gift card were kept in a locked file cabinet separately from the data. The participant roster, identification numbers, and acknowledgement of receiving the incentive gift card, as well as all data, will be destroyed at the time specified by the IRB.

Data Analysis

Data from completed questionnaires was entered by the researcher into SPSS 21.0 Graduate Pack for analysis and double checked for completeness and accuracy. Preliminary data analysis included standard data cleaning, distributions and patterns of missing data examination, determination of reliability of scaled instruments, and any problems that are identified were addressed. Descriptive statistics were examined for participant demographic and clinical characteristics and major study variables. Multiple linear regressions were used to test the hypotheses.

Frequency distributions were used to examine for possible coding and data entry errors. Reliability of each instrument were examined with Cronbach' s alpha (as appropriate). Each interval/ratio level variable was examined for normal distribution to determine whether parametric or non-parametric testing is appropriate for missing data. For single items missing from multiple-item questionnaires, subject means replacement was used. An alpha of $p < 0.05$ (two-tailed) was used to determine statistical significance. Pearson Product Moment Correlations for main variables of the study and participant characteristics were examined for potential covariates. Because of the small sample size, correlations of participant characteristics and theoretical variables with asthma QOL were examined and only those significant at .20 level were included in the model. The assumptions of multiple linear regressions were tested and verified and if any

assumptions were not met, decisions were made about proceeding with the analysis. Descriptive statistics were used to describe the sample.

Hypothesis One

Hypothesis One (Higher asthma knowledge [KASE-AQ-Knowledge] and higher health literacy [STOFHL] higher perceived social support [MOS] lower perceived asthma triggers [ATI] will all contribute significant variance to better self-efficacy [KASE-AQ-Self-efficacy] of adult asthma management). Asthma knowledge and health literacy were entered in Step 1 and perceived social support and asthma triggers were entered in Step 2. The change in R^2 at each step will be examined for statistical significance. In addition the total $R^2$for the full model will be evaluated. In the final model, those variables that are statistically significant will be identified by the significance of the Beta. All variables in this hypothesis are continuous but the results may not be normally distributed.

Hypothesis Two

Hypothesis Two (Higher self-efficacy [KASE-AQ-Self-efficacy] will be associated with better asthma self-management [ASMQ], better medication adherence [Morisky], and better asthma control [ACQ]). All variables in this hypothesis are continuous. The Pearson Product Moment Correlation coefficient (*r*) was used to interpret the strength and direction of the relationship among variables (asthma self-management, medication adherence, asthma control, and self-efficacy).

Research Questions

Research question one - Using multiple regression determine which variables (personal factors-asthma knowledge [KASE-AQ-Knowledge], health literacy [STOFHL], environmental factors-perceived social support [MOS], perceived asthma trigger [ATI],

asthma self-efficacy [KASE-AQ-Self-efficacy], behaviors-asthma Self-Management [ASMQ], asthma medication adherence [Morisky], and asthma control [ACQ]), contribute the most variance to the outcome variable, Asthma Quality of Life [HRQOL].

Multiple linear regressions will be used to test research question one. Asthma knowledge [KASE-AQ-Knowledge], health literacy [STOFHL], environmental factors-perceived social support [SSQ], perceived asthma trigger [ATI], asthma self-efficacy [KASE-AQ-Self-efficacy], behaviors-asthma Self-Management [ASMQ], asthma medication adherence [Morisky], and asthma control [ACQ] was entered simultaneously into a regression model with Asthma Quality of Life (HRQOL) as the dependent variable.

All variables in this hypothesis were continuous. Asthma QOL was the dependent variable.

Research question two - What are the relationships among daily asthma symptoms (diary), sleep quality and asthma QOL? All variables in this hypothesis were continuous. The Pearson Product Moment Correlation coefficient (r) was used to interpret the strength and direction of the relationship among variables (sleep quality and asthma QOL).

Research question three - Does sleep quality contribute significantly to Asthma Quality of Life more than personal factors (asthma knowledge, health literacy), environmentally factors (perceived social support and asthma triggers), asthma self-efficacy, behaviors (asthma self-management, medication adherence, asthma control)? Sleep quality was entered in Step 1 and asthma knowledge, health literacy, perceived social support, asthma triggers, asthma self-efficacy, asthma self-management, medication adherence, and asthma control was entered in Step 2. The change in R^2 at

each step was examined for statistical significance. In addition the total R^2 for the full model was evaluated. In the final model, those variables which are statistically significant were identified by the significance of the Beta. All variables in this hypothesis are continuous but the results may not be normally distributed.

Research question four - What are the common symptoms experienced by adult African Americans' with asthma and their responses to the symptoms? Descriptive statistics will be used to describe their symptoms from the ACD and The Pearson Product Moment Correlation coefficient (*r*) was used to interpret the strength and direction of the relationship among variables (ACD symptoms and responses).

Summary

The methodology was described in which the relationships of variables were tested. The correlational design of the study was described. The setting, sample, and estimation of sample size were described. The instruments to collect data on: asthma knowledge, health literacy, social support, asthma triggers, asthma self-management, medication adherence, asthma control, sleep quality, asthma quality of life, and an asthma diary were discussed with scoring and psychometrics documented. Procedures and protection of human subjects were discussed. Finally, data analysis was discussed to evaluate the hypotheses and research questions for this study.

CHAPTER IV

RESULTS

The results of this study of self-management behaviors of adult African Americans' with asthma are presented in this chapter. A description of sample characteristics, findings from the questionnaires and diaries, and hypothesis testing and research questions are reported.

Adult African Americans' with asthma ages 18 to 68 were recruited from a regional university, a community college, and the communities of rural South Georgia between June 2012 to April 2013 and screened for eligibility criteria. Details of screening and response rates are in Figure 2. Of the potential participants screened, 41 met eligibility criteria. Two did not complete the study and were lost to follow-up, for an attrition rate of 4.9%.

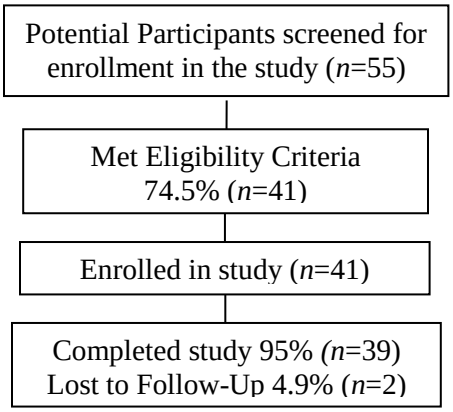


Figure 2. *Response rate for adult African American asthmatics participating in a study.*

Sample Characteristics

Table 4 is a summary of the descriptive statistics for the study participants in this study. The majority of the participants were middle-aged, with ages ranging from 18 to 68, female, and insured. An equal proportion of the participants were single or married. The majority of the participants had graduated from college or had attended some college, reported an income of less than $30,000.

Table 4

Adult African American Asthmatics Characteristics (N=39)

Characteristics	*M*	(*SD*)	*n*	%
Age	55.9	(7.99)		
Gender				
Male			14	(35.9)
Female			25	(64.1)
Marital Status				
Single			16	(41.0)
Married			16	(41.0)
Divorced/Widowed/Long-Term			7	(18.0)
Relationship				
Education				
Less than High School			11	(28.2)
High School Graduate			6	(15.4)
Some College			11	(28.2)
College Graduate/Post Graduate			11	(28.2)
Study				
Income				
Less than $10,001			11	(28.2)
$10,001 to #30,000			12	(30.8)
$30,001 to $50,000			7	(17.9)
Greater than $50,000			9	(23.1)
Insurance				
Yes			23	(59.0)
No			16	(41.0)

Sample Health Characteristics

Health characteristics of the sample are in Table 5. The vast majority (87.2%) of the participants reported that they did not currently smoke; however, one third reported a history of smoking. Although more than half had received asthma education, only 28.2% reported that they had a peak flow meter. Most participants indicated receiving asthma education from a doctor and the average number of years since receiving asthma education was 4.03 (*SD* = 7.38). Specific details about the type of asthma education and the reason for not having a peak flow meter were not collected. More than half of the sample (61.5%) had one or two other medical conditions and almost one third took one additional medication other than bronchodilators. Almost one-third of the sample (30.8%) reported not exercising at all. In Table 6, the descriptive data of the asthma diary are presented. A more detailed and thorough discussion of the variables and characteristics will follow later in the chapter.

Table 5

Adult African American Asthmatics Health Characteristics (N = 39)

Health Characteristics	*M*	*(SD)*	*n*	%
Currently Smokes				
Yes			5	(12.8)
No			34	(87.2)
Years of Smoking	5.19	(1.67)		
Years of Smoking for Current Smokers	24.0	(13.42)		
History of Smoking				
Yes			13	
No			26	

(Table 5 Continues)

(Table 5 Continued)

Health Characteristics	*M*	*(SD)*	*n*	%
Packs per day for current smokers				
Half pack			4	(80)
1 pack			1	(20)
Has a Peak Flow meter				
Yes			11	(28.2)
No			28	(71.8)
Hours of sleep needed to feel refreshed	8.02	(1.77)		
Years of having asthma	22.11	(18.28)		
Other Medical Conditions				
1 other medical conditions			16	(41.0)
2 other medical conditions			4	(10.3)
3 or more medical conditions			4	(10.3)
No other conditions reported			15	(38.5)
Current Medications				
Only reported bronchodilators			19	(48.7)
1 additional medication			12	(30.8)
2 additional medications			5	(12.8)
3 or more additional medications			3	(7.7)
Exercise Frequency	2.79	(1.52)		
None			12	(30.8)
1 time per week			5	(12.8)
2 times per week			9	(23.1)
3 times per week			5	(12.8)
Greater than 3 times per week			8	(20.5)
Received Asthma Education				
Yes			26	(66.7)
No			13	(33.3)
Asthma Education in years	4.03	(7.38)		
Where did you receive our asthma education from?				
Doctor			18	(46.2)
Nurse			6	(15.4)
Respiratory Therapist			1	(2.6)
Other/class			1	(2.6)
BMI	34.06	(10.78)		

Table 6

Descriptive Data from Seven Day Asthma Diary

Asthma Diary Symptoms/Components	*M*	*(SD)*	Observed Range
Questions for AM			
Times woken at night by asthma	.86	(.84)	0-2.86
Symptoms when you woke up	1.06	(.90)	0-3.14
Questions for PM			
How limited were your activities were because of your asthma?	1.30	(1.05)	0-5
Amount of shortness of breath today?	1.48	(1.15)	0-5.29
How much time did you wheeze today?	1.19	(0.98)	0-3.29
Total number of puff(s) of bronchodilator taken in the past 24hours	1.97	(1.91)	0-8.29

Note: Times woken - 0 (not woken at all) - 6 (awake all night); Symptoms for AM - 0 (no symptom - 6 (very severe symptoms); Limitations in activities - 0 (not limited at all) – 6 (totally limited); Amount of Shortness of breath - 0 (none) – 6 (a very great deal); Wheeze - 0 (not at all) - 6 (all of the time).

Descriptive Statistics for Major Study Variables

Pre-analysis data screening was conducted prior to statistical analysis and included screening for errors of data entry, outliers, normal distribution, multicollinearity, and missing data. Normality was assessed for all interval/ratio level variables by analyzing skewness, kurtosis, histograms, and box plots as outlined by Munro (2005) and Field (2005). The Shapiro-Wilk and Kilmogorov-Smirnov was conducted to check normality on all theoretical variables. All variables were normally distributed with the exception of the asthma knowledge, social support, medication adherence, asthma diary, sleep quality and the health literacy instruments.

For the REALM-SF (n = 31) which measured health literacy, 79.5% of participants recognized all the words successfully resulting in insufficient variance to use that variable in further analysis. Because there was more variability in the variable, formal educational level, this variable was used for analysis as a proxy for health literacy.

Initially, the asthma knowledge instrument had a low reliability coefficient; the proportions of the sample responding correctly and incorrectly for all items from the questionnaire are reported for descriptive purposes (Table 7). To improve the reliability of the knowledge scale, the item to total correlations of the scale were reviewed and items with less than .20 correlations were removed systematically until the Cronbach' s alpha was improved to .67. A total of 7 items were removed from the knowledge scale resulting in a Revised Knowledge scale of 11 items. This revised version was used to compute a total score that was used in remaining analyses.

