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**Factors Related to the Emotional Responses of Rural School-aged
Children Who have Asthma**

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**Factors Related to the Emotional Responses of Rural School-aged
Children Who have Asthma**

by

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Dedication

To my lovely mother Amelia Flores Garcia, and my kind father Gabriel Gustavo Garcia who taught that there is no goal that one cannot accomplish if one is willing to apply “some elbow grease” and get to work.

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Factors Related to the Emotional Responses of Rural School-aged Children Who have Asthma

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Asthma is a complex, chronic disorder of the airways that is characterized by underlying inflammation, airflow obstruction, and bronchial hyperresponsiveness.

Asthma symptoms can be frightening and can have an effect on the emotional functioning Quality of Life (QOL) of school-aged children who have asthma.

The purpose of this exploratory, descriptive, cross-sectional, correlational study was to explore the influence of factors identified in the literature on school-aged children's emotional responses to asthma. Guiding this study was a theoretical model that proposed that the impact of chronic illness severity on QOL is potentially mediated by both resource and barrier factors. The population of interest was 85 school-aged children (ages 6-12) and parents of children who have asthma that were recruited from participants already enrolled in year 4 of the Asthma in Central Texas (ACT) study (R01NR007770, Sharon D. Horner, P.I.) at The University of Texas at Austin.

Significant inverse correlations were found between asthma related child emotional functioning QOL and each of the following variables: asthma severity, $r = -.30, p < .01$; child internalizing behaviors, $r = -.26, p < .05$, and child externalizing behaviors, $r = -.43, p < .001$. Significant inverse relationships were found between caregiver emotional functioning QOL and each of the following variables: asthma severity, $r = -.39, p < .001$; child internalizing behaviors, $r = -.22, p < .05$ and child externalizing behaviors, $r = -.25, p < .05$. Multiple regression analysis revealed that asthma severity and child externalizing problems accounted for 26% of the variance in child emotional functioning QOL. No moderators or mediators were identified.

Findings from this study imply that externalizing problem behaviors of school-aged children may be a predictor of their negative feelings about their asthma. Nursing educators should consider including the emotional impact of asthma on children in nursing curriculums as this may ultimately influence health care providers to more skillfully address this important issue in both assessment and intervention settings.

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Chapter 1

Introduction

Approximately 7 million (9.1%) children share the diagnosis of asthma, the most common chronic childhood illness in the United States (Akinbami, Moorman, & Liu, 2011). Data from the 2012 National Health Interview Survey reported that 5.7% of children in the U.S. under age 15 had an asthma episode in the past 12 months. In this same report, higher percentages of boys under age 15 experienced asthma episodes (6.7%) than girls (4.75%). Sex-adjusted percentages of children under age 15 years who had an asthma attack in a 12 month period were 5.0% Hispanic, 4.7% non-Hispanic white, and 11.1% non-Hispanic black (Centers for Disease Control and Prevention, [CDC], 2012c).

Asthma is a complex, chronic disorder of the airways that is characterized by underlying inflammation, airflow obstruction, and bronchial hyperresponsiveness (U.S. Department of Health and Human Services [USDHHS], 2007). Asthma symptoms, such as coughing, wheezing, chest tightening, and shortness of breath may be triggered by a range of allergens such as pollen, dust-mites, mold, and animal dander. Stress, weather changes, and strong emotional expressions such as crying and laughing hard can also potentially trigger asthma (Akinbami et al., 2011; USDHHS, 2007). Asthma symptoms resulting from inflammation and small airway narrowing include coughing, chest pain, and shortness of breath (Akinbami et al., 2011). Asthma symptoms can be frightening and interfere with important daily childhood tasks such as school performance and play

time (Berg, Anderson, Tichacek, Tomizh, & Rachelefsky, 2007; Lee, Parker, DuBose, Gwinn, & Logan, 2006).

An emotional response to asthma may be defined as an emotional reaction that one has to the effects of asthma (*Medical Dictionary, online*, 2013). The emotional responses of children who have asthma, as well as the emotional responses of their caregivers (parents), may be seriously affected by the manifestations of asthma (Walker, 2012, 2013). Two emotional responses that have been repeatedly linked to asthma are depressive and anxious symptoms (American Psychiatric Association, [APA], 2000). Children who have asthma have been reported to have more depressive and anxious symptoms when compared to children who did not have asthma (Friedman, 2007; Meuret, Ehrenreich, Pincus, & Ritz, 2006), and increased odds of having behavioral problems (Blackman & Gurka, 2007). Emotional responses of caregivers have often been found to be negatively affected by their children's asthma (Brown et al., 2008; Spear, 2007; Waxmonsky et al., 2006).

Currently, there are implications that factors contributing to the emotional responses in school-aged children who have asthma may also potentially influence their asthma morbidity (Waxmonsky et al., 2006) and emotional functioning quality of life (QOL) (Horner, Brown, & Walker, 2012; Walker, 2013). Additionally, emotional responses in school-aged children who have asthma are often overlooked in asthma nursing assessments (Ignatavicius & Workman, 2010; Seidel et al., 2011), and may even go unrecognized by both parents (Rockhill et al., 2007) and the health care system (Katon, Richardson, Russo, Lozano, & McCauley, 2006).

A component of quality of life in school-aged children, emotional functioning quality of life, may be potentially enhanced by the identification (APA, 2000) and treatment (Merikangas et al., 2010; Townsend, 2009) of emotional responses, which may originate from depressive and anxious disorders (Bender & Zhang, 2008; Waxmonsky et al., 2006). Additionally, gaining a greater understanding of factors that influence the emotional responses of school-aged children who have asthma may assist health care providers in targeting or developing clinical assessment and intervention tools to assist in the improvement of the emotional functioning quality of life in these children, an important component in overall pediatric asthma quality of life (Wilson et al., 2012). The identification of factors influencing the emotional responses of school-aged children who have asthma may also assist in clinical improvements that may have the long term potential of influencing decreased asthma morbidity, possibly through the improvement of overall quality of life in children who have asthma (Waxmonsky et al., 2006).

Purpose

This study was an exploratory, descriptive, cross-sectional, correlational study of 85 rural school-aged children already enrolled in the longitudinal Asthma in Central Texas Project (ACT). The purpose of this study was to explore the influence of factors on school-aged children's emotional responses to asthma. Identifying factors that contribute to the emotional responses in school-aged children who have asthma is considered an important key in improving the emotional functioning quality of life and ultimately overall quality of life for these children. Additionally, research that aids in the development of feasible assessment and intervention strategies that target contributory

factors to the emotional component of asthma in school-aged children may also potentially assist in the reduction of part or whole of the negative emotional contribution to the disease (Waxmonsky et al., 2006).

An exploratory study of 183 rural school-aged children was conducted that examined relationships among demographic factors, children's coping, asthma self-management, and asthma related QOL. In this study, 16% of the variance in child's asthma emotional functioning QOL was accounted for by the variables coping frequency, race/ethnicity, and asthma severity, $R^2 = .16$, $F(3, 163) = 10.04$, $p < .001$ (Horner et al., 2012). Although this was a statistically significant finding, more than 80% of the variability was unaccounted for, presenting a need for further research to ascertain additional factors influencing children's asthma emotional functioning QOL. The next logical step in the research process was to identify factors that contributed to the emotional functioning QOL or the emotional responses of school-aged children who have asthma. In an effort to accomplish this, a systematic and extensive review of the literature was conducted (Walker, 2012). As a result of the literature review, the following variables were identified as being associated with the emotional responses of children who have asthma: (a) asthma severity; (b) missed school days; (c) increased child medical services use; (d) child internalizing behaviors; (e) child externalizing behaviors, and (f) caregiver or parental emotional responses. These variables had been studied individually with varying statistical methods demonstrating their associations to emotional responses in children who have asthma. However, the exploration of the

combined influence of these variables on children's emotional responses had not yet been addressed (Walker, 2012).

Significance

Emotional responses have been consistently linked to the asthma experiences of school-aged children (Friedman, 2007; Katon et al., 2007; Meuret et al., 2006). There are various ways that emotional responses have been presented in the literature. When discussing the emotional responses of school-aged children who have asthma, some commonly used terms that have been used are depression, anxiety, depressive symptoms, and anxious symptoms. Internalizing disorders is a more encompassing term used in the literature to describe anxiety and/or depression, or the manifestations of either or both of these disorders (Achenbach & Edelbrock, 1983; APA, 2000). Internalizing disorders are often identified in school-aged children by their internalizing behavioral problems which can include depressive and/or anxious symptoms, and somatic complaints (Achenbach & Edelbrock, 1983; Meuret et al., 2006).

In studies of internalizing disorders and childhood asthma, higher levels of emotional responses or depressive and anxious symptoms were consistently reported in children who have asthma when compared to children who did not have asthma (Friedman, 2007; Katon et al., 2007; Meuret et al., 2006). Concordantly, caregivers of children who have asthma reported their children to have more internalizing behaviors when compared to reports from caregivers of children who did not have asthma (Klennert et al., 2001; Meuret et al., 2006). The higher levels of emotional responses reported by

children and parents of children who have asthma may have been related to their experiences of managing the symptoms of childhood asthma.

Emotional responses in school-aged children who have asthma were also reported to be externalizing in nature (Berz, Murdock, & Mitchell, 2005; Blackman & Gurka, 2007; Katon et al., 2007; McCauley, Katon, Russo, Richardson, & Lozano, 2007). Externalizing disorders is another term used in the literature when discussing school-aged children's emotional responses, and describes disorders of conduct or disruption (Achenbach & Edelbrock, 1983; APA, 2000). Externalizing behaviors are used by clinicians to identify externalizing disorders and may include impulsivity, hyperactivity, and aggression (Achenbach & Edelbrock, 1983; APA, 2000).

In studies of externalizing disorders and childhood asthma, it was reported that children with asthma had higher odds of having Attention Deficit Hyperactivity Disorder (ADHD), than children that did not have asthma (Ortega et al., 2003). Interestingly, the ability to pay attention, a deficit in ADHD, was reported as a crucial element in a child's ability to self-recognize asthma symptoms, (Koinis-Mitchell et al., 2009), and is an area of particular concern when considering asthma and the emotional responses of school-aged children. Reports have also suggested that children who have asthma and internalizing disorders, and also act out behaviorally, may actually have their emotional responses more readily identified by their parents (Rockhill et al., 2007) and the health care system (Katon et al., 2006) than children with the same symptoms who do not act out.

The significance in studying the emotional responses of school-aged children who have asthma is related to the overall negative impact of asthma to the nation. The burden of asthma contributes to a national consumption of resources (CDC, 2012a), affecting the families of over 7 million children (Akinbami et al., 2011). Asthma is reported to cost an average of \$1,039 per child per year (CDC, 2012a); U.S. asthma related medical expenses have been reported at \$56 billion per year. In 2008, 10.5 million missed school days and 14.2 million missed work days were attributed to asthma (CDC, 2012a). Additionally, 479,300 hospitalizations, 1.9 million emergency department (ED) visits, and 8.9 million doctor visits were related to asthma in 2009 (CDC, 2012a).

Problems associated with the management of asthma in school-aged children impacts the national workforce and educational system by adversely influencing both parental daily routines and children's school attendance (CDC, 2012a). School-aged children were an appropriate focus for asthma study because of their physical (Akinbami, Moorman, Garbe, & Sondik, 2009) and emotional vulnerability to the disease (Horner et al., 2012), as well as dependency on caregivers for asthma management (CDC, 2012b; Hogan-Quigley, Palm, & Bickley, 2012).

School-aged children had lower asthma prevalence rates than adolescents, but actually used more healthcare resources for asthma (Akinbami et al., 2009). Although extensive information regarding the diagnosis and management of childhood asthma was available, (USDHHS, 2007) and reportedly being dispersed (Akinbami et al., 2009), school-aged children's asthma morbidity and mortality rates continued to remain disturbingly high. For twelve years, when compared to both younger and older age

groups, children ages 5-17 years consistently had the highest asthma attack prevalence rates in the nation (American Lung Association, [ALA], 2012). Additionally, 333 school-aged children (ages 5-14) suffered asthma related deaths during the three year period from 2007-2009 (ALA, 2012).

Studying factors that affect emotional responses in school-aged children who have asthma is significant partially because of the overwhelming burden of asthma to the nation. Carving out a small portion of the problem, or seeking to find factors that influence the emotional functioning quality of life in school-aged children, or frequency of emotional responses related to asthma, may ultimately have an impact on the overall national burden presented by asthma. By identifying factors that influence the emotional functioning QOL in school-aged children who have asthma, nursing assessment and intervention tools may be developed that favorably readjust the influence of these factors, with the ultimate goal of improving pediatric asthma QOL, and adding to the improvement of asthma morbidity.

Statement of the Problem

Emotional responses such as worry, anger, fear, and frustration have been linked to anxious and depressive symptoms (APA, 2000; Townsend, 2009). Extensive descriptive research has been conducted that generally supports the idea that emotional responses, or depressive and anxious symptoms, are disproportionately found in children who have asthma (Feldman, Ortega, Koinis-Mitchell, Kuo, & Canino, 2010; Friedman, 2007; Goodwin, Messineo, Bregante, Hoven & Kairam, 2005; Goodwin, Pine, & Hoven, 2003; Katon et al., 2007; Klinnert et al., 2001; Meuret et al., 2006; Morrison, Goli,