Table 7

Responses to Asthma Knowledge Questionnaire

Knowledge Question Topic	Correct % (*n*)	Incorrect % (*n*)
Recognize asthma symptoms	95.0 (37)	5.0 (2)
Components of the respiratory system	92.3 (36)	7.7 (3)
Activities that make my asthma attacks worse*	87.2 (34)	12.8 (5)
Peak flow meter as objective measure of lung function*	79.5 (31)	20.5 (8)
Function of lungs*	71.8 (28)	28.2 (11)
Ways to prevent asthma attacks*	64.1 (25)	35.9 (14)
They can recognize physiological changes before asthma attack*	53.8 (21)	46.2 (18)
Factors to readjust for treatment of acute attack	48.7 (19)	51.3 (20)
Asthma as a physical illness	46.2 (18)	53.8 (21)
Prevalence of asthma in the United States	43.6 (17)	56.4 (22)
Oxygen exchange*	41.0 (16)	59.0 (23)
"ABC's" of treating an acute attack*	38.5 (15)	61.5 (24)
Recognizing false statements about asthma*	35.9 (14)	64.1 (25)
Air needs to be warmed and humidified before reaching lungs*	33.3 (13)	66.7 (26)
Not a common asthma trigger*	33.3 (13)	66.7 (26)
Cause of exercise-induced asthma	25.6 (10)	74.4 (29)
Early warning signs of impending attack	20.5 (8)	79.5 (31)
Causes of an asthma attack*	7.7 (3)	92.3 (36)

Note: *Indicates item retained for the revised knowledge scale.

Concepts of the Social Cognitive Theory Used with

Adult African American Asthmatic Self-Management

Descriptive statistics are presented for all instruments that measured main theoretical constructs, including personal factors (asthma knowledge and health literacy), environmental factors (social support and asthma triggers), asthma self efficacy, behaviors (asthma self-management, medication adherence, asthma control, and sleep quality), and asthma quality of life. All instruments had acceptable Cronbach' s alpha (or Kuder-Richardson for dichotomous measures) coefficients (Table 8) except for the asthma knowledge questionnaire as previously described. The sleep quality subscales scores will be discussed later. For the Asthma Self-Management instrument, 43.6 % of participants scored below the midpoint of scale indicating they had poor self-management. Scores of > 2 on the Morisky Medication Adherence measure indicate poor adherence and 64.1% of participants scored above the cut off. Most participants (79.5%) scored below the established cut off of 20 on the Asthma Control Scale indicating their asthma was not well controlled. For sleep quality measured by PSQI a score of > 5 indicates poor sleep quality and 66.7% of participants scored above the cut off on this scale (see Table 8).

Table 8

Descriptive Statistics and Cronbach' s Alpha Coefficient for Theoretical Variables

Variable	*M*	*(SD)*	Observed Range	Possible Range	Cut-Off Score	% Meeting Cut-Off Score	Cronbach' s Alpha
Revised Asthma Knowledge (KASE)	5.46	(2.40)	1-10	0-11			.67
Health Literacy (REALM-SF)	6.54	(2.19)	0-7	0-7			.86
Social Support(MOS)	72.93	(22.01)	23.16-100	0-100			.98
Asthma Self Efficacy (ASE)	75.46	(12.34)	46-98	0-100			.89
Asthma Self-Management (ASM)	55.28	(21.72)	6.25-93.75	0-100			.75
Medication Adherence (Morisky)	3.69	(2.19)	1-8	0-8	>2	64.1	.69
Asthma Control (ACT)	16.10	(4.29)	6-25	5-25	<20	79.5	.85
Sleep Quality (PSQI)	8.53	(4.95)	2-21	0-21	>5	66.7	.87
Asthma Quality of Life (AQOL-S)	4.54	(1.27)	1.97-6.91	1-7	>6	20.5	.97

Note: Asthma Knowledge from the Knowledge Attitudes Asthma self-efficacy Questionnaire(KASE); Health Literacy= REALM-SF (Short Form); Social Support=Medical Outcomes Study (MOS) of Social Support; Asthma Triggers=Asthma trigger inventory; Asthma Self Efficacy= Asthma self-efficacy from the Knowledge Attitudes Asthma self-efficacy Questionnaire (KASE); Asthma Self-Management=Asthma Self-Management Questionnaire; Medication Adherence=Morisky Medication Adherence instrument; Asthma Control=Asthma Control Test; Sleep Quality=Pittsburgh Sleep Quality Index, Asthma Quality of Life=Asthma Quality of Life Questionnaire Standard (AQOL-S).

Personal Factors in Asthma Management

Asthma knowledge and health literacy were the personal factors examined in this study. Participants on average responded correctly to about half the asthma knowledge items. As reported earlier, the health literacy score were high (M = 6.54, SD = 2.19) with the majority (79.5%) recognizing and pronouncing the words correctly. This indicated

that most scored at the high school level and could understand most patient education information and materials.

Environmental Factors in Asthma Management

Environmental factors measured were asthma triggers and social support. An asthma diary was also completed in which the participants answered questions about their symptoms as well as documented their peak expiratory flow rate (PEFR). The diary will be discussed in detail later with research question four.

The Asthma trigger inventory asked participants to identify their top six triggers. The proportion of participants experiencing different asthma triggers are detailed in Table 9. Common triggers (≥ 50% of sample reporting) were several types of pollen, upper respiratory problems, running, cats, and house dust. The triggers that were not as common among the participants were being angry, feeling alone, exhaust fumes, bicycle riding, stress from home, certain intense odors, feeling tense, climbing flights of stairs, depressed mood, smell of paint, sport activities, perfumes, arguments with people, being excited, intense worries, feeling unhappy, animal hair, overexertion, viruses, feeling weak, pollen from weeds, feathers from birds, and sprays. On average, participants reported high levels of social support as measured on Medical Outcomes Study (MOS) Social Support Survey (Table 8).

Table 9

Asthma Triggers Experienced by 50% or More of the Participants

Asthma Trigger	%	*(n)*
Pollen from trees	71.8	(28)
House dust	64.1	(25)
Pollen from grass	59.0	(23)
Cats	56.4	(22)
Cold	53.9	(21)
Cigarette smoke	53.9	(21)
Running	53.9	(21)
Flu	53.9	(21)
Pollen from weeds	51.2	(20)
Sinus Problems	51.2	(20)

Note: Table of all asthma triggers are in Appendix J.

Self-efficacy in Asthma Management

Overall confidence in managing their asthma (asthma self-efficacy) was high (M = 75.46, SD = 12.34) out of possible total score of 100. Observed asthma self-efficacy scores ranged from 48 to 98 indicating generally the participants felt confident in their ability to manage their asthma.

Asthma Management Behaviors

Asthma management behaviors measured were asthma self-management, medication adherence, asthma control, and sleep quality. On average the overall self-

management score was slightly above the midpoint at 55.28 (*SD* = 21.72) of the scale (possible score of 0-100). Areas of self-management that were incorrectly identified by a majority of the sample were related to ways to prevent asthma flare-ups (77%), taking the prescribed inhalers (67%), the correct way to use a peak expiratory flow rate (PEFR) (64%), having asthma and being able to exercise (59%), and the purpose of rescue medications (51%).

Medication adherence (Morisky Medication Adherence Scale) had a mean score of 3.69 (*SD* = 2.19) which is above the cut-off score > 2.0 indicating low adherence. On asthma control (ACT) for the past week, the participants had an average score (*M* = 16.10, *SD* = 4.29) falling below the recommended cut-off score of 20 indicating uncontrolled asthma (Table 9). Descriptive statistics for the individual items of the ACT scale are in Table 10.

Table 10

Asthma Control

	M	*(SD)*	Observed Range
Total Asthma Control Test (ACT)	16.10	(4.29)	6-25
Individual Questions			
How much time did your asthma keep you from getting much done at work, school, or at home?	3.51	(.82)	2-5
How often have you had shortness of breath?	3.0	(1.21)	1-5
How often did your asthma symptoms wake you up at night or earlier than usual in the morning?	3.36	(1.20)	1-5
How often have you you used your rescue medication?	2.97	(1.20)	1-5
How would you rate your asthma control?	3.26	(.91)	1-5

Note: Individual items had a possible range of 1(not controlled at all)-5(completely controlled).

Sleep quality (PSQI) results are in Table 11.On average, participants reported poor overall sleep quality (*M* = 8.53, *SD* = 4.95) indicated by the average total scale score greater than the cut-off point of 5. An Almost 40% reported getting less than 7 hours of sleep in the past month. The vast majority 87.1% (*n* = 34) reported taking more than 15 minutes to fall asleep indicating sleep latency as a problem. More than half (*n* = 23) reported a problem with daytime function and sleepiness. The proportion of participants that rated their sleep as less than 5 (associated with good sleep quality) was 33.3% (*n* = 13). Finally, over half (51.2%, *n* = 20) reported not taking any medicine to help with their sleep. A healthy individual should have a minimum of 85% sleep efficacy with an idea of above 90%. The participants had an average sleep efficiency (SE) score of .77 (*SD*=1.06) with a majority scored of 1 (74-84% SE) indicating poor sleep efficacy. A score of 3 indicated less than 65% sleep efficiency.

Table 11

Various Dimensions of Sleep Quality

Subscales	M	*(SD)*	Observed Range	Possible ange	Cronbach's Alpha
Total Sleep Quality	8.53	(4.95)	2-21	0-21	.87
Duration of sleep	.59	(.91)	0-3	0-3	
Sleep Disturbance	1.79	(.80)	0-3	0-3	
Sleep Latency	1.46	(.94)	0-3	0-3	
Day Dysfunction due to sleepiness	1.59	(.99)	0-3	0-3	
Sleep Efficiency	.77	(1.06)	0-3	0-3	
Overall Sleep Quality	1.33	(.89)	0-3	0-3	
Need Meds to Sleep	1.00	(1.21)	0-3	0-3	

Relationships among Participant Characteristics and Theoretical Variables

Correlations (Pearson & Spearman Rho) were conducted among the participant characteristics and theoretical variables and the results are in Table 12, and those with statistically significant associations are highlighted below. Smoking was associated with more asthma triggers. Being insured was associated with higher education, more asthma knowledge, better asthma self-management, and poorer sleep quality. Higher income was associated with higher educational level and higher scores on the asthma knowledge scale. Participants that exercised had better asthma self-management, better asthma control, better sleep quality, and better asthma QOL. Being married was associated with less education. The participants that had lower BMI reported better asthma QOL.

Table 12

Relationship among Adult African American Asthmatic Characteristics and Theoretical Predictor Variables

	EDU	[a]KNOW	ATI	[a]MOS	SE	ASM	[a]Morisky	ACT	[a]PSQI	AQLQ
Age	.05	.03	.30	.03	-.16	.03	-.08	-.23	.30	.11
Gender	.04	.11	.04	-.03	.08	-.13	.04	-.23	.18	.27
Smoke	-.12	.14	.36*	-.06	-.12	-.10	-.07	-.30	.11	.11
Insurance	.54**	.57**	-.11	.14	.09	.40*	.25	-.15	.33*	.07
Income	.63**	.39*	-.16	.30	.21	.23	.19	.17	-.05	-.15
Exercise	.27	.09	.03	.24	.24	.33*	-.18	.40*	-.44*	-.35*
Marital Status	.36*	.22	-.08	-.03	-.17	-.07	.08	-.18	.12	-.08
BMI	-.15	-.25	.11	-.09	-.01	-.09	-.23	.01	-.08	-.32*

Note: *$p < .05$, ** $p < 0.01$, two tailed, [a]Spearman's rho reported. EDU-Education, KNOW=Asthma Knowledge, ATI=Asthma Trigger Inventory, MOS= Social Support, SE=Asthma Self Efficacy, ASM=Asthma Self-Management, Morisky=Medication Adherence, ACT=Asthma Control Test, PSQI=Sleep Quality, AQLQ=Asthma Quality of Life.

Relationships among Asthma Theoretical Variables

See Table 13 for the correlations among the asthma theoretical variables. Higher education was associated with better asthma self-efficacy, asthma self-management, and asthma QOL. Better asthma knowledge was associated with better asthma self-management. Fewer asthma triggers were associated with better asthma self-efficacy, fewer asthma symptoms as reported in the asthma diary, more asthma control, and better asthma QOL. More social support was related to better asthma self-efficacy, better asthma self-management, and better asthma QOL. Better asthma self-efficacy was associated with better asthma self-management, fewer asthma symptoms as reported in the asthma diary, better asthma control, better sleep quality, and better asthma QOL. Better asthma self-management was associated with better asthma QOL. The more asthma symptoms reported in the morning and bedtime diary were associated with worse asthma control, poorer asthma self-efficacy, worse medication adherence, poorer sleep quality, and worse asthma QOL. Better asthma control was associated with better sleep quality and better asthma QOL. Finally, better sleep quality was associated with better asthma QOL.

For the purposes of testing of the hypotheses and answering the research question, only the theoretical variables that are correlated $\geq .20$ level or higher were included in the regression models. After the initial regression was conducted nonsignificant variables were removed and the analysis repeated.