Wagoner, Brown, & Khan, 2002; Ortega, Huertas, Canino, Ramirez, & Rubio-Stipec, 2002, Ortega et al., 2003; Ortega, McQuaid, Canino, Goodwin & Fritz, 2004; Waxmonsky et al., 2006). Furthermore, childhood asthma research has also identified various pertinent factors such as asthma severity (Bender & Zhang, 2008; Blackman & Gurka, 2007; Katon et al., 2007; Richardson et al., 2006; Waxmonsky et al., 2006; Winter, Fiese, Spagnola, & Anbar, 2011; Wood et al., 2006, 2007, 2008), missed school days (Bender & Zhang, 2008; Blackman & Gurka, 2007; Daniel, Boergers, Kopel, & Koinis-Mitchell, 2012; Moonie, Sterling, Figgs, & Castro, 2006), increased child medical services use (Goodwin et al., 2005; Morrison et al., 2002; Silver, Warman, & Stein, 2005), child internalizing (Berz et al., 2005) and externalizing behaviors (Blackman & Gurka, 2007; Katon et al., 2007; McCauley et al., 2007), and caregiver or parental emotional responses (Brown et al., 2006, 2008; Celano et al., 2008; Murdock, Adams, Pears, & Ellis, 2012; Silver et al., 2005) related to the emotional responses of children who have asthma. However, much of this preliminary descriptive research sought solely to validate whether children who have asthma also had emotional responses, and if so, were these responses more present in children who have asthma than in children who did not have asthma (Feldman, Ortega, McQuaid, & Canino, 2006; Katon et al., 2007; Meuret et al., 2006). Additionally, research on children's asthma and emotional responses focused on the presence of anxious and depressive symptoms related to a number of variables, but it generally did not address the children's perceptions of these symptoms (Bender & Zhang, 2008; Berz et al., 2005; Feldman et al., 2010). Rarely, in childhood

asthma studies, was the idea of the “perceived impact of asthma on a patient’s QOL” (Wilson et al., 2012, p. S9) or children’s asthma emotional functioning QOL addressed.

Current research has mostly been conducted to identify variables that have an influence on children’s overall asthma QOL (Al-Akour, & Khader, 2008; Cortina, et al., 2011; Lahaye, Van Broeck, Bodart, & Luminet, 2012). Research that focuses on children’s overall asthma quality of life does not often report specific information regarding the influence of variables on the emotional component of QOL. Consequently, there is currently a paucity of studies that actually address the specific and extremely important component of children’s asthma emotional functioning QOL.

Another problem inherent in current childhood asthma studies that also study children’s emotional responses is that they are not designed to uncover data specific to school-aged children, ages 6-12 (Walker, 2012). Many research studies conducted on children, emotions, and asthma combine the findings of adolescents and children in their reports (Blackman & Gurka, 2007; Katon et al., 2007; Kean, Kelsay, Wamboldt, & Wamboldt, 2006). This method does not account for the differing developmental needs of school-aged children and adolescents, and thus limits the generalizability of such studies to the school-age population. Children and adolescents face different life stressors related to developmental stages (Hogan-Quigley et al., 2012), and may interpret symptoms in chronic illness quite differently (Linder, 2008), and thus are in need of studies unique to their age groups.

In summary, there is a paucity of research identifying the variables that influence asthma related emotional functioning QOL in school-aged children. Research that does

address the variables that influence school-aged children's asthma related emotional functioning QOL often aggregates the information of school-aged children and adolescents when reporting their findings. Thus, the overarching question that was addressed in this study was: What is the influence of the variables asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, child hospitalizations, child ED visits, and child missed school days on the emotional functioning component of QOL of school-aged children who have asthma?

Theoretical Framework Development

A theoretical framework was developed by this researcher in an attempt to illustrate currently studied factors as they related to the emotional responses of school-aged children who have asthma. The theoretical framework was a model for inquiry that questioned the strength and direction as well as the potential influence of previously identified variables on asthma related emotional functioning QOL in school-aged children. The first step in the development of the theoretical framework was to perform a thorough review of the literature to answer the following questions:

- (a) What factors contribute to the emotional responses of school-aged children who have asthma?
- (b) What are the potential gaps in the literature regarding the emotional responses of school-aged children (ages 6-12) who have asthma?
- (c) Are children with a lower socioeconomic status (SES) and those who are minorities represented in the literature proportionate to their prevalence (Walker, 2012, p. 406)?

The literature review included fifteen years (1996-2011) and was conducted using PUBMED, CINAHL, PsycINFO, Cochrane, Social Sciences Citation Index, and Proquest Dissertations and Theses databases. The decision to use a fifteen year period for the literature review was made as a result of the asthma benchmark date in 1997 when the Guidelines for Diagnosis and Management of Asthma was released and distributed by the National Heart, Lung, and Blood Institute, National Institutes of Health (NIH, NHLBI, 1997; Walker, 2012).

After identifying pertinent factors in the literature review, the process of theory synthesis was used. A main goal of theory synthesis is to strive to gain new insight regarding a phenomenon of interest using the literature itself as the database (Walker & Avant, 2011). Using the process of theory synthesis, four factor groupings were identified, sorted, and named by similarities which were as follows: physiological factors, behavioral factors, familial emotional factors, and asthma risk factors.

Factor Groupings

Physiological Factors

Physiological factors identified in the literature related to the emotional responses of school-aged children who have asthma were asthma symptoms, asthma attacks, asthma severity, quantity of asthma symptoms, and recent asthma diagnosis. Higher negative affect scores or depression and anxiety, were associated with more reported asthma symptoms (Bender & Zhang, 2008). Greater risk for internalizing disorders was linked to a life time history of asthma attacks in children when compared to controls (Feldman et al., 2006). Asthma severity was found to be significantly correlated to depression and

anxiety in children ages 7-18 (Wood et al., 2006). Youth reports of overall number of asthma symptoms had significant association with the number of internalizing symptoms (Richardson et al., 2006) and youth with a more recent asthma diagnosis had higher likelihood of also having an internalizing disorder (Katon et al., 2007).

Other physiological factors found in the literature were asthma morbidity factors and included use of inpatient and outpatient medical services and child school absences. Higher use of inpatient and outpatient medical services was noted in children who had asthma and internalizing disorders when compared to children who had asthma and did not have internalizing disorders (Goodwin et al., 2005). In one study of 104 children ages 8-18 years, child self-reported anxiety predicted missed school days due to asthma, $OR = 1.068$, 95% CI [1.004, 1.136], and child self-reported depression predicted missed school days due to asthma $OR = 1.065$, 95% CI [1.006, 1.127] (Bender & Zhang, 2008).

Behavioral Factors

Behavioral factors identified and linked to emotional responses in school-aged children included parent reports of externalizing behaviors, poor interpersonal relations, and higher odds of exhibiting behavioral problems. Children who had asthma and also had parent reported externalizing behaviors had a significant higher likelihood of also having one or more internalizing disorders (Katon et al., 2007). Children who had asthma and also self-reported internalizing disorders were more likely to have problems with interpersonal relations (Berz et al., 2005), and children with more severe asthma had

increased odds of having developmental, emotional, and behavioral problems, $OR = 4.13$, 99% CI [2.40, 7.11] (Blackman & Gurka, 2007).

Familial Emotional Factors

Familial factors related to emotional responses of school-aged children who had asthma included parental emotional responses such as depression and anxiety. Mothers' depression scores were found to be significantly correlated to depression scores of children who had asthma (Waxmonsky et al., 2006). In another study, caretakers of children who had more severe asthma reported more anxiety than caretakers of children with milder asthma; overall caregiver distress, anger, and depression were found to be unrelated to child asthma severity (Silver et al., 2005).

Asthma Risk Factors

Asthma risk factors have been defined in the literature as variables that can be used to identify individuals who are at greater risk for serious asthma manifestations (Horner, Surratt, & Smith, 2002). Risk factors that were selected as the focus of this study were race/ethnicity and SES. These risk factors were selected due to the disproportionate number of minority (CDC, 2012a) and poor (Akinbami et al., 2009) children who suffer from the ill effects of asthma.

Investigation of studies considering the risk factor race/ethnicity showed that in one study Hispanics were reported to have worse emotional functioning QOL scores when compared to non-Hispanic white and black school-aged children (Horner et al., 2012). Similarly, quality of life was found to be higher for non-Latino white children who

had asthma when compared with African American and Latino children (Daniel et al., 2012). One study of caregivers' perceptions of their minority children's emotional responses to asthma reported that their children expressed feelings of trust in their caregivers, yet fear, embarrassment, anger, and frustration related to the effects of asthma (Walker, 2013). The paucity of information found in the literature regarding the emotional responses of specific racial/ethnic groups of children to the effects of asthma supported a need for further investigation and study.

This researcher also investigated studies that reported data on the risk factor SES. Current studies that linked SES, childhood asthma, and emotional responses were not found after a review of the literature was conducted using the Academic Search Complete database, with an unlimited time frame, entering the words "asthma and children", "SES", and "emotion". Due to the disproportionately number of the poor who are reportedly affected by asthma, (Akinbami et al., 2009) it seemed reasonable to use SES as an independent variable in order to explore its influence on child's asthma emotional functioning QOL.

Selected Variables

The following variables were selected as representatives of the previously identified factor groupings for the study: Asthma severity, child hospitalizations, child Emergency Department (ED) visits, child missed school days, child internalizing and externalizing behaviors, caregiver emotional functioning QOL, SES, and race/ethnicity. These variables had been researched individually with varying methods demonstrating their associations to emotional responses in children who have asthma. However, the

combined influence of these variables on children's emotional responses had not been addressed (Walker, 2012).

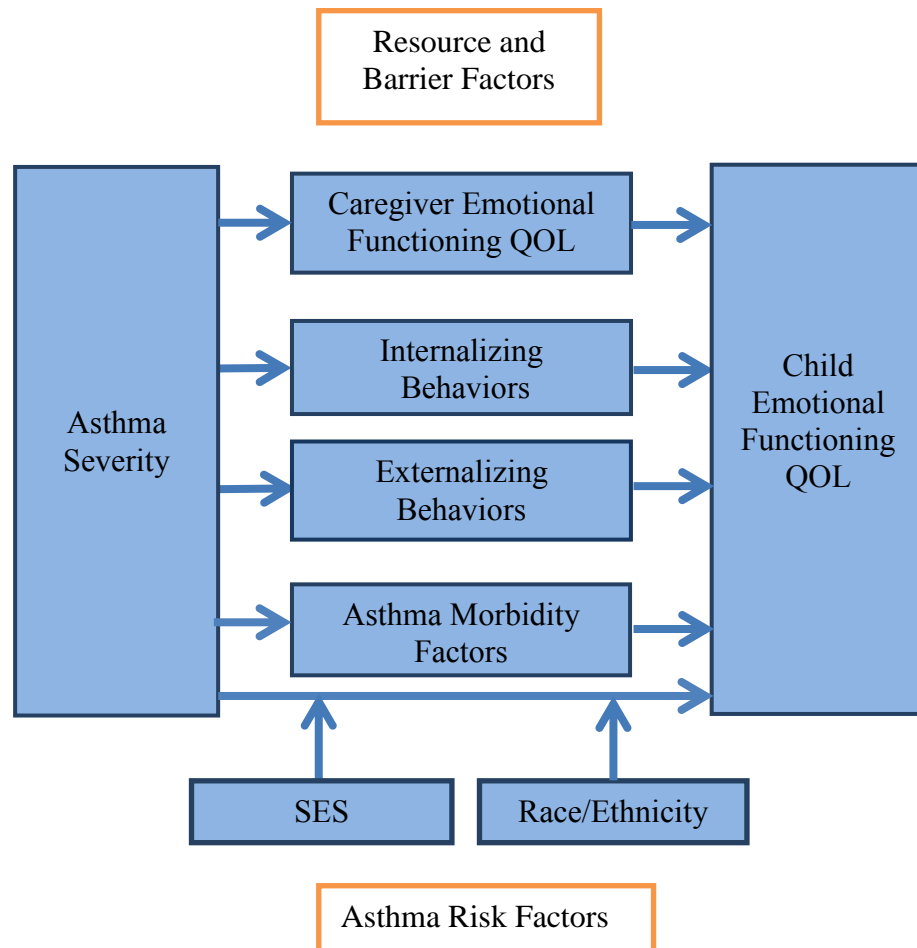
Theoretical Framework

The theoretical framework of this study was the reformulation of previous theoretical models that addressed the effects of severity of chronic illness on quality of life (Stuifbergen, Seraphine, Harrison, & Adachi, 2005; Stuifbergen, Seraphine, & Roberts, 2000). These theoretical models proposed that the impact of chronic illness severity on QOL was potentially mediated by both resource and barrier factors. Resource factors may include both personal and environmental characteristics that potentially have an indirect or direct positive influence on QOL (Stuifbergen & Rogers, 1997). Barrier factors may include environmental, interpersonal, and intrapersonal factors that potentially negatively affect QOL (Pender 1987; Stuifbergen et al., 2000). A potential resource factor identified in this study was caregiver emotional functioning QOL. Caregivers who had greater emotional functioning QOL, or who had fewer feelings of worry and concern about the manifestations of their children's asthma, may also have served as an emotional resource or strength to their children. Children may resultantly have felt less emotional distress regarding their asthma due to a stable reaction from their caregivers. Thus, greater emotional functioning QOL in a caregiver could have potentially had a positive influence on the emotional functioning QOL of the child who has asthma. Potential barrier factors identified in this study were child hospitalizations, child ED visits, child missed school days, and child problem behaviors. Children who spent excessive time in hospitals and/or ED rooms and missed valuable school time may

as a result have had decreased ability to do well socially and academically in school. Academic and social problems may have resulted in negative emotional responses from children who had asthma, thus affecting their emotional functioning QOL. They may also have engaged in problem behaviors due to frustrations possibly caused by diminished success in the school setting. Problem behaviors may have brought children who had asthma to the attention of the school system in a negative light, and also resulted in negative emotional responses from these children. Problem behaviors may have negatively affected their emotional functioning QOL. Thus, child hospitalizations, child ED visits, child missed school days, and child problem behaviors were considered potential barrier factors or factors that had a potential to negatively affect the emotional functioning QOL of children who had asthma.

The theoretical framework of this study is demonstrated in Figure 1. Asthma severity is presented in the model as a predictor of child emotional functioning QOL. The potential mediators to the effects of asthma severity on child emotional functioning QOL are resource and barrier factors which are next presented in the model and are listed as follows: caregiver emotional functioning asthma QOL, child problem behaviors which include both internalizing and externalizing behaviors, and asthma morbidity factors which include child hospitalizations, child ED visits, and child missed school days. Socio-economic status and race/ethnicity are presented as potential asthma risk factors or moderating factors to the theoretical model of asthma severity as a predictor of asthma related child emotional functioning QOL.

Figure 1 Theoretical Framework of Study



Research Questions

RQ1: What are the relationships among asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors (i.e., child hospitalizations, child ED visits, child missed school days), and asthma related child emotional functioning QOL?

RQ2: To what extent do asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors (i.e., child hospitalizations, child ED visits, and child missed school days) account for the variance in asthma related child emotional functioning QOL?