Table 13

Relationships among Theoretical Predicator Variables

	EDU	[a]KNOW	ATI	[a]MOS	SE	ASM	[a]Morisky	[a]AM Diary	[a]PM Diary	ACT	[a]PSQI	AQLQ
EDU												
[a]KNOW	.56**											
ATI	-.25	.09										
[a]MOS	.31	.09	.08									
SE	.32*	.12	-.19	.47**								
ASM	.48**	.57**	.01	.34*	.49**							
[a]Morisky	.17	.16	-.40*	-.25	-.24	.11						
[a]AM Diary	-.09	.08	.41**	-.26	-.49**	-.15	-.10					
[a]PM Diary	-.19	.06	.39*	-.30	-.48**	-.16	-.20					
ACT	.04	-.08	-.33*	.30	.53**	.18	-.11	-.73**	-.67**			
[a]PSQI	.06	.23	.22	-.03	-.35*	.07	.15	.53**	.59**	-.50**		
AQLQ	.36*	.16	-.38*	.36*	.59**	.44**	.02	-.65**	-.73**	.72**	-.51**	

Note: *Correlation is significant at the 0.05 level (2-tailed) and ** is significant at the 0.01 level (2-tailed). [a]=Spearman Rho, EDU-Education, KNOW=Asthma Knowledge, ATI=Asthma Trigger Inventory, MOS= Social Support, SE=Asthma Self Efficacy, ASM=Asthma Self-Management, Morisky=Medication Adherence, AM Diary=Asthma Morning Diary, PM Diary= Asthma Bedtime Diary, ACT=Asthma Control Test, PSQI=Sleep Quality, AQLQ=Asthma Quality of Life.

Hypothesis Testing

Hypothesis 1: *(Higher asthma knowledge [KASE-AQ-Knowledge] and higher health literacy [REALM-SF] higher perceived social support [MOS] lower perceived asthma triggers [ATI] will all contribute significant variance to better asthma self-efficacy [KASE-AQ- Asthma self-efficacy] of adult asthma management).*

Hierarchical multiple regression was conducted to answer hypothesis 1. Asthma knowledge and asthma triggers were not correlated with asthma self-efficacy at the .20 level (Table 14) and were not included in the regression. Exercise and income were entered with education level in the first step and perceived social support was entered in the second step. Neither exercise nor income was significant predictors of asthma self-efficacy. Therefore, exercise and income variables were removed from the model.

The results of the final regression analysis are in Table 14. Education was entered in the first step and perceived social support was entered in the second step. The full model was significant ($F(2, 38) = 5.65$, $p = .02$) and accounted for 24% of the variance of asthma self-efficacy. Only social support was an independent predictor of asthma self-efficacy, with higher social support associated with more confidence in asthma management (self-efficacy). Education was not significant in the final model; therefore, this hypothesis was partially supported.

Table 14

Summary of Hierarchal Regression Analysis for the Variables Predicting Asthma Self-efficacy (N=39)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
Education	3.34	1.62	.32*	2.20	1.58	.21
Social Support				.22	.09	.38*
R2 Change	.10			.14		
R2	.10			.24		
Adjusted R2	.08			.20		
F	4.25			5.65		
(*p* value model)	*p* = .05			*p* = .01		

Note: $p < .05$.

Hypothesis 2: *(Higher asthma self-efficacy [KASE-AQ-Asthma self-efficacy] will be associated with better asthma self-management [ASMQ], better medication adherence [Morisky], and better asthma control [ACQ]).*

The hypothesis was tested by conducting a Pearson Product Correlation (Table 13). Higher asthma self-efficacy was statistically significantly associated with better asthma self-management and better asthma control (ACQ) ($p < .01$). Medication adherence was not significantly related to self-efficacy; however, the relationship was in the expected direction of higher medication adherence with better asthma self-efficacy. Therefore, the hypothesis was partially supported.

Research Questions

Research question one: *Using multiple regression to determine which variables (personal factors-asthma knowledge [KASE-AQ-Knowledge], health literacy [REALM-SF], environmental factors-perceived social support [MOS], perceived asthma trigger [ATI], asthma self-efficacy [KASE-AQ-Asthma self-efficacy], behaviors-asthma Self-Management [ASM], asthma medication adherence [Morisky], and asthma control [ACT]), contribute the most variance to the outcome variable, Asthma Quality of Life [AQLQ]*.

Hierarchical multiple regression was conducted to answer the research question. Exercise, BMI, gender, income, smoking, and age all were correlated with the dependent variable of AQLQ at ≥ .20 (Table 12). These were entered into a regression model with AQLQ as the dependent variable. Only BMI was significant and included in the subsequent model. The independent variables (education, social support, asthma trigger, asthma self efficacy, asthma self-management, and asthma control) were entered into the regression simultaneously with the relevant demographic variables from the first regression.

Only BMI and asthma control were significant in the full model, thus, the nonsignificant variables were removed and the final model is presented in Table 15. The final model was significant ($F(2, 38) = 29.80$, $p = .001$) and accounted for 62.3% of the variance of asthma control in asthma quality of life. Asthma control and BMI were independent predictors in asthma QOL. Better asthma control and lower BMI were associated with better asthma QOL.

Table 15

Summary of the Hierarchical Regression Model to Predict Asthma Quality of Life (AQLQ) (N = 39)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
BMI	-0.04	.02	-.32*	-.04	.01	-.32*
Asthma Control				.22		
R2 Change	.10			.52		
R2	.10			.62		
Adjusted R2	.08			.60		
F	4.25			29.80		
(*p* value model)	*p* = .05			*p* = .01		

Note: *p <.01, **p <.001 two tailed.

Because of the high correlation between the asthma control (ACT) measure and the asthma QOL measure of >.70 and the large change in the F-statistic in the regression when ACT was added, an alternative approach to address the overlap of measures was conducted. The five items of the ACT were correlated with the total score of the AQOL. All of the five items of the ACT were highly correlated with the AQOL indicating redundancy in the items except for one item about shortness of breath, which was correlated at (r = .28, p = .09). This single item was used in rerunning the regression model with BMI. The results of that regression are in Table 16.

Table 16

Summary of the Hierarchical Regression Model to Predict Asthma Quality of Life (AQLQ with Single Item from ACT) (N =39)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
BMI	-0.04	.02	-.32*	-.05	.01	-.38*
Single Item-Asthma Control Control				.36	.16	.35*
R2 Change	.10			.12		
R2	.10			.22		
Adjusted R2	.08			.18		
F	4.25			5.07		
(*p* value model)	*p* = .05			*p* = .01		

*Note:***p* <.01, ***p* <.001 two tailed.

The results of this approach were similar to the original regression with both BMI and the single ACT item remaining as independent predictors of asthma QOL. Having a lower BMI and less shortness of breath (better control) were associated with better asthma QOL.

Research question two -*What are the relationships among daily asthma symptoms (diary), sleep quality, and asthma QOL?*

Table 17 summarizes the relationships among asthma symptoms from the asthma morning and bedtime diary, sleep quality, and asthma QOL. Morning and bedtime diary symptoms were averaged over a seven day period. Better sleep quality and better asthma

QOL were significantly associated with fewer asthma symptoms and more asthma control. Morning and bedtime asthma diary symptom scores were significantly associated with sleep quality and asthma QOL.

Table 17

Relationships among Asthma Symptoms Using the Asthma Daily Diary, Sleep Quality, and Asthma QOL

	Symptoms/Control Morning Diary	Symptoms/Control Bedtime Diary	[a]Sleep Quality	Asthma QOL
Symptom/Control Morning Diary				
Symptom/Control Bedtime Diary	.83**			
[a]Sleep Quality	.53**	.59**		
Asthma QOL	-.63**	-.68**	-.51**	

Note: ** Correlation is significant at the 0.01 level (2-tailed), and [a] = Spearman Rho.

Research question three-*Does sleep quality contribute significantly to Asthma Quality of Life more than personal factors (asthma knowledge, health literacy), environmentally factors (perceived social support and asthma triggers), asthma self-efficacy, behaviors (asthma self-management, medication adherence, asthma control)?*

Hierarchical multiple regression was conducted to answer this research question. Because BMI was the only participant characteristic identified as an independent predictor in AQOL in earlier analysis, it was the only participant characteristic included in the model. The covariate, BMI, was entered with the independent theoretical variables (education, social support, asthma trigger, asthma self efficacy, asthma self-management, and asthma control) in the first step and sleep quality was entered in the second step. The

only variables that remained significant predictors of AQLQ were BMI and asthma control. Therefore, the nonsignificant variables except for sleep quality were removed and the regression repeated. The final model is in Table 18 with BMI, and asthma control was entered in the first step and sleep quality was entered in the second step. BMI and asthma control accounted for significant variance in Asthma Quality of Life (Table 18). The full model was significant (F (3, 38) = 19.87, p = .001) and accounted for 63.8% of the variance of Asthma QOL. Asthma Control and BMI were significant independent predictors of Asthma QOL.

Better asthma control and lower BMI were associated with better asthma quality of life. However, sleep quality was not significant independent predictor of asthma QOL.

Table 18

Summary of Hierarchal Regression Analysis for the Variables Predicting Asthma Quality of Life (N=39)

	Step 1			Step 2		
Variable	*B*	*SE B*	*ß*	*B*	*SE B*	*ß*
BMI	-0.04	.01	-.32*	-.04	.01	-.35*
Asthma Control	.21	.03	.72**	.19	.04	.64**
Sleep Quality				-.04	.03	-.14
R2 Change	.62			.01		
R2	.62			.64		
Adjusted R2	.60			.61		
F	29.81			20.56		
(p value model)	p =.001			p =.001		

Note: *p < .01 two tailed, **p < .001two tailed.

Because of the high correlation between the ACT and the asthma QOL measures as discussed earlier, the regression was repeated using the single item from the ACT as in the earlier regression. The regression results using this single item differed from the model using the whole scale and are presented in Table 19. While BMI remained a significant predictor, the single item about control of shortness of breath did not. Sleep quality also was significant independent predictor in this model whereas it was not in the model using the full ACT. Higher BMI, less asthma control related to shortness of breath and worse sleep quality was associated with worse asthma QOL.

Table 19

Summary of Hierarchal Regression Analysis for the Variables Predicting Asthma Quality of Life Using Single Item from ACT (N=39)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
BMI	-.05	.02	-.38*	-.04	.02	-.35*
Single Item-Asthma Control Control	.36	.16	.35*	.20	.15	.19
Sleep Quality				-.11	.04	-.43*
R2 Change	.22			.16		
R2	.22			.38		
Adjusted R2	.18			.32		
F	5.07			7.08		
(*p* value model)	*p* = .01			*p* = .001		

Note: *p <.01 two tailed, **p <.001two tailed.

Research question four - *What are the common symptoms experienced by adult African Americans' with asthma and their responses to the symptoms?*

Descriptive statistics are used to describe the asthma diary components in Table 20. Only two participants documented using a peak expiratory flow rate (PEFR) daily in their asthma diary. The participants reported rarely being awakened at night by their asthma, mild symptoms, upon awakening, little limitations in their activities during the day because of their asthma and little shortness of breathe during the daytime. The participants reported "a little" wheezing during the day and on average reported little use of their puffs/inhalations of bronchodilator (M = 1.97, SD = 1.91) in a twenty-four hour period. However, some reported using their puffs/inhalations of bronchodilator up to eight times per day.

Table 20

Seven-day Asthma Diary Components

Variable	*M*	*(SD)*	Observed Range	Possible Range
Components				
Questions for AM				
Times woken at night by asthma	.86	(.84)	0-2.86	0-6
Symptoms when you woke up	1.06	(.90)	0-3.14	0-6
Questions for PM				
How limited you were because of your asthma?	1.30	(1.05)	0-5	0-6
Amount of shortness of breath today?	1.48	(1.15)	0-5	0-6
How much time did you wheeze today?	1.19	(0.98)	0-3	0-6
Total number of puff(s) of bronchodilator taken in the past 24 hours	1.97	(1.91)	0-8	--

An exploratory analysis was conducted with sleep quality being the outcome variable. All of the personal variables that were correlated at the ≥ .20 level with sleep quality were entered as an independent variable into a regression model. Exercise, age, and insurance were all correlated at the ≥ .20 level. Exercise, age, and insurance all were independent predictors of sleep quality. The analysis continued with adding all of the theoretical variables that were correlated at the ≥ .20 level were entered into the regression along with exercise, age, and insurance. Exercise, age, and insurance were entered first then theoretical variables of education, self-efficacy, asthma triggers, and asthma control were entered as independent variables and sleep quality being the dependent variable. Exercise was the only significant independent predictor of sleep quality. More exercise was associated with better sleep quality. See Table 21 for the regression results.

Table 21

Summary of Hierarchal Regression Analysis for the Variables Predicting Sleep Quality (N = 39)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
Exercise	-1.49	.44	-.46	-1.24	.50	-.38**
Age	.13	.05	.37**	.09	.05	.25
Education				.77	.64	.19
Asthma Self-efficacy				-.05	.07	-.14
Asthma Triggers				.66	1.08	.09

(Table 21 Continued)

(Table 21 Continues)

	Step 1			Step 2		
Variable	*B*	*SE B*	ß	*B*	*SE B*	ß
Asthma Control				-.27	.21	-.24
R2 Change	.34			.13		
R2	.34			.46		
Adjusted R2	.30			.36		
F	9.09			4.55		
(*p* value model)	*p* =.001			*p* =.002		

Note: *p < .01 two tailed, **p < .001two tailed.

This chapter presented the results of a prospective and correlational study to determine the relationship between asthma knowledge, health literacy, social support, asthma triggers, asthma self efficacy, asthma self-management, medication adherence, asthma control, sleep quality, and asthma quality of life. A description of participants' characteristics, findings from the questionnaires, results of hypothesis testing, and research questions answers were reported from this small sample of 39 adult African Americans' with asthma.