RQ3: To what extent do SES and race/ethnicity modify the relationship between asthma severity and asthma related child emotional functioning QOL?

RQ4: To what extent does caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors, (i.e., child hospitalizations, child ED visits, child missed school days) mediate the relationship between asthma severity and asthma related child emotional functioning QOL?

Definitions

School-aged Children

School-aged children were defined in this study as children who were between the ages of 6 and 12 years of age. The children in the study were enrolled in public school grades 2-5. Demographic information regarding the children in the study was gathered at time 1 of the ACT study when the caregivers (parents) filled out the general information booklet.

Asthma Risk Factors

Asthma risk factors were defined as variables used to identify individuals who were more susceptible to having serious asthma exacerbations (Horner et al., 2002). Asthma risk factor *SES* was operationalized using Hollingshead Four Factor Index

calculation (Hollingshead, 1975). Asthma risk factor *race/ethnicity* was operationalized as non-Hispanic white, non-Hispanic black, Hispanic, or Other.

Asthma Severity

Asthma severity has been classified by both impairment and risk and has been defined as the “the intrinsic intensity of the disease process” (NIH, NHLBI, 2007). Asthma severity was operationalized by using a parent report scale, Severity of Chronic Asthma (SCA) (Horner, Kieckhefer, & Fouladi, 2006).

Externalizing Behaviors

Externalizing behavior problems have been identified using a dichotomous approach to viewing behavioral dysfunction in children that includes both externalizing and internalizing behavior problems (Achenbach & Edelbrock, 1983; APA, 2000). Externalizing behavior problems were characterized by less control of emotions and could include problems with interpersonal relationships, irritable and belligerent behavior, as well as rule breaking (Achenbach & Edelbrock, 1983; Guttmanova, Szanyi, & Cali, 2007). Externalizing behaviors were operationalized using the externalizing behaviors parent report subscale of the Behavior Problems Index (BPI) (Guttmanova et al., 2007; Peterson & Zill, 1986).

Internalizing Behaviors

Internalizing behavior problems have also been identified using a dichotomous approach to viewing behavioral dysfunction in children that included both externalizing and internalizing behavior problems (Achenbach & Edelbrock, 1983; APA, 2000).

Internalizing behavior problems were characterized by an over control of emotions and could include problems with social withdrawal, manifestations of dependency, as well as feelings that one was inferior or worthless (Achenbach & Edelbrock, 1983; Guttmanova et al., 2007). Internalizing behaviors were operationalized using the parent report internalizing behaviors subscale of the BPI (Guttmanova et al., 2007; Peterson & Zill, 1986).

Caregiver's Emotional Functioning Quality of Life (QOL)

Caregivers in this study were defined as the parents and/or guardians who managed the health of the child in the home. Caregivers' emotional functioning QOL has been defined as the emotional impact of asthma on the daily life of caregivers of children who have asthma and has been measured by the frequency of their emotional responses related to their children's asthma (Juniper et al., 1996b). Caregiver's Emotional Functioning QOL was operationalized using the emotional functioning 9 item subscale of the Pediatric Asthma Caregiver's Quality of Life Questionnaire (Juniper et al., 1996a).

Child Emotional Functioning Quality of Life (QOL)

Asthma related child emotional functioning QOL has been defined as the emotional impact of asthma on the daily life of a child (Juniper et al., 1996b). Asthma related child emotional functioning QOL was operationalized using the revised emotional functioning 8 item child report subscale from the Pediatric Asthma Quality of Life Questionnaire (Juniper et al., 1996b; Horner et al., 2012).

Asthma Morbidity

Morbidity has been defined as the degree that a disease state such as asthma affects a patient (Morbidity, 2013). Asthma morbidity has been measured by both physician office visits, as well as hospitalizations (NIH, NHLBI, 2012). Asthma morbidity was operationalized by determining frequency of ED visits and hospitalizations as well as school absences (child missed school days) experienced by children in the study (CDC 2012a).

Assumptions

The following are assumptions that were identified for this study.

1. School-aged children who have asthma have emotional responses to asthma.
2. Factors related to emotional responses in school-aged children influence the burden of childhood asthma.
3. School-aged children can appropriately serve as informants of their emotional responses to asthma.
4. Caregivers will try to serve as honest informants of their own emotional responses and of factors regarding their children's experiences with asthma.

Limitations

The limitations of this study included using a convenience cross-sectional sample in a longitudinal study in the southwestern United States, thus limiting generalizability of the findings. Other study limitations included threats to internal validity as a result of the correlational nature of the study. Correlational researchers must be aware of the

possibility of competing explanations to what may influence an effect (Polit & Beck, 2008). Some of these explanations or potential threats to the internal validity of the study included temporal ambiguity and history.

When using correlational methods to study asthma severity as a predictor of asthma related child emotional functioning QOL, a temporal ambiguity problem may occur when attempting to determine if asthma severity precedes the emotional responses of school-aged children to asthma, or if the emotional responses of these children precede the severity of asthma (Richardson et al., 2006; Waxmonsky et al., 2006). The additional internal validity threat of history as it refers to this study may be described as follows. There may have been other experiences other than those encountered with asthma severity that may have influenced the asthma related emotional functioning QOL of the participants, thus making it difficult to determine the accurate effects of the predictors of the study (Polit & Beck, 2008).

Summary

When studying school-aged children who have asthma, there were many factors related to their emotional responses that had been reported in the literature. The study of emotional responses or emotional functioning quality of life in school-aged children is a worthy project. A great deal of information regarding school-aged children's emotional responses to asthma has often been reported combined with data on adolescents. Consequently, there has been limited available data specific to school-aged children who have asthma. Studies of emotional responses related to asthma have verified that emotional responses do indeed exist more predominantly in children who have asthma

when compared to children who do not have asthma. However, the determination of the influence of variables in relation to the emotional functioning component of QOL of school-aged children who have asthma has rarely been addressed. This study sought to address these gaps in the literature by asking questions regarding the influence of previously identified factors on emotional functioning QOL of school-aged children who have asthma.

Chapter 2

Literature Review

The theoretical framework presented in chapter 1 will be used as an organizing format for the six sections presented in the literature review. Section one will include research studies that describe the reported relationships between asthma severity and the emotional responses of school-aged children who have asthma. The differing methods used to measure asthma severity will also be presented in section one. Section two will discuss research studies that address child use of medical services and child school absences and how these asthma morbidity indicators relate to the emotional response of school-aged children who have asthma. Section three will present research studies that discuss the relationship between child internalizing and externalizing behaviors and the emotional responses of school-aged children who have asthma. Section four will discuss research studies that associate parental (caregiver) emotional responses to the emotional responses of school-aged children who have asthma. Section five will discuss the asthma risk factors race/ethnicity and SES as they relate to the emotional responses of school-aged children who have asthma. The final section or section six of the review of the literature will provide support for the use of emotional functioning QOL in both caregivers and children to study their emotional responses to the effects of asthma. Section six will also present studies that uniquely address the emotional functioning component of asthma related quality of life as it relates to children who have asthma.

Asthma Severity

Asthma severity is classified by both impairment and risk and has been defined as the “the intrinsic intensity of the disease process” (USDHHS, 2007). Asthma impairment in children is assessed by measuring the frequency and intensity of asthma symptoms as well as functional limitations due to asthma. Asthma risk in children is determined by ascertaining the likelihood of asthma attacks, progressive decline in lung growth, or risk of negative effects from medications (USDHHS, 2007).

Asthma severity has been linked to the emotional responses of children who have asthma (Bender & Zhang, 2008; Blackman & Gurka, 2007; Katon et al., 2007; Richardson et al., 2006; Waxmonsky et al., 2006; Winter et al., 2011; Wood et al., 2006, 2007, 2008). The following studies support a relationship between asthma severity, which has been defined and measured variably (Everhart & Fiese, 2009; Moy et al., 2001), and the emotional responses in children who have asthma. In general, the literature presents a positive or direct relationship between asthma severity and internalizing, or anxious and depressive symptoms in children.

In one study of youth who had asthma (ages 11-17) ($N = 756$; 74.6% White, 12.3% African American, 2.5% Asian and Pacific Islanders, 7.4% Native American, 3.3% Other), youth that met specific criteria were considered to have severe asthma, or to be at higher risk for asthma exacerbation (Richardson et al., 2006). Asthma was considered to be severe if youth met any one of the following criteria in a one year period: having had 4 or more ambulatory visits, 1 or more asthma related ED visits, asthma hospitalizations, or prescription of oral steroids for asthma. This study reported a

significant relationship between a component of asthma severity, asthma symptoms, and internalizing disorders (Richardson et al., 2006). After controlling for asthma severity, the intensity of asthma treatment, medical comorbidities and demographics, youth in this study with anxiety and/or depressive symptoms significantly reported more asthma symptoms in a 2 week period when compared with youth who had asthma who did not have anxiety and/or depressive symptoms (Richardson et al., 2006). Using logistic regression, having a depressive or anxiety disorder was found to be strongly associated with the following symptoms: Shortness of breath $OR = 2.42$, 95% CI [1.60, 3.65], chest tightness $OR = 2.22$, [1.46, 3.37], cough $OR = 2.02$, [1.34, 3.03], a persistent cold $OR = 1.74$, [1.12, 2.70], wheezing with a cold $OR = 2.05$, [1.34, 3.14], and wheezing without a cold $OR = 2.57$, [1.69, 3.90] (Richardson et al., 2006). Youth that had a depressive or anxiety disorder averaged 5.4 symptom days, 95% CI [4.6, 6.1], compared to an average of 3.5 symptom days in youth who had asthma who did not have depressive or anxiety disorders, 95% CI [3.2, 3.8] (Richardson et al., 2006).

Using the 2003 National Survey of Children's Health as the data source, a study of 102,353 randomly selected children ages 0-17 was conducted (Blackman & Gurka, 2007). The determination of asthma was made in this study by asking parents the following question: "Does your child currently have asthma?" If the parent responded affirmatively, the parent was then asked to rate their child's asthma severity by stating the "degree of difficulty" caused by their child's asthma. The parents were asked to rate this as minor, moderate, or severe (Blackman & Gurka, 2007). In this study, children with severe asthma were found to have more than four times the odds of having problems

associated with depression and anxiety than children who did not have asthma, $OR = 4.47$, 99% CI [2.27, 8.80] (Blackman & Gurka, 2007).

In another study (ages 8-18) ($N = 104$; 37.5% White, 25.9% African American, 21.1% Hispanic, 15.4% Other), similar associations between asthma symptoms and emotional responses of children who had asthma were discovered (Bender & Zhang, 2008). Asthma severity variables measured were health care usage related to asthma in the last month, and symptoms due to asthma in the last 2 weeks (Bender & Zhang, 2008). Higher negative affect in this study, determined by more depressive and anxious symptoms, (measured by the Revised Children's Manifest Anxiety Scale (RCMAS), and Children's Depression Inventory (CDI)), were associated with child reports of more frequent asthma symptoms (Bender & Zhang, 2008). Child self-reported anxiety predicted missed school days due to asthma, $OR = 1.068$, 95% CI [1.004, 1.136], and child self-reported depression predicted missed school days due to asthma $OR = 1.065$, 95% CI [1.006, 1.127] (Bender & Zhang, 2008). This study demonstrated a potential predictive link between negative affect, defined as anxious and depressive symptoms, and asthma severity indicators which were increased asthma symptoms, and manifestations of symptoms leading to missed school days.

Other reports have similarly linked components of asthma severity and emotional responses (Katon et al., 2007). In one such study of youth ages 11-17 years ($N=781$ with asthma; $N = 598$ random controls, 81.6% Caucasian, 4.8% African American, 6.5% Asian/Pacific Islander, 4.3% Native American, 2.8% Other), youth were considered to be at medical risk for asthma exacerbation if they met the criteria for any one of the

following health care use variables over a 1 year period: 4 or more asthma ambulatory visits, 1 or more asthma related visits to the ED, 1 or more asthma hospitalizations, or 1 or more prescriptions of oral steroids for asthma (Katon et al., 2007). Youth in this study who had one or more depressive or anxiety disorder were also reported to have more asthma symptom days when compared to youth who did not have these internalizing disorders (Katon et al., 2007). Similarly, youth who had asthma were reported to be two times more likely to have an internalizing diagnosis related to depression and anxiety than youth in the study that did not have asthma (Katon et al., 2007).

In another study pertinent to asthma severity of youth ages 7-17 ($N = 129$; 65% African American, 13% White, 18% Hispanic, 4% Other) a relationship between emotional responses (depressive symptoms) and asthma severity or asthma disease activity was reported (Waxmonsky et al., 2006). The term *disease activity* was used by the researchers to differentiate between their participants who had used long-term control medication and the then current definition by National Heart, Lung, and Blood Institute of *asthma severity* which encouraged assessment before beginning long-term control treatment (NIH, NHLBI, 2002; Waxmonsky et al., 2006). Disease activity was rated as mild, moderate, or severe using the NHLBI guidelines for asthma severity (Waxmonsky et al., 2006). The number of daytime and nighttime symptoms per week, as well as FEV₁ (forced expiratory volume in 1 second) were additional factors used to determine disease activity. Twenty-six percent of youth who had asthma in this study also reported depressive symptoms. A significant positive correlation was found between self-reported depressive symptoms in youth and asthma disease activity, $r = 0.25$. Parental reports of

their children's internalizing disorders were also positively correlated to disease activity or asthma severity, $r = 0.18$.

In another study of 215 children diagnosed with asthma ages 5-12 years (58% White, 29% African American, 12% mixed race, 1% Asian American; 3% Latino ethnicity), after controlling for mother's education, medication adherence, child sex and age, asthma severity was found to be positively and significantly related to child internalizing symptoms and positively, though non-significantly related to child externalizing symptoms (Winter et al., 2011). Asthma severity in this study was measured using two different methods, parent reports and spirometry measures. The Functional Severity of Asthma Scale was used for parental reports of asthma severity. Spirometry results of forced vital capacity (FVC), forced expiratory flow in 1 second (FEV_1), and forced expiratory flow 25%-75% of vital capacity (FEV_{25-75}) were used by a pediatric pulmonologist to determine asthma severity. An $FEV_1 < 40\%$ of predicted score was classified as severe asthma, $FEV_1 > 40\%$ and $< 60\%$ was classified as moderate asthma, and $FEV_1 80\%$ or greater was classified as slight or normal asthma (Winter et al., 2011). In this study increased asthma severity (reported by caregivers), was significantly related to greater child internalizing symptoms, $\beta = .15$, $p = .05$ and non-significantly related to greater externalizing symptoms, $\beta = .13$, $p = .08$. These results were reported after controlling for the effects of medication adherence, maternal education, and child age and gender (Winter et al., 2011).