The majority of the participants was female, attended or graduated from college, has an income of $10,001 to $30,000, was insured, did not smoke, did not have a history of smoking, and did not have a peak flow meter. Overall, the participants had low asthma knowledge, high health literacy, high perceived social support, high perceived asthma self-efficacy, moderate asthma self-management, had low adherence to their medication, low asthma control, poor sleep quality, and a moderate asthma QOL.

Most of the hypotheses were only partially supported. Social support was an independent predictor of asthma self-efficacy. BMI and asthma control were independent predictors of asthma QOL. Education was not a significant predictor of asthma QOL. However, sleep quality was an independent predictor of asthma QOL when only one item about shortness of breath from the ACT was used in the regression. The morning and bedtime asthma diary components were significantly correlated with sleep quality and asthma QOL. Exercise was an independent predictor of sleep quality. A discussion of these results will be presented in the next chapter.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Chapter V presents a discussion of study findings and conclusions of the study results. This chapter ends with a discussion of the study limitations, strengths of the study, implications for practice, use of the Social Cognitive Theory in adult African Americans' asthma self-management, and future research. Asthma is a disease that is not curable but can be managed and the person with asthma can live a normal healthy life (ALA, 2013).

The majority of this sample reported uncontrolled asthma and this was reflected in poor sleep as measured by self report using a well-established instrument, the PSQI. The large proportion of participants with uncontrolled asthma may be due in part to the lack of use of a peak flow meter to monitor daily airflow. Current guidelines recommend daily use of a peak flow meter to monitor airflow and allow persons to take preventative action. In this sample, only eleven participants reported having a peak flow meter, but only two persons recorded daily readings on their asthma diary. The reasons for lack of use were not obtained in this study; however, one possible explanation is that a peak flow meter may not have been prescribed by their HCP. Another explanation is that the flow meter may have been recommended by their HCP, but the person with asthma did not see the benefit and thus, did not use it. A recent study has shown that adherence to using a peak flow meter was less than half the sample (Gouder et al., 2013); however, other studies that used the peak flow meter as part of an intervention have demonstrated

the benefits of using one (Kaya et al., 2009; Pereira et al., 2009). In another study, researchers compared monitoring asthma symptoms versus peak flow and they concluded that symptom monitoring was preferred because it was easier for the person with asthma to perform (Harver et al., 2009). In the current study, the only monitoring conducted was with the asthma diary that included use of the PEFR. Participants answered questions in the morning as well as at bedtime about their asthma symptoms. On average, most of the persons with asthma in the study did not use a PEFR as part of their self-management. To address the lack of PEFR use, HCPs need to stay current with guidelines and recommendations for asthma and the usage of peak flow meters for self-management. Also, asthma patients need education on the usage and importance of monitoring peak expiratory flow rates daily in asthma self-management, and further to improve their self-efficacy. Furthermore, an asthma action plan needs to be developed for every person with asthma that includes daily monitoring of PEFR.

On average, the participants in the current study had been diagnosed with asthma for a long time with the majority reporting receiving education from their doctor. Participants may have received their initial education years ago and they may not be aware of current self-management guidelines and treatment options. However, the timing of when participants received education was on average four years prior but the type and extent of the education were not collected in this study.

Although participants reported uncontrolled asthma symptoms, they indicated a high level of confidence in their ability to control their asthma. This may be an issue because if individuals are confident in how they are managing and controlling their asthma, then those individuals may be less likely to seek additional asthma education.

The high confidence of persons in managing their asthma is consistent with findings from another study of adults with asthma (Mancuso et al., 2010). Most studies have focused on asthma self-efficacy of adolescents or caregivers of children with asthma (Gau & Hung, 2014; Kaul, 2011; Kouba et al., 2013; Wood et al., 2010). In persons with COPD, a different respiratory condition, higher self-efficacy in self-management was associated with better self-management (Simpson & Jones, 2013). One consideration is that asthma self-efficacy may not be a good indicator for adult African Americans' with asthma; further research is needed to conclude this.

On average, participants in the current study were overweight with 51% classified as obese. Obesity was associated with worse asthma quality of life as it has been in other studies (Al-kalemji et al., 2013; King et al., 2009; Schatz et. al., 2007a). Other studies have found obesity to be associated with worse asthma control (Boulet 2013; Fitzpatrick et al., 2012; Gorman & Chu 2009; Gruchała-Niedoszytko et al., 2013; Holguin, 2012; Juel & Ulrik, 2013). Obesity also has been associated with poor sleep quality and other studies show similar results (Nan et al., 2014; Novosad et al., 2013). BMI was a significant predicator of asthma QOL and this finding is consistent with other studies (Al-kalemji et al., 2013; King et al., 2009; Schatz et. al., 2007a).

In addition to being obese, the majority of participants reported they did not routinely exercise. Lack of exercise affects the health of people in a negative way without asthma as well as people with asthma (Mancuso et al., 2006). Exercise has been shown to improve asthma QOL (Haave & Hyland 2008; Pacheco et al., 2012; Turner et al., 2011) however, there are studies with inconclusive findings about the influence of exercise on QOL and better asthma control (Bidulescu et al., 2010; Heikkinen et al., 2012; Meyer

et al,. 2013; Pigeon et al., 2011; Vgontzas et al., 2008). Lack of exercise has also been associated with worse asthma control and other studies have shown that exercise improves perceived asthma control (Dogra et al., 2010; Iikura Yi et al., 2013). A possible explanation of the inconsistent findings regarding exercise and asthma QOL could be a result of participants not choosing the right time to exercise since a late evening exercise could have a negative impact on sleep (Myllymaki et al., 2011).

The participants in the current study reported scores that indicated low adherence to medication similar to other studies of adults with asthma (Foster et al., 2012; Sofianou et al., 2013). One study with an intervention designed to reduce barriers to asthma medication adherence and improve asthma control and productivity/daily activities found the intervention improved medication adherence, improved asthma control and productivity (Park et al., 2010). Persons with asthma as well as others with chronic diseases need improvement in medication adherence (Mosen et al., 2010; Rolnick et al., 2013). Lim (2010) found under and over self-reporting for oral corticosteroid usage and usage varied among other drug classes for asthma management. HCPs need to identify the barriers to medication adherence and identify strategies to improve medication adherence for persons with asthma.

An additional medication may be the types of medications used to control asthma symptoms. The majority of the participants reported being prescribed only a bronchodilator or one additional medication which may or may not have been a low dose inhaled corticosteroid and this is inconsistent with current asthma treatment recommendations according to Global Initiative for Asthma (GINA, 2012). Overuse of bronchodilators and problems with adherence to corticosteroids within the African

American population has been reported previously (Mosen et al., 2010). Lim (2010) found issues with overuse of bronchodilators, but his study did not focus on a specific population. In a study of adults with asthma, 94% of participants used 0 to 4 puffs of bronchodilators per day, but the remarkable finding was the underuse of oral corticosteroid use (Bourdin et al., 2012). Therefore, people with asthma are perhaps over-using bronchodilators to treat symptoms and they may not understand when and how to use the medications prescribed to them. Tailored asthma medication education is needed to assist patients to better understand the usage of medication and when they should take medications for asthma management (Bourdin et al., 2012).

Most of the participants in current study reported poor sleep quality, sleeping less than seven hours per night, prolonged sleep latency, daytime dysfunction, which is consistent with another study with a similar population (Bidulescu et al., 2010). In the current study, about half of the participants reported not taking any sleep medication to help with sleep. In a study by Bidulescu et al. (2010) researchers found a relationship between more sleeping medications and longer sleep latency, longer sleep duration, and worse global sleep quality. Examining the use of sleep medications will be important in future studies to better understand sleep problems in adults with asthma. A possible explanation for the poor sleep quality is lack of asthma control. In addition, poor sleep quality may contribute to a cycle where poor sleep quality will worsen asthma symptoms and more symptoms contribute to worse sleep quality. Strategies to identify the root cause of poor sleep quality and the relationship with asthma symptoms are needed to potentially improve asthma control.

The asthma knowledge scale was modified from an 18 to 11 item scale to improve the reliability. The current study participants scored slightly below the midpoint of the revised scale and the asthma knowledge scores were lower than in other studies (Choi & Cho Chung 2011; Emtner et al., 2009; Sodhi et al., 2013) but similar asthma knowledge scores were found in one study (Mancuso et al., 2010). Asthma knowledge did not to change after an educational intervention of asthma self-management (Choi & Cho Chung, 2011). These results may indicate that better instruments to measure asthma knowledge are needed to capture changes in asthma knowledge or that more than knowledge is needed for self-management.

The participants scored slightly below the midpoint on the Asthma Trigger Inventory, which is similar to another study (Peterson et al., 2012). The most common triggers in the current study were: pollen from trees, house dust, pollen from grass, cat, cold, cigarette smoke, running, flu, and sinus problems. Similar triggers have been found in other studies (Peterson, Gaeta, Birkhahn, Fernandez, & Mancuso, 2012). HCPs may need to educate adults with asthma about identifying their specific asthma triggers and minimizing exposure (Malone et al., 2008).

Health literacy has been shown to have a direct relationship with asthma knowledge (Sobel et al., 2009) and self-management (Curtis et al., 2012) and asthma control and asthma QOL (Apter et al., 2013). Health literacy was high in this sample, therefore, the results of this may not generalize to those persons with low health literacy. Because health literacy was shown to be important in previous studies, researchers need to consider including a health literacy measure in future studies.

On average, the social support for participants in the current study was high, which is similar to other studies (Black et al,. 2010; McCormick et al., 2014). Better social support has been directly related to better asthma control and asthma QOL (McCormick et al., 2014). In the current study, better social support was associated with better asthma self-efficacy, but it was not associated with asthma self-management. Social support has been well documented with the pediatric asthmatic population and has been associated with an overall improvement in a healthy lifestyle for asthma management (Kirk et al., 2012; Stewart et al., 2011; Yang et al., 2010). The findings from the current study of higher social support associated with more self-confidence (self-efficacy) in asthma self-management indicate social support is an important consideration for adults with asthma.

The participants generally reported understanding asthma self-management; however, their asthma was not well controlled. Most research about asthma self-management has focused on children and adolescents where parents may assist with the self-management of the illness and these studies may not generalize adults with asthma (Kaya et al., 2009; Meer et al., 2011; Rhee et al., 2012; van Gaalen et al., 2012). Additionally, no studies were identified that used the ASM instrument within an adult sample. Development of an instrument to measure asthma self-management in adults may be needed. One innovative study with an intervention designed to improve asthma self-management in adults used mobile phone technology (Millard et al., 2014). They found that mobile phone technology improved asthma self-management in adults. A recent study that used the Internet to deliver an asthma self-management intervention was found to result in better asthma self-management in adults as well (van Gaalen et al.,

2012). Therefore, using interventions delivered via technology show promise to improve asthma self-management in adults.

The seven-day asthma diary revealed unique information in PEFR use, SABA use, and asthma symptoms. Participants reported few night time awakenings because of their asthma, few asthma symptoms when they woke up, few limitations of their activities because of their asthma, little shortness of breath during the day, little wheezing during the day, and on average around two puffs usage of bronchodilator during the past twenty-four hour period. According to GINA and other asthma guidelines, using two puffs of a bronchodilator daily would be considered over usage. It may be that the reported asthma symptoms and activity limitations were few because of the use of the bronchodilator. However, this may be problematic or not the best strategy to manage asthma symptoms long term. A possible explanation for the over usage of bronchodilators is that there is a lack of understanding for use of the routine medication for asthma and this evidence supports a need to improve asthma education for adult African Americans' with asthma. Another possible explanation is that the participants in this study could not afford or have the resources to purchase inhaled corticosteroid and relied on the less expensive SABA as a maintenance drug. However, in this study, information about drug availability was not collected and cause cannot be determined. In a two-group experimental study comparing the benefits of diary usage with an education intervention, diary use was associated with older age and higher education while severe asthma and cigarette smoking were associated with nonuse of the asthma diary (Valerio et al., 2008). Other studies focused on computer diaries to monitor lung function and paper diaries to monitor symptoms and

medication usage (Ireland et al., 2012; Jiang et al., 2009) or development of a nighttime diary (Voorend-van Bergen et al., 2013; Yoshihara et al., 2011).

In general, participants in the current study were not well-controlled or well-managed as evidenced by the asthma control score; even though they had high asthma self-management knowledge and high health literacy. In one study, findings differed in that persons with asthma reported better asthma control (Baptist et al., 2013) but African Americans' were not well represented in the sample. Previous studies have found that persons with asthma overestimated the control of their asthma (Millard et al., 2014; Pereira et al., 2009). Clinicians need to carefully assess asthma control, as patients may perceive their asthma is well controlled when it is not. Clinicians need to educate persons with asthma about what it means to be "well controlled" regarding asthma symptoms.