Wood et al., (2006, 2007, 2008) conducted several studies testing the pathways of effect of a bio-behavioral family model in pediatric asthma that posited that negative

family emotional climate affects child depression that in turn affects asthma severity. Asthma severity was measured using the NHLBI guidelines, taking into consideration both pulmonary function (FEV_1) and daytime and nighttime asthma symptoms (Wood et al., 2008). Negative family emotional climate was a predictor of child depression, $\beta = .19$, $p < .01$ which was a predictor of asthma disease severity, $\beta = .23$, $p < .01$. Parent-child relational security, which is related to a child's positive or negative emotions felt in the presence of his/her parents, was reported as an independent contributor rather than a mediator as had been originally predicted. Parent-child relational security was also reported as inversely predicting child depression, $\beta = -.40$, $p < .001$ (Wood et al., 2008).

Asthma severity in the preceding research studies, measured with varying methods, demonstrated a link between emotional responses of school-aged children who have asthma, such as anxious and depressive symptoms, and asthma severity. Strong associations were reported between asthma severity, number of asthma symptoms, and asthma symptom days and the emotional responses of children who have asthma (Bender & Zhang, 2008; Blackman & Gurka, 2007; Katon et al., 2007; Richardson et al., 2006; Waxmonsky et al., 2006; Winter et al., 2011; Wood et al., 2008).

The preceding studies additionally illustrate the fact that school-aged children are rarely isolated as the sole focus when conducting studies on asthma severity and emotional responses of children who have asthma (Winter et al., 2011). The combination of adolescents with school-aged children in studies of asthma severity and children's emotional responses appears to be a more common investigative approach (Bender &

Zhang, 2008; Blackman & Gurka, 2007; Katon et al., 2007; Richardson et al., 2006; Waxmonsky et al., 2006; Wood et al., 2006, 2007, 2008).

The preceding studies support the use of asthma severity as a potential predictor of child emotional responses related to asthma. Additionally, findings from these studies align with a systematic literature review of asthma severity and child QOL in pediatric asthma which reported direct correlations between asthma severity and child QOL in 9 out of fourteen studies (Everhart & Fiese, 2009). The need for studies limited to the school-aged population and the effects of asthma severity on their emotional QOL or the frequency of their emotional responses related to asthma was also supported.

Asthma Morbidity Factors

Asthma morbidity in school-aged children can be measured by many indicators. Two common asthma morbidity indicators for children who have asthma are child missed school days and child medical services use. Child medical services use due to asthma was operationalized as days hospitalized and times to the ER due to asthma.

School Absences

Approximately 10.5 million school days are missed each year because of asthma (Akinbami et al., 2011). Children with asthma reportedly missed more school than children who did not have asthma (Moonie et al., 2006); in one report children who had asthma missed nearly three times more school days when compared to children who did not have asthma (Blackman & Gurka, 2007). One dissimilar report of 353 students in the Dallas Texas Independent School District reported no difference in missed school days

by children who had asthma when compared to children who did not have asthma (Millard, Johnson, Hilton, & Hart, 2009). Regardless, asthma severity has been linked to school absences in one study of predominately minority children (Moonie et al., 2006) as well in a study using the 2003 National Survey of Children's Health (Blackman & Gurka, 2007).

In a study of asthma severity and missed school days ($N = 9014$, Subset $N = 874$ who had asthma; grades K-12; 94% African American, 5.2% White), after adjusting for demographic factors and days of enrollment, mean days absent from school increased as asthma severity increased, $p = .007$. This study not only reported more missed school days for children who had asthma, but reported severity of asthma as a significant link to missed school days (Moonie et al., 2006).

Another study used logistic regression to compute the odds ratios for various behavioral outcomes related to parentally reported asthma severity (Blackman & Gurka, 2007). Children with moderate asthma had over 4 times the odds of missing more than 10 days of school per year when compared to children who did not have asthma, $OR = 4.98$, 99% CI [3.85, 6.44]. Children in this same study with severe asthma had 13 times the odds of missing greater than 10 days of school per year when compared to children who did not have asthma, $OR = 13.00$, 99% CI, [7.33, 23.07] (Blackman & Gurka, 2007).

Associations have also been reported between missed school days for children who have asthma and their emotional responses (Bender & Zhang, 2008; Daniel et al., 2012). In one study of children who had asthma ($N = 104$; ages 8–18; 37.5% White, 25.9% African American, 21% Hispanic, 15.3 % Other), children's emotional response

scores significantly predicted missed school days, when controlling for medication adherence (Bender & Zhang, 2008). Children's self-rated depression and anxiety scores significantly predicted missed school days, $OR = 1.065$, 95% CI [1.006, 1.127] and $OR = 1.068$, [1.004, 1.136] respectively (Bender & Zhang, 2008).

In another similar study ($N = 147$; ages 6-13; 33.3% White, 25.6% African American, 40.1% Latino), emotional responses of school-aged children and missed school days were found to be associated (Daniel et al., 2012). After controlling for poverty, missed sleep, a symptom related to asthma severity (USDHHS, 2007), was significantly related to anxiety in Latino children, $R^2 = 0.19$, $F(2, 48) = 5.78$, $p = .006$. However, a significant association between anxiety and missed sleep was not found in African American children, $R^2 = 0.01$, $F(2, 34) = 0.03$, $p = .967$ or Non-Latino White children, $R^2 = 0.08$, $F(2, 42) = 1.88$, $p = .165$ (Daniel et al., 2012). Stronger associations between missed sleep and school absences were also found in children with higher levels of anxiety when compared to children who had lower anxiety scores, $\beta = .34$, $p < .05$ (Daniel et al., 2012). Conversely, children in this study with lower levels of anxiety also had stronger reported associations between ED use and missed sleep, when compared to children who had high anxiety scores, $p < .01$ (Daniel et al., 2012).

Clearly a relationship has been reported in the literature between the emotional responses of school-aged children and missed school days. Additional reports that link asthma severity to the number of missed school days have also been reported. As was stated earlier in Chapter 1 of this paper, previous theoretical models that address chronic illnesses have posited that the effects of chronic illness severity on quality of life are

mediated by resources and barriers factors (Stuifbergen et al., 2005; Stuifbergen et al., 2000). Using a similar line of reasoning, the effects of asthma severity on the child emotional functioning QOL in school-aged children could potentially be mediated by barrier factors such as missed school days (Stuifbergen et al., 2005). Absence of school days could be considered a barrier to positive emotional functioning quality of life. As school-aged children who have asthma miss school, it may make it more difficult for them to academically achieve, be involved in extra-curricular activities, and maintain friendships (Walker, 2013). These barriers, which are potentially influenced by the severity of asthma, may then mediate the effects of asthma severity on emotional functioning QOL in school-aged children who have asthma.