Five participants in this study reported that they currently smoked with an average of 24 years. The majority of the current smokers reported that they smoked a half pack per day. Of the participants that reported smoking, descriptively they had more asthma triggers causing asthma symptoms. The Centers for Disease Control and Prevention (CDC) have identified smoking as the top preventable health problem (CDC, 2014) and given the negative outcomes of smoking and asthma, health care providers need to continue to try to find ways to help adults with asthma quit smoking.

Implications for Theory Building

The findings from the current study indicate that the adapted Social Cognitive Theory (SCT) may not be the best framework to explain factors associated with asthma QOL. Asthma self-management is complex and another theory may be needed since only one of the environmental factors and behaviors were the only variables that were independent predictors for asthma QOL. One study of adults with asthma used the SCT framework and it did not predict positive outcomes with asthma self-management (Denford et al., 2013). However, in the current study the sample size did not allow adequate power to test all of the variables in the regression models. That could be conducted with a larger sample size. Due to the complex nature of asthma self-management, the adapted SCT may not be the best for explaining the factors that influence asthma self-management in adult African Americans'. Models for other chronic illness may be a better fit. For example, Riegel's Theory of Self-Care addresses monitoring, management and maintenance of cardiovascular symptoms and may better reflect the pattern of chronic illness (Riegel, 2008; Rockwell & Riegel, 2001).

Since asthma self-management is a complex and multi-faceted disease control process which involves emotional, as well as motivation issues, a motivational theory might better explain factors which influence asthma self-management. For example, a motivation theory such as Self-Determination Theory may be beneficial with asthma self-management as it has a focus on autonomous motivation. Interventions based on this theory have been effective in self-management behavior change in other chronic diseases such as diabetes (Williams et al., 2009) and heart failure (Cha et al., 2012; Dunbar, Clark,

Quinn, Gary, & Kaslow, 2008). Other theories or combing theories may have more explanatory power in the self-management of asthma and QOL than SCT alone.

Limitations of the Study

The limitations must be taken into account when considering the findings of this study. There were five main limitations: 1) sample size, 2) recruitment, 3) overlap of measures, 4) low reliability of knowledge scale, and 5) violation of statistical assumptions for regression. First, the sample size did not provide sufficient power to adequately test more complex regression complex statistical models. Second, while an incentive gift card was offered, recruiting was challenging, as well as contacts made via telephone. Two participants were lost to follow-up. Recruiting eligible participants from the community settings (university campus, faith based organization, and referrals from other asthmatics) in rural south Georgia limits the generalizability of the findings to all African Americans' with asthma.

Third, there was considerable overlap with two of the measures of asthma control and the asthma diary and in reviewing the items of both instruments there were similar item content. These instruments need further testing to determine if they are measuring distinct concepts and may need to be revised to reduce overlap. Fourth, the asthma knowledge scale had a low reliability but items were eliminated and an acceptable reliability score was achieved for use in data analysis. Finally, another limitation was that asthma knowledge, social support, medication adherence, asthma diary, sleep quality, and health literacy were not normally distributed resulting in problems in conclusion validity.

Strengths of the Study

This study used a cross-sectional design to assess adult African Americans'' asthma self-management practices with prospective collection of diary data. African American adults are disproportionally affected by asthma and studies often do not have large a representation of African Americans' (Baptist et al., 2011; Rank et al., 2010; Schaffer & Yarandi 2007). The study used a seven-day asthma diary twice-a-day to assess PEFR monitoring, asthma symptoms, and asthma control. The adapted Social Cognitive Theory was used and the Social Cognitive Theory has been used with other asthma studies (Denford et al., 2013) and other chronic diseases studies (e.g. COPD, diabetes). The student PI was the sole collector of data and this provided consistency of the study protocol.

Implications for Practice

The findings of this study do provide ways to improve clinical practice and hopefully improve health outcomes. HCPs may consider providing education to persons with asthma on a more regular basis and recognize that initial education at diagnosis may not be adequate. HCPs may also need professional development to improve their proficiency with the current asthma guidelines. Providing education at every interaction with persons with asthma may be a better approach focusing on what it means to be "well controlled" regarding asthma symptoms. Return demonstration or the teach-back method are valid techniques and could be integrated as appropriate during the educational sessions, especially with use of devices such as the peak flow meter. Understanding the benefits and how to use a peak flow meter properly may maximize the patient's asthma control.

Although participants in this study had high health literacy based on the REALM-SF, they did not report well-controlled asthma. Therefore, one might conclude that adults with low literacy may report poorly controlled asthma. Therefore, all educational materials should be appropriate for the health literacy level of the recipient. The person with asthma needs education on a variety of topics such as medication usage, asthma triggers, peak flow meters, and asthma action plans as applicable. Providers need to help patients understand about the various types and classes of medications used with asthma management and when to use the various types (quick relief or long-term), as the dairy data indicated participants might over rely on bronchodilators. Furthermore, the HCP should give simple clear directions in an asthma action plan so the patient will know what medications to take based on their peak flows from their PEFR.

Persons with asthma need to learn about asthma triggers and it is very important for them to determine which one(s) of the triggers results in an asthma attack. Knowing which triggers affect one's asthma can allow for one to self-manage their asthma to minimize or eliminate exposure to those triggers. However, their environment may be a barrier in controlling triggers and if that is the case, the HCP should assist them in ways to minimize triggers. Given the lack of use of peak flow meters in this study, persons with asthma need specific education on the usage of peak flow meters. Helping the person with asthma understand the objective data that the peak flow meter provides and how this information can be used is a critical component of self-management. Also, HCPs need to educate adults with asthma on how to use an asthma action plan. Approximately 80% of participants in this study did not know impending signs of an attack and 92% did not know causes of asthma. The use of scenarios can verify that the

patient understands what action is needed with various states of their asthma. Asthma action plans are consistently used for children with asthma and are beneficial (Polisena et al., 2007; Tan et al., 2013). There are websites such as http://www.nhlbi.nih.gov/health/resources/lung/index.htm and http://www.lung.org/lung-disease/asthma/ that provide evidence-based information on asthma management that HCPs can share with patients. Persons with low income individuals who do not have Internet access at home should be given community resources information on where to find access to the Internet like at the local library. Furthermore, the information should be provided in a paper format to reinforce what is discussed during the visit as well as a reference for when they are at home.

On average, participants reported over use of bronchodilators and exceeded recommended daily use. Individuals may not realize they are experiencing chronic symptoms if they routinely use bronchodilators as this sample indicated their activities were not limited by their symptoms. Furthermore, the side effects from the bronchodilator usage could have an impact on their asthma QOL. However, HCPs may not regulate routine asthma medications accurately at visits if the patient does not fully report their pattern of bronchodilator use, nurses and other HCPs need to educate patients with asthma to accurately report asthma symptoms, asthma control, and medication usage since their previous visit.

Since the majority of the participants had scores that indicated poor sleep quality, the HCPs need to further investigate the reason for poor sleep quality. Additional screening and monitoring is needed to assist in identifying the root cause of the poor sleep quality including the difficulties with falling asleep, problems with daytime

function and sleepiness, and sleep efficiency. Our study supported findings of another study that found poor sleep quality was associated with poor asthma control and QOL in adults with asthma; however, they did not focus on a specific population or ethnic group (Luyster et al., 2012). There are also studies that have shown a relationship with obesity and sleep disturbances and the participants in this sample had a BMI that indicated obesity (Vgontzas et al., 2008). In a review of research study about asthma and sleep-disordered breathing and concluded if left untreated could result in an increase mortality (Meyer et al., 2013). The HCP will need to assess, diagnose, and address the factors associated with the cause of poor sleep quality. The HCP needs to consider sending the participants for sleep diagnostics to identify problems with sleep or assisting the person with asthma in obtaining better control of their asthma and monitoring to determine if sleep quality improves. Also, HCPs can encourage persons with high BMIs to lose weight by exercising and eating healthier ultimately possibly improving asthma control and sleep quality.

Technology has exploded with innovative ways to assist asthmatics to self-manage their asthma. There are special applications (APPS) that can be loaded to smartphones (Millard et al., 2014). Telephone coaching is also available to talk to a HCP about asthma and ways to improve self-management of asthma. Telehealth has been shown to help rural communities who have asthma patients who have barriers to access to healthcare specialists. Telehealth allows the patients to be connected with HCP from a distance using cameras and speakers so the two can communicate and thus improve asthma self-management and outcomes (van Gaalen et al., 2012). The Internet has been used to improve asthma self-management (van Gaalen et al., 2012).

Future Research

This study adds to the growing body of research that examines factors that influence asthma self-management in African American adults. First replication of this study with a larger sample size to increase the power and to test the hypotheses and answer the research questions is needed. Second, a study with a longer follow-up time might provide better information about the asthma symptom patterns. Collecting data over time would improve the evaluation of asthma self-management behaviors. Third, as discussed previously, different theories for chronic illness may be better to guide research about self-management in adults with asthma. Fourth, conceptual clarity of asthma control and management are needed with reliable and valid measures for use in research. Evaluation of psychometric properties of instruments could improve measurement of concepts. The PSQI scores within this study were unusually high which indicated poor sleep quality and future research might include objective measures such as home polysomnography to assess sleep quality. It is imperative to address the cause of the poor sleep quality and assist HCPs in developing focused interventions to improve sleep quality.

Conclusion

This study adds to the body of literature concerning the factors which influence the self-management of adult African Americans' with asthma. Future research is needed to determine whether the adapted SCT is adequate for predicting asthma QOL in this population. While other chronic diseases research supports the use of the SCT, this study suggests that the model may need modification to include additional variables which will

better explain all of the components and factors that influence the self-management of adult African Americans' with asthma.

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APPENDICES

APPENDIX A

IRB Approval

StudySummary

Study Status: Approved
Principal Investigator: Clark, Patricia
IRB Number: H124S2
Study Title: Factors which influence Adult African Americans Asthma Self-Management
Expiration Date: 06/05/2015

Factors which influence Adult African Americans Asthma Self-Management
Approved
Factors which influence Adult African Americans Asthma Self-Management

Storage Code:

Study Classification:

Study Department(s)

Name	Is Primary
GSU-B.F.lewisSchool of Nursing	Yes

StudyPersonnel

Principal Investigator:	Patricia	Clark
Study Contact:	James Holland	Patricia Clark
Student Principal Investigator:	James Holland	

EJ

IRBNumber: H12452 IRBofRecord:

CommitteeofRecord:

Full Board Committee ▼ 06/08/2012 IRBInitialApproval:

IRBExpiration: 06/05/2015

lastContinuingReviewApproved: 06/06/2014

INSTITUTIONAL REVIEW BOARD

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Atlanta, Georgia 30302-3999
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In Person: Alumni Hall
30 Courtland St, Suite 217

June 8, 2012

Principal Investigator: Clark, Patricia

Student PI: James Holland

Protocol Department: B.F. Lewis School of Nursing

Protocol Title: Factors which influence Adult African Americans Asthma Self-Management

Funding Agency: Georgia State University- Sigma Theta Tau Chapter-Epsilon Alpha

Submission Type: Application H12452

Review Type: Expedited Review, Category 7

Approval Date: June 8, 2012

Expiration Date: June 7, 2013

The Georgia State University Institutional Review Board (IRB) reviewed and approved the above referenced study in accordance with 45 CFR 46.111. The IRB has reviewed and approved the research protocol and any informed consent forms, recruitment materials, and other research materials that are marked as approved in the application. The approval period is listed above.

Federal regulations require researchers to follow specific procedures in a timely manner. For the protection of all concerned, the IRB calls your attention to the following obligations that you have as Principal Investigator of this study.

1. For any changes to the study (except to protect the safety of participants), an Amendment Application must be submitted to the IRB. The Amendment Application must be reviewed and approved before any changes can take place

2. Any unanticipated/adverse events or problems occurring as a result of participation in this study must be reported immediately to the IRB using the Unanticipated/Adverse Event Form.

3. Principal investigators are responsible for ensuring that informed consent is properly documented in accordance with 45 CFR 46.116.

    - The Informed Consent Form (ICF) used must be the one reviewed and approved by the IRB with the approval dates stamped on each page.

4. For any research that is conducted beyond the approval period, a Renewal Application must be submitted at least 30 days prior to the expiration date. The Renewal Application must be approved by the IRB before the expiration date else automatic termination of this study will occur. If the study expires, all research activities associated with the study must cease and a new application must be approved before any work can continue.

5. When the study is completed, a Study Closure Report must be submitted to the IRB.

All of the above referenced forms are available online at https://irbwise.gsu.edu. Please do not hesitate to contact Susan Vogtner in the Office of Research Integrity(404-[redacted]) if you have any questions or concerns.

[redacted]
Cynthia A. Hoffner, IRB Vice-Chair

VALDOSTA STATE UNIVERSITY
Building for Our Next Century

June 14, 2012

Mr. James D. Holland
College of Nursing
Valdosta State University

Dear Mr. Holland:

Thank you for contacting the IRB regarding recruitment of study participants through Valdosta State University for your proposed study, "Factors Which Influence Adult African Americans Asthma Self-Management." Given that this research is intended to satisfy academic requirements for your doctoral degree at Georgia State University, the Valdosta State University Institutional Review Board (IRB) recognizes the jurisdiction of the Georgia State University IRB over this research protocol.

The VSU IRB Chair has reviewed your recruitment plans and hereby grants you permission to recruit study participants on the VSU campus and through official VSU channels in accordance with the approved protocol.

If you modify the protocol in a manner that requires approval of the GSU IRB, please provide the VSU IRB with a copy of your modification request and the GSU IRB's approval of that request. Likewise, if this research continues beyond twelve months and undergoes continuation review at GSU, please provide a copy of the continuation approval for the file at VSU.

We wish you good luck with this project. Please let me know if the VSU IRB can be of further assistance.

Sincerely,

[redacted]

Barbara H. Gray
IRB Administrator

cc: Dr. John F. Elder, VSU IRB Chair

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3-2-2012

James D. Holland, MSN, RN, RRT, RCP
College of Nursing
Valdosta State University
[redacted]

Dear Mr. Holland:

This letter is to confirm that we will cooperate with you to recruit participants for your study of adult African American's self management of asthma. As I told you by telephone, we are a small, residential college in a rural area of South Georgia. We have an enrollment of approximately 3,200 students. African Americans constitute 18% of the student body. Abraham Baldwin Agricultural College draws students primarily from a 15 county surrounding area, but a sizable number of our students are from other parts of Georgia or other states. The Student Health Center at ABAC serves around 3,500 student visits every year. Once you get the Institutional Review Board approval, we will be happy to allow you to have access to our students to recruit participants.

From my conversations with you, I understand your aims. I am very interested in learning more about your study. It sounds like the study would be an important addition to the literature. Good luck to you in your research.

Sincerely,

[redacted]

Troy Spicer

APPENDIX B

Participant Recruitment

Valdosta State Participant Recruitment Email

Dear Valdosta State University Faculty, Staff, and Student?
I am seeking African American/Black men and women 18 to 70 years of age for a research study about asthma. To be eligible to participate in this study you will need to: have a diagnosis of asthma, take bronchodilators more than twice a week (asthma medication), able to read, able to write, and to speak English. You will not be eligible if you have serious problem with your asthma or had a lung infection in the last six weeks or have a cognitive deficit problem or a severe psychopathology. Taking part in the study involves completing a diary twice day for seven days and completing a set of questionnaires that ask about your asthma. The diary should take about 5 minutes twice a day. The set of questionnaires should take about 90 minutes for a total time of about 2 hours for the diary and questionnaires. Participants will receive a $10 gift card and educational information about asthma.

For more information and questions please contact

James Holland, RN at [redacted] or [redacted]@valdosta.edu
Doctoral Student at Byrdine F. Lewis School of Nursing,
Georgia State University, Atlanta, Georgia and
Instructor, College of Nursing, Valdosta State University, Valdosta, Georgia

NEWSPAPER AD FOR DISSERTATION RECRUITMENT

To be eligible to participate in this study you will need to: have a diagnosis of asthma, take bronchodilators more than twice a week (asthma medication), able to read, able to write, and to speak English. You will not be eligible if you have serious problem with your asthma or had a lung infection in the last six weeks or have a cognitive deficit problem or a severe psychopathology. Taking part in the study involves completing a diary twice day for seven days and completing a set of questionnaires that ask about your

asthma. The diary should take about 5 minutes twice a day. The set of questionnaires should take about 90 minutes for a total time of about 2 hours for the diary and questionnaires. Participants will receive a $10 gift card and educational information about asthma.

For more information and questions please contact

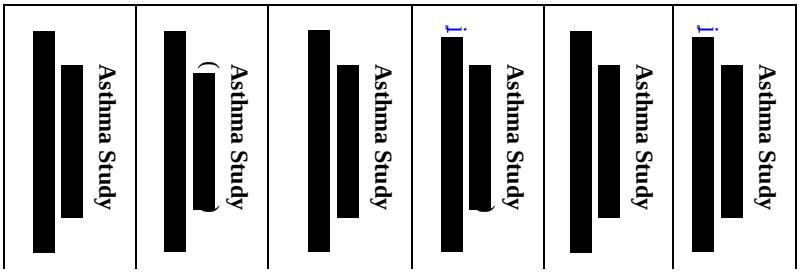
James Holland, RN at [redacted] or [redacted]@valdosta.edu
Doctoral Student at Byrdine F. Lewis School of Nursing,
Georgia State University, Atlanta, Georgia and
Instructor, College of Nursing, Valdosta State University, Valdosta, Georgia

DISSERTATION RECRUITMENT FLYER

Do you or someone you know have Asthma?

To be eligible to participate in this study you will need to: have a diagnosis of asthma, take bronchodilators more than twice a week (asthma medication), able to read, able to write, and to speak English. You will not be eligible if you have serious problem with your asthma or had a lung infection in the last six weeks or have a cognitive deficit problem or a severe psychopathology. Taking part in the study involves completing a diary twice day for seven days and completing a set of questionnaires that ask about your asthma. The diary should take about 5 minutes twice a day. The set of questionnaires should take about 90 minutes for a total time of about 2 hours for the diary and questionnaires. Participants will receive a $10 gift card and educational information about asthma.

For more information and questions please contact
James Holland, RN at [redacted] or [redacted]@valdosta.edu
Doctoral Student at Byrdine F. Lewis School of Nursing,
Georgia State University, Atlanta, Georgia and
Instructor, College of Nursing, Valdosta State University, Valdosta, Georgia



APPENDIX C

Brief Screening Tool

ID#_____

Brief screening tool

_____ Have you been diagnosed with asthma?
_____How often do you take your bronchodilators? Must take more than twice per week.
_____Can you read?
_____Can you write?
_____Do you speak English?
_____Are you an African American?
_____How old are you?

_____Have you had acute exacerbation or infection in the last six weeks?
_____ Have you been diagnosed with a cognitive deficit problem, or severe psychopathology (e. g., schizophrenia, depression)?

APPENDIX D

Informed Consent

Georgia State University
Byrdine F. Lewis, School of Nursing
Informed Consent

Title: Factors which influence adult African Americans asthma self-management

Principal Investigator: Patricia C. Clark, PhD, RN, FAAN
Student Principal Investigator: James Holland, MSN, RN, RRT, RCP

I. Purpose:

You are invited to take part in a research study. The purpose of the study is to learn about how African Americans take care of their asthma. We will ask you questions about your triggers for asthma, your confidence in managing your asthma, how you manage your asthma and how asthma affects your quality of life. You are invited to take part because you are an adult African American who has asthma. A total of 50 people will be recruited for this study. Taking part in this study will take about 5 minutes two times each day for a week to keep a brief diary. At the end of the week, it will take about 90 minutes to answer questions about taking care of your asthma.

II. Procedures:

If you decide to take part in the study, you will meet with the student researcher (student- PI) and answer a few questions. The few questions will be about your age, education, length of time with asthma. The student researcher also will ask you to read a one page sheet with 7 words on it. The student researcher will tell you how to use the asthma diary and questions. The diary is a few short questions about how you feel about your asthma. You will answer the diary two times each day for a week. At the end of the week, you will answer the question packet that will take about 90 minutes. You will have a choice to return the diary and question packet to the student researcher in person or mail it back in. If you decide to mail it back to the student researcher, you will be given a self-addressed stamped envelope to use. You will receive a $10 gift card and written information about managing your asthma when your diary and question packet have been returned. You will receive a follow up telephone call from the student investigator to answer any questions that were missed during the study.

III. Risks:

In this study, you will probably not have any more risks than you would in a normal day of life. However, it is possible that thinking about your experience may cause you to be sad or upset. If being in the study causes you to become upset, you can contact James Holland at [redacted] or Dr. Clark at [redacted] He or she will talk with you about your feelings. If you need counseling because of being upset about your experience, James Holland or Dr. Clark will talk with you about how to find a counselor. However, Georgia State University and Valdosta State University have not set aside funds to pay for this care or to compensate you if you need care.

IV. Benefits:

Taking part in this study may not benefit you. Overall, we hope to learn about how adult African Americans manage their asthma. This information will help us to better care for African Americans and others who have asthma.

V. Voluntary Participation and Withdrawal:

Taking part in research is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions or stop taking part at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

VI. Confidentiality:

We will keep your records private to the extent allowed by law. We will use a study number, rather than your name on study records. Only the Principal Investigator and student –PI will have access to the information you provide. All personal information about you will be stored in a locked filing cabinet in the student-PI's office. Your name and corresponding number will be secured in a lock file cabinet in a different place from your answers to questions to protect your privacy. Your name and other facts that might point to you will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. You will not be identified personally.

VII. Contact Persons:

Call Dr. Patricia Clark (PI) at [redacted] or email at [redacted], and James Holland (Student-PI) at [redacted] and at [redacted] if you have questions, concerns, or complaints about this study. You can also call if think you have been harmed by the study. Call Susan Vogtner in the Georgia State University Office of Research Integrity at [redacted] or [redacted] if you want to talk to someone who is not part of the study team. You can talk about questions, concerns, or suggestions about the study. You can also call Susan Vogtner if you have questions or concerns about your rights in this study.

VIII. Copy of Consent Form to Subject:

We will give you a copy of this consent form to keep.

If you are willing to volunteer for this research, please sign below.

Participant	Date
Researcher	Date

APPENDIX E

Demographic Data and Screening Sheet

<table>
<tr>
<td>1. Age_____
2. Height_____
3. Weight_____
4. Marital Status_____
1. Single
2. Married
3. Divorced
4. Widowed
5. Separated
6. Long term relationship</td>
<td>5. What other health problems do you have?(check all that apply)
____Hypertension
___GERD
____Heart Disease
___Diabetes
____Kidney Disease
___Sleep Disorder
____Other(please list)_____</td>
</tr>
<tr>
<td>6. Gender
___Female
___Male</td>
<td>7. Do you use a Peak Flowmeter?
___Yes
___No</td>
</tr>
<tr>
<td>8. Do you smoke?
___Yes
___No</td>
<td>9. How much do you need to sleep to feel refreshed? _____</td>
</tr>
<tr>
<td>10. Have you ever smoked?
____Yes
____No</td>
<td>11. Does anyone else in your family have asthma?
____Yes
____No
Please list:</td>
</tr>
<tr>
<td>12. How long have/did you smoked?
____years</td>
<td>13. Do you have health insurance?
_____Yes
_____No</td>
</tr>
<tr>
<td>14. How many packs per day do you smoke?
____1/2 pack
____1 pack
____2 packs
____greater than 2 packs</td>
<td>15. What is highest level of education?
___Less than 9th grade
___Some High School
___High School graduate
___1-3 years college
___College graduate
___Masters Degree
___Doctorate Degree</td>
</tr>
<tr>
<td>16. How long have you had asthma?
____years</td>
<td>17. What is your annual household income?
___$10,000 or less
___$10,001 to 20,000
___$20,001 to 30,000
___$30,001 to 40,000
___$40,001 to 50,000
___Greater than $50,000</td>
</tr>
</table>

18. Have you had a lung infection or been hospitalized for your asthma in the past six weeks? _____Yes _____No

19. How often do you exercise? What type of exercise?_____

___None
___1 time per week
___2 times per week
___3 times per week
___>3 times per week

20. Have you ever received any asthma education?
___Yes ___No

How long ago?_____
What type? (from a Doctor, Nurse, Respiratory Therapist, or a class)_____

21. Please list your medications here: (Asthma Drugs, and Other Drugs)

Drug	Dosage	How often do you take it?	Last Taken

APPENDIX F

Health Literacy Sheet

ID#_____

Health Literacy Sheet

REALM-SF

Menopause ☐

Antibiotics ☐

Exercise ☐

Jaundice ☐

Rectal ☐

Anemia ☐

Behavior ☐

_____ Score

APPENDIX G

Instrument Packet

ID #_____

Factors which influence Adult African Americans Asthma Self-Management

For questions about the Study Contact
Student Researcher (Student-PI)
James D. Holland
[redacted]
Email- [redacted]

Doctoral Dissertation Chair (PI)
Patricia Clark, PhD, RN
[redacted]
Email- [redacted]

ID #_____

7 day Asthma Diary

Morning Diary

If you use a peak flow meter (PEFR) to check your breathing, please record in the chart below. If you do not use a PEFR, please leave blank. Then complete the rest of the diary by answering questions. Write in the number the best describes how your asthma has been during the night and this morning (think about how your asthma has been since you filled in your diary last night).

Date							
Time awake							
Peak Expiratory Flow Rate 1. If you use a PEFR for a breathing test please fill in the diary before taking your asthma medications. Complete the rest of the diary by answering the questions.							
How often were you woken by your asthma during the night? 0=not woken at all 1=once 2=a few times 3=several times 4=many times 5= a great many times 6=awake all night							
How bad were your asthma symptoms when you woke up this morning? 0= no symptom 1=very mild symptoms 2=mild symptoms 3=moderate symptoms 4=quite severe symptoms 5=severe symptoms 6=very severe symptoms							

ID #_____

Bedtime Diary

Please write in the number that best describes how your asthma has been during the day today (think about how your asthma has been since you filled in your diary this morning).