Child Medical Services Use

In the United States in 2007, asthma was responsible for 6.7 million office visits, 0.64 million ED visits, and 157,000 hospitalizations in children ages 0-17 years (Akinbami et al., 2011). Increased use of medical services has been linked to internalizing disorders in children who have asthma (Goodwin et al., 2005; Morrison et al., 2002) and significantly and negatively associated to health related QOL (Swartz, 2010). Probable diagnosis of depressive and anxiety related disorders were positively associated with higher use of healthcare service for asthma (Goodwin et al., 2005); higher depressive symptoms in inner city children were associated with asthma related hospitalizations in the last year (Morrison et al., 2002).

Morrison et al., (2002) did a pilot study with 46 inner-city children, ages 6-17 who had asthma (41% African American, 26% White, 26% Hispanic, 7% Other), to examine the relationship between objective measures of asthma severity and severity of depression (Morrison et al., 2002). Findings included an association between asthma related hospitalizations in the past year and higher scores of depression, $p = .03$ and a 30% prevalence of likely, very likely, or almost certain major depressive disorder found in this population (Morrison et al., 2002).

In another pilot study of children who had asthma, ages 5-11 ($N = 74$), those who had more than one anxiety or depressive disorder, also had higher number of ED visits and inpatient hospitalizations when compared to children that did not have anxiety or depressive disorders (Goodwin et al., 2005). Although these findings did not reach statistical significance, they suggest a link between internalizing disorders in children who have asthma and asthma morbidity factors, particularly the use of medical services (Goodwin et al., 2005).

Another study with similar findings was conducted of 193 caretakers of children who had asthma (86% mothers; children ages 2-12; 64% Hispanic, 34% African American). Study findings included reports of positive relationships between asthma symptom severity and asthma primary care visits, $r(191) = .41, p < .001$ and asthma symptom severity and the number of asthma related ED visits, $r(191) = .31, p < .001$ (Silver et al., 2005).

Generalizing the previously mentioned models of chronic illness (Stuifbergen et al., 2000), child medical services use could be viewed as a mediating barrier factor to the

effects of asthma severity on child emotional functioning QOL. Increased use of medical services suggests that children are spending their time in locations that require them to focus on the manifestations of their chronic illness. Increased use of medical services for children who have asthma may also potentially have an effect on the psychological growth and development of these children (McNelis et al., 2000; Sattler, 2001). The use of medical services for asthma (Walker, 2012) may potentially mediate the effects of asthma severity on emotional functioning QOL for children who have asthma.

Child Problem Behaviors

Associations between emotional responses in children who have asthma and behavioral problems were consistently reported in the literature (Berz et al., 2005; Blackman & Gurka, 2007; Katon et al., 2007; McCauley et al., 2007). Internalizing disorders, such as anxiety and depression, often went unrecognized by both the health care system (Katon et al., 2006) and parents (Rockhill et al., 2007) in children who had asthma if they did not act out behaviorally. Children who had asthma were also reported to have higher rates of learning disabilities and difficulty paying attention when compared to children who did not have asthma (Blackman & Gurka, 2007). School-aged children (ages 6-12) who talked to their peers about asthma were more likely to be teased than children who did not talk to their friends about their asthma, $OR = 2.47$, 95% CI [1.57, 3.89] (Pettway, Valerio, & Patel, 2011).

Internalizing Behaviors

As was stated earlier in this paper, asthma severity has been positively linked with depressive and anxious symptoms in many studies of childhood asthma (Bender & Zhang, 2008; Blackman & Gurka, 2007; Katon et al., 2007; Richardson et al., 2006; Waxmonsky et al., 2006; Winter et al., 2011; Wood et al., 2006, 2007, 2008). In an additional study of 48 children, ages 8-12 ($N = 27$ with asthma, $N = 21$ without asthma; 75% Black non-Hispanic, 23% Hispanic, 2% American Indian), asthma status was defined as either having a physician diagnosis of asthma, or having no chronic illness. After controlling for age, gender, and asthma status, children with higher levels of anxiety and depression were also found to be more likely to have interpersonal relationship problems, $\beta = -.46$; $p < .01$ and $\beta = -.71$; $p < .001$ respectively. Interpersonal relationship problems included children feeling that other children did not want to play with them, did not like, or respect them. The interpersonal relationship problems of these children could also be classified as internalizing behavioral problems. Internalizing behavioral problems are often manifested by feelings of low self-esteem or low self-worth (Achenbach & Edelbrock, 1983). This study did not find differences between children who had asthma and controls when examining associations between anxiety and depression and interpersonal relationship problems (Berz et al., 2005).

Externalizing Behaviors

In a previously mentioned study using the 2003 National Survey of Children's Health as the data source (102,353 randomly selected children ages 0-17), children who

had asthma were found to have higher rates of behavioral disorders, attention-deficit/hyperactivity disorder (ADHD), and learning disabilities when compared to children who did not have asthma (Blackman & Gurka, 2007). After adjusting for race/ethnicity, gender, age, income, and parental educational levels, children with severe asthma also had nearly three times the odds of having ADHD when compared to children who did not have asthma, $OR = 2.93$, 99% CI [1.60, 5.39]. Children who had asthma also had greater odds of having learning disabilities, $OR = 3.21$, 99% CI [1.92, 5.37] and behavioral or conduct problems, $OR = 4.18$, 99% CI [2.20, 7.94] than children who did not have asthma. Children who had moderate asthma had 2.58 times the odds of having difficulty with emotions, concentration, behavior, and getting along with others when compared to children who did not have asthma, $OR = 2.58$, 99% CI [2.07, 3.21] (Blackman & Gurka, 2007). As asthma severity increased, the odds ratios of having these behavioral problems also increased (Blackman & Gurka, 2007).

Similarly, in another study of youth who had asthma ($N = 767$; ages 11-17; 80.3% Caucasian, 6.3% African American, 3.5% Asian and Pacific Islanders, 6.8% Native American, 3.2% Other), psychosocial functional impairment was defined using the past 3 months and asking “how much trouble have you had with...” “getting into trouble,” “getting along with kids your age,” and “your school work or doing your job” (McCauley et al., 2007). Youth in this study with at least one anxiety or depressive disorder also had significantly worse psychosocial functioning scores or got into trouble, had more difficulty managing school work, jobs, and interpersonal relationships, $t(765) = 10.42$, $p < .001$ (McCauley et al., 2007).

Significant relationships have been reported in the literature between internalizing disorders, also described as anxiety and depression, and behavioral problems (both internalizing and externalizing) in children who have asthma. Many children who have asthma not only face the possibility of increased anxious and depressive symptoms, but many times have the added difficulty in maintaining appropriate behavior and social relations. Having higher odds for ADHD, learning disabilities, and emotional difficulties may add to the complexity of their behavioral issues, as well as to the emotional burden experienced by many school-aged children who have asthma.

Conceptualizing child behaviors as a mediating factor between asthma severity and child emotional functioning QOL, child problem behaviors could potentially be considered a barrier factor (Stuifbergen et al., 2005). How this variable affects child emotional functioning QOL could partially depend on whether children exhibit no problem behaviors