Date							
Time you go to bed							
How limited were you in your activities today because of your asthma? 0= not limited at all 1= very slightly limited 2=slightly limited 3=moderately limited 4=very limited 5=extremely limited 6=totally limited							
How much shortness of breath did you experience today? 0= none 1=a very little 2=a little 3=a moderate amount 4=quite a lot 5= a great deal 6= a very great deal							
How much of the time did you wheeze today? 0=not at all 1= hardly any of the time 2= a little of the time 3=a moderate amount of the time 4=a lot of the time 5=most of the time 6=all the time							
Please record the total number of puffs/inhalations of bronchodilator (_____) you have used in <u>the past 24 hours.</u>							

ID #_____

Complete the survey packet after your seventh day of your diary.

ID #_____

Please complete every survey and answer every question. After you complete the packet, please return it back to James Holland. Call him at [redacted] or email him at [redacted]

The Knowledge and Self-Efficacy

Asthma Questionnaire

This survey contains a series of statements, written in the first person, concerning your opinions about your asthma. The survey also contains questions regarding your knowledge of asthma. Please read each of the items carefully; then, circle the letter that you feel answers the question best. Remember to CHOOSE ONLY ONE RESPONSE for each item. Thank you.

1. Which one of the following is not a common asthma symptom?

    a. Sore, dry throat
    b. Coughing
    c. Chest tightness
    d. Wheezing
    e. Shortness of breath

ID #_____

2. Which one of the following statements is true?

    a. Asthma can be the result of an emotional illness
    b. People bring asthma on themselves
    c. Asthma is the result of how children are raised
    d. Asthma is a physical illness
    e. Both A and D

3. I can recognize the changes that occur in my lungs before an asthma attack begins.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

4. Which one of the following is not a component of the respiratory system?

    a. Alveoli
    b. Larynx
    c. Trachea
    d. Bronchial tubes
    e. Duodenum

5. The function of the lungs is to:

    a. Bring carbon dioxide in and push oxygen out
    b. Enhance cardiac output and increase stroke volume
    c. Bring oxygen in and push carbon dioxide out
    d. Cleanse the nasal passages and prevent ketoacidosis
    e. Bring oxygen in and push nitrogen out

ID #_____

6. I can do a great deal to solve the problems that asthma can cause.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

7. When it comes to my asthma, I feel that I can avoid having to miss work or other daily responsibilities.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

8. Oxygen is exchanged in the _____:

    a. Larynx
    b. Alveoli
    c. Pancreas
    d. Bronchial tubes
    e. Trachea

9. Air needs to be _____ before it reaches the lungs.
    a. Warmed
    b. Humidified
    c. Cooled
    d. B and C
    e. A and B

ID #_____

10. I can prevent asthma in almost all situations.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

11. I have confidence in my ability to keep my asthma under control when I am in a different city on vacation or on a business trip.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

12. Which one of the following is not a common asthma trigger?

    a. Weather changes
    b. Laughing
    c. Aspirin
    d. Exercise
    e. Caffeine

13. Which one of these physiological changes does not occur in the respiratory system before and during an asthma attack?

    a. The muscles around the bronchial tubes tighten
    b. The mucus in the bronchial tubes thickens
    c. The inner lining of the bronchial tubes swells
    d. The blood vessels of the bronchial tubes enlarge
    e. The airways narrow

ID #_____

14. I can take the necessary steps to avoid or to manage an asthma attack effectively.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

15. The number of people with asthma in the United States is approximately _____:

    a. 10 million
    b. 5 million
    c. 3 million
    d. 1 million
    e. 200,000

16. I feel confident in my ability to exercise without having an asthma attack.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

ID #_____

17. Which one of the following statements is false?

    a. The best time to treat an attack is before it starts.
    b. The longer you wait to treat an attack after it begins, the more likely the attack is to clear.
    c. Modifying your activities, drinking clear liquids, and using your inhaler will help clear an attack.
    d. An attack can be treated before it begins by paying attention to your medications, the environment, your asthma triggers, your early warning signs, and your health habits.
    e. For some people, menstrual periods may trigger asthma attacks.

18. I do very well at perceiving the level of my asthma at all times, including when I am experiencing no asthma at all, when I am experiencing slight asthma, when I am experiencing moderate asthma, and when I am experiencing severe asthma.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

19. When I have an asthma attack and have no idea what caused it, I may have _____:

    a. Failed to take my asthma medications
    b. Unknowingly come into contact with one of my asthma
    c. triggers
    d. Been experiencing a great deal of stress lately
    e. Been unaware of or ignored my early warning signs
    f. All of the above

ID #_____

20. I have confidence in my ability to keep my asthma under control when problems arise in my family.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

21. Which one of the following may actually make an asthma attack worse?

    a. Continuing to exercise or work once an attack begins
    b. Resting instead of remaining active to clear the mucus
    c. Pursed-lip breathing techniques
    d. Drinking warm liquids
    e. Using a bronchodilator during the attack

22. I can handle the problems that asthma may cause.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

23. The cause of exercise-induced asthma is _____:

    a. Cooling and drying of the airways
    b. Overheating of the airways
    c. Not taking in enough oxygen
    d. Not being able to rid the lungs of carbon dioxide fast enough
    e. Build-up of lactic acid

ID #_____

24. Three "Rs" that are helpful in treating an acute asthma attack are:

    a. Readjust medications, Readjust food intake, and Readjust fluid intake
    b. Rest, Relaxation, and Right breathing
    c. Readjust medications, Restrict fluids, and Restrict eating
    d. Record symptoms, Report to physician, and Refrain from drinking liquids
    e. Record triggers, Remove all stressors, and Renew commitment to take medications on time

25. I can learn to be an effective asthma self-manager.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

26. If cigarette smoke is bothering me, I feel that I can ask the person to stop smoking.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

27. To prevent asthma attacks, it is important to pay attention to _____:

    a. My early warning signs and my asthma triggers
    b. Good health habits and medication compliance
    c. The environment
    d. A and B
    e. A, B, and C

ID #_____

28. Two early warning signs of an impending asthma attack are:

    a. Emotional and attitude changes
    b. Physical changes and insomnia
    c. Physical and attitude/mood changes
    d. Dizziness and increased sweating
    e. Dysphoric mood and emotional changes

29. I feel that I can take my asthma medications as prescribed by my doctor.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

30. Three "ABCs" that are helpful in treating an acute asthma attack are _____:

    a. Alleviate stress, Breathe rapidly, and Calm down
    b. Address maladaptive behaviors, Breathe in a shallow manner, and Cough frequently to clear mucus from lungs
    c. Adjust activities, use a Bronchodilator, and Consume clear, lukewarm liquids
    d. Ask for help, Blow into your peak flow meter, and Check your peak flow values

ID #_____

31. During an asthma episode, I can refrain from panicking in order to better manage the attack.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

32. I have confidence in my ability to avoid frequent trips to the emergency room because of my asthma.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

33. Which one of the following instruments objectively measures lung functioning?

    a. Sphygmomanometer
    b. Peak flow meter
    c. Auto-auscultation device
    d. Stethoscope
    e. Polygraph

34. I don't have a lot of confidence in my ability to manage my asthma.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

ID #_____

35. Which one of the following indicates that your inhaler is empty?

    a. The inhaler stands up at the top of the water
    b. The inhaler lays flat on the bottom of the water
    c. The inhaler floats on its side on top of the water
    d. The inhaler floats on a diagonal toward the top of the water
    e. The inhaler stands up on the bottom of the water

36. Once an attack starts, I am not capable of stopping it; I just have to wait until it subsides.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

37. I have a lot of confidence in my ability to detect the early warning signs of my asthma

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

38. Possible side effects of theophylline (Theo-Dur) may include:

    a. Visual disturbances, sweating, and confusion
    b. Memory disturbances, increased appetite, and water retention
    c. Insomnia, weight gain, and depressed mood
    d. Vomiting, headache, and irritability
    e. Fatigue, restlessness, and slurred speech

ID #_____

39. I can avoid or minimize most of my asthma triggers.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

40. I can use positive self-talk to help control my asthma.

    a. True
    b. Mostly true
    c. Sometimes true and sometimes false
    d. Mostly false
    e. False

Asthma Trigger Inventory

There are many different causes for asthmatic symptoms. Situations causing symptoms can vary considerably from one person to the other. Please indicate for each of the listed causes below how often they are involved when you experience symptoms of asthma. Please base your answers on your *own personal experience, not* on what you think should lead to asthma for the typical patient. The following things can trigger my asthma alone or in part: (for *each* trigger please circle the number that applies most to you)

0=Never, 1=rarely, 2=Sometimes, 3=Most of the time, and 4=Always

Please make sure you have circled *one* answer for *each* trigger.

	Never	Rarely	Sometimes	Most of the time	Always
1. Having a cold	0	1	2	3	4
2. Cigarette smoke	0	1	2	3	4
3. Running	0	1	2	3	4
4. Being angry	0	1	2	3	4
5. Pollen from trees	0	1	2	3	4
6. Feeling alone	0	1	2	3	4
7. Exhaust fumes	0	1	2	3	4
8. Bicycle riding	0	1	2	3	4
9. Stress at home	0	1	2	3	4
10. Certain intensive odors	0	1	2	3	4
11. Pollen from grass	0	1	2	3	4
12.Feeling tense	0	1	2	3	4

13. Climbing flights of stairs	0	1	2	3	4
14. Depressed mood	0	1	2	3	4
15. Smell of paint	0	1	2	3	4
16. Sport activities	0	1	2	3	4
17. Perfumes	0	1	2	3	4
18. Arguments with people	0	1	2	3	4
19. Flu	0	1	2	3	4
20. Sinus problems	0	1	2	3	4
21. Being excited	0	1	2	3	4
22. Intense worries	0	1	2	3	4
23. Feeling unhappy	0	1	2	3	4
24. Animal hair	0	1	2	3	4
25. Overexertion	0	1	2	3	4
26. Viruses	0	1	2	3	4
27. Feeling weak	0	1	2	3	4
28. Pollen from weeds	0	1	2	3	4
29. Feathers from birds	0	1	2	3	4
30. Sprays	0	1	2	3	4
31. Cats	0	1	2	3	4
32. House dust	0	1	2	3	4

Please list below up to six of the strongest triggers of your asthma.
My strongest asthma triggers are:

1._____

2._____

3. _____

4._____

5_____

6._____
Please indicate below how much each of these triggers affects your daily life:
This trigger affects my daily life…

0=Not at All, 1=Slightly, 2=Moderately, 3=Very Much, and 4=Completely

	Not at All	Slightly	Moderately	Very Much	Completely
1.	0	1	2	3	4
2.	0	1	2	3	4
3.	0	1	2	3	4
4.	0	1	2	3	4

5.	0	1	2	3	4
6.	0	1	2	3	4

Please indicate below to what extent you are able to control or avoid each of these triggers in your daily life without medication
(bronchodilators, reliever or rescue medication):
I can control this trigger…
0=Not at All, 1=Slightly, 2=Moderately, 3=Very Much, and 4=Completely

	Not at All	Slightly	Moderately	Very Much	Completely
1.	0	1	2	3	4
2.	0	1	2	3	4
3.	0	1	2	3	4
4.	0	1	2	3	4
5.	0	1	2	3	4
6.	0	1	2	3	4

ASTHMA SELF-MANAGEMENT QUESTIONNAIRE

Please circle the letter that corresponds to your answer for each question.

1. A main method to prevent asthma flare-ups is to…
a. take medicines before meals
b. take steroids in pill form
c. get a flu vaccine
d. go to the emergency room at the first sign of symptoms
e. I don't know

2. Taking the prescribed two puffs of your inhaler two times a day…
a. is the same as taking one puff four times a day
b. is the same as taking four puffs once a day
c. can be arranged in any way as long as you take a total of four puffs a day
d. is not the same as any other regimen
e. I don't know

3. Maintenance medicines...
a. help prevent future symptoms
ID #_____
b. don't need to be taken every day
c. make you breathe better right after you take them
d. can only be taken in pill form
e. I don't know

4. **The correct way to use a peak flow meter is to…**
a. take a deep breath and then blow into the mouthpiece slowly
b. start exhaling and then put the mouthpiece in your mouth
c. put the mouthpiece in your mouth and then inhale and exhale
d. take a deep breath then blow into the mouthpiece as fast as you can
e. I don't know

5. If you are not having asthma symptoms…
a. your lungs are not sensitive to irritants
b. it is OK to skip some doses of medicine
c. you should still avoid triggers
d. you are probably cured of asthma
e. I don't know

6. Rescue medicines…
a. should not be taken more than three or four times a day
b. help prevent future flare-ups
c. have no side effects
d. do not cause you to become tolerant to medicine
e. I don't know

Please circle the letter that corresponds to your answer for each question.

7. When using your inhaler, you should…
a. take shallow breaths
b. inhale quickly
c. inhale slowly
d. press your inhaler several times while you are inhaling
e. I don't know

8. After you have used your inhaler, you should…
a. hold your breath for several seconds
b. take the second puff as soon as possible after the first puff
c. keep taking puffs until you feel better
d. wash the inhaler in a tub of water
e. I don't know

9. If you are having symptoms and don't know why, the first thing you should do is…
a. take some doses of steroid medicine
b. call your doctor
c. count how fast you are breathing
d. change your immediate environment
e. I don't know

ID #_____

10. Taking more rescue medicines than prescribed…
a. is really not harmful
b. is a good way to manage symptoms caused by exercise
c. may mean you can take less maintenance medicine
d. may mean you need more maintenance medicine
e. I don't know

11. The benefit of using a peak flow meter every day is…
a. you can detect small changes in lung function even before symptoms start
b. it can tell you when you can decrease your medicines
c. you can see how well you can inhale
d. you can have a way to compare yourself to other people with asthma
e. I don't know

12. For people with asthma, exercise…
a. is something that should not be done regularly
b. can help improve breathing capacity
c. is only good if done for at least 30 minutes at a time
d. can trigger symptoms because the lungs are not taking in enough oxygen
e. I don't know

Please circle the letter that corresponds to your answer for each question.

13. Asthma can be cured by…
a. taking daily medicine
b. avoiding triggers, such as dust and cigarette smoke
c. using a peak flow meter
d. there is no known cure for asthma
e. I don't know

14. Asthma flare-ups…
a. usually occur suddenly without warning
b. can occur when several minor triggers come together
c. cannot be triggered by strong emotions
d. always cause wheezing
e. I don't know

15. If you are prescribed a seven-day course of steroid pills…
a. you don't have to avoid triggers while you are taking the pills
b. your symptoms can't get worse while you are taking the pills
c. you don't need to use your peak flow meter while you are taking the pills
d. you should finish the prescription even if you feel better after several doses
e. I don't know

ID #_____

16. **Which of the following can help control asthma?**
a. reducing stress levels
b. drinking plenty of water to stay hydrated
c. avoiding foods with sulfites, such as dried fruits and wine
d. all of the above
e. I don't know

Please circle YES or NO to the following questions about your medications.
The Morisky 8-Item Medication Adherence Scale

1. Do you sometimes forget to take your asthma medication?	YES	NO
2. Over the past two weeks, were there any days when you did not take your asthma medication?	YES	NO
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?	YES	NO
4. When you travel or leave home, do you sometimes forget to bring along your medications?	YES	NO
5. Did you take your asthma medicine yesterday?	YES	NO
6. When you feel like your blood pressure is under control, do you sometimes stop taking your medicine?	YES	NO
7. Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your asthma treatment plan?	YES	NO
8. How often do you have difficulty remembering to take all your asthma medication?	YES	NO

Asthma Control Test

This survey was designed to help you describe your asthma and how your asthma affects how you feel and what you are able to do. To complete it, please mark an ☒ in the one box that best describes your answer.

1. In the **past week**, how much of the time did your **asthma** keep you from getting as much done at work, school, or at home?

All of the time ☐	Most of the time ☐	Some of the time ☐	A little of the time ☐	None of the time ☐

2. During the **past week**, how often have you had shortness of breath?

More than once a day ☐	Once a day ☐	3 to 6 times a week ☐	Once or twice a week ☐	Not at all ☐

ID #_____

3. During the **past week**, how often did your **asthma** symptom (wheezing, coughing, and shortness of breath, chest tightness or pain? Wake you up at night or earlier than usual in the morning?

4 or more nights a week ☐	2 to 3 nights a week ☐	Once a week ☐	Once or Twice ☐	Not at all ☐

4. During the **past week**, how often have you used your rescue inhaler or nebulizer medication (such as Albuterol, Ventolin, Proventil, Maxair, or Primatene Mist)?

3 or more times per day ☐	1-2 times per day ☐	2-3 times per week ☐	Once a week or less ☐	Not at all ☐

5. How would you rate you **asthma** control during the **past week**?

Not Controlled at all ☐	Poorly Controlled ☐	Somewhat Controlled ☐	Well Controlled ☐	Completely Controlled ☐

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.
During the past month,

1. When have you usually gone to bed? _____

2. How long (in minutes) has it taken you to fall asleep each night?
_____

3. When have you usually gotten up in the morning? _____

4. How many hours of actual sleep do you get at night? (This may be different than the number

of hours you spend in bed) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month	Less than once a week	Once or twice a week	Three or more times week
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				

c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe, including how often you have had trouble sleeping because of this reason(s): _____				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7.During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?				

Asthma Quality of Life Questionnaire (S)

Please complete all questions by circling the number that best describes how you have been during the last 2 weeks as a result of your asthma.

HOW LIMITED HAVE YOU BEEN **DURING THE LAST 2 WEEKS** IN THESE ACTIVITIES **AS A RESULT OF YOUR ASTHMA**?

	Totally Limited	Extremely Limited	Very Limited	Moderate Limitation	Some Limitation	A little Limitation	Not at all Limited
1. STRENUOUS ACTIVITTIES (such as hurrying, exercising, running up stairs, sports)	1	2	3	4	5	6	7
2. MODERATE	1	2	3	4	5	6	7

ACTIVITIES (such as walking, housework, gardening, shopping, climbing stairs)							
3. SOCIAL ACTIVITIES (such as talking, playing with pets/children, visiting friends/relatives)	1	2	3	4	5	6	7
4. WORK-RELATED ACTIVITIES (tasks you have to do at work*) If not employed, these should be tasks you have to do most days	1	2	3	4	5	6	7
5. Sleeping (if you are not employed or self-employed, these should be tasks you have to do most days.)	1	2	3	4	5	6	7

HOW MUCH **DISCOMFORT OR DISTRESS** HAVE YOU FELT **DURING THE LAST 2 WEEKS?**

6. How much discomfort or distress have you felt over the last 2 weeks as a result of CHEST TIGHTNESS?	A very Great Deal 1	A Great Deal 2	A Good Deal 3	Moderate Amount 4	Some 5	Very Little 6	None 7

IN GENERAL, **HOW MUCH OF THE TIME DURINGTHE LAST 2 WEEKS** DID YOU:

	All of the time	Most of the time	A good bit of the	Some of the	A little of the	Hardly any of	None of the time

			time	time	time	the time	
7. Feel CONCERNED ABOUT HAVING ASTHMA?	1	2	3	4	5	6	7
8. Feel SHORT OF BREATH as a result of your asthma?	1	2	3	4	5	6	7
9. Experience asthma symptoms as a RESULT OF BEING EXPOSED TO CIGARETTE SMOKE?	1	2	3	4	5	6	7
10. Experience a WHEEZE in your chest?	1	2	3	4	5	6	7
11. Feel you had to AVIOD A SITUATION OR ENVIRONMENT BECAUSE OF CIGARETTE SMOKE?	1	2	3	4	5	6	7

HOW MUCH **DISCOMFORT OR DISTRESS** HAVE YOU FELT DURING **THE LAST 2 WEEKS?**

	A very Great Deal	A Great Deal	A Good Deal	Moderate Amount	Some	Very Little	None
	1	2	3	4	5	6	7
12. How much discomfort or distress have you felt over the last 2 weeks as a result of COUGHING?	1	2	3	4	5	6	7

IN GENERAL, **HOW MUCH OF THE TIME DURING THE LAST 2 WEEKS DID YOU:**

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
13. Feel FRUSTRATED as result of your asthma?	1	2	3	4	5	6	7
14. Experience a feeling of CHEST HEAVINESS?	1	2	3	4	5	6	7

IN GENERAL, **HOW MUCH OF THE TIME DURING THE LAST 2 WEEKS** DID YOU:

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
15. Feel CONCERNED ABOUT THE NEED TO USE MEDICATION for your asthma?	1	2	3	4	5	6	7
16. Feel the need to CLEAR YOU THROAT?	1	2	3	4	5	6	7
17. Experience asthma symptoms as a RESULT OF BEING EXPOSED TO DUST?	1	2	3	4	5	6	7
18. Experience DIFFICULTY BREATHING OUT as result of your asthma?	1	2	3	4	5	6	7
19. Feel you had to AVOID A SITUATION OR ENVIRONMENT BECAUSE OF DUST?	1	2	3	4	5	6	7
20. WAKE UP IN THE MORNING WITH ASTHMA SYMPTOMS?	1	2	3	4	5	6	7
21. Feel AFRAID OF NOT HAVING YOUR ASTHMA MEDICATION	1	2	3	4	5	6	7

AVAILABLE?							
22. Feel bothered by HEAVY BREATHING	1	2	3	4	5	6	7
	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
23. Experience asthma symptoms as a RESULT OF THE WEATHER OR AIR POLLUTION OUTSIDE?	1	2	3	4	5	6	7
24. Were you WOKEN AT NIGHT by your asthma?	1	2	3	4	5	6	7
25. AVOID OR LIMIT GOING OUTSIDE BECAUSE OF THE WEATHER OR AIR POLLUTION?	1	2	3	4	5	6	7

IN GENERAL, **HOW MUCH OF THE TIME DURING THE LAST 2 WEEKS** DID YOU:

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
26. Experience asthma symptoms as a RESULT OF BEING EXPOSED TO STRONG SMELLS OR PERFUME?	1	2	3	4	5	6	7
27. Feel AFRAID OF GETTING OUT OF BREATH?	1	2	3	4	5	6	7
28. Feel you had to AVOID A SITUATION OR ENVIRONMENT BECAUSE OF STRONG SMELLS OR PERFUME?	1	2	3	4	5	6	7
29. Has your asthma INTERFERED WITH GETTING A GOOD NIGHT'S SLEEP?	1	2	3	4	5	6	7

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	Hardly any of the time	None of the time
30. Have a feeling of FIGHTING FOR AIR?	1	2	3	4	5	6	7

HOW LIMITED HAVE YOU BEEN **DURING THE LAST 2 WEEKS?**

	Severely Limited Most Not Done	Very Limited	Moderately Limited Several Not Done	Slightly Limited	Very Slightly Limited Very Few Not Done	Hardly Limited At All	Not Limited Have Done All Activities
31. Think of the OVERALL RANGE OF ACTIVITIES that you would have liked to have done during the last 2 weeks. How much has your range of activities been limited by your asthma?	1	2	3	4	5	6	7

	Totally Limited	Extremely Limited	Very Limited	Moderate Limitation	Some Limitation	A Little Limitation	Not at all Limited
32. Overall, among ALL THE ACTIVITIES that you have done during the last 2 weeks, how limited have you been by your asthma?	1	2	3	4	5	6	7

MOS SOCIAL SUPPORT SURVEY

People sometimes look to other for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you need if you it? Circle one number on each line.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Emotional/informational support	1	2	3	4	5
Someone you can count on to listen to you when you need to talk	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
Someone whose advice you really want	1	2	3	4	5
Some to share your most private worries and fears with	1	2	3	4	5
Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
Someone who understands your problems	1	2	3	4	5
Tangible support					
Someone to help you if you were confined to bed	1	2	3	4	5
Someone to take you to the doctor if you needed it	1	2	3	4	5
Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
Someone to help with daily chores if you were sick	1	2	3	4	5
Affectionate support					
Someone who shows you love and affection	1	2	3	4	5
Someone to love and make you feel wanted	1	2	3	4	5
Someone who hugs you	1	2	3	4	5
Positive social interaction					
Someone to have a good time with	1	2	3	4	5
Someone to get together with for relaxation	1	2	3	4	5
Someone to do something enjoyable with	1	2	3	4	5
Additional item					
Someone to do things with to help you get your mind off things	1	2	3	4	5

How burdensome was it to complete this packet of surveys?

Severely Burdensome 1	Very Burdensome 2	Moderately Burdened 3	Slightly Burdened 4	Very Slightly Burdened 5	Hardly Burdened At All 6	Not Burdened 7

APPENDIX H

Gift Card Adknowledgement Sheet

ID#_____

I acknowledge that I received the $10 Wal-Mart gift card and asthma self-management packet for completing the asthma study for James Holland.

_____ _____

Signature Date

Gift card number_____

APPENDIX I

Asthma Triggers

Asthma Trigger	%	*(n)*
Pollen from trees	71.8	(28)
House dust	64.1	(25)
Pollen from grass	59	(23)
Cats	56.4	(22)
Cold	53.9	(21)
Cigarette smoke	53.9	(21)
Running	53.9	(21)
Flu	53.9	(21)
Pollen from weeds	51.2	(20)
Sinus Problems	51.2	(20)
Smell of Paint	48.7	(19)
Sprays	46.2	(18)
Sport activities	38.5	(15)
Overexertion	38.5	(15)
Climbing flights of stairs	35.9	(14)
Exhaust fumes	33.3	(13)
Certain intense odors	33.3	(13)
Perfumes	30.8	(12)
Animal hair	30.8	(12)
Feathers from birds	30.8	(12)
Bicycle riding	28.2	(11)
Being angry	20.5	(8)
Being excited	17.9	(7)
Feeling weak	17.9	(7)
Stress at home	15.4	(6)
Feeling tense	15.4	(6)
Arguments with people	15.4	(6)
Viruses	12.8	(5)
Depressed mood	10.3	(4)
Intense worries	10.3	(4)
Feeling alone	7.7	(3)
Feeling unhappy	5.1	(2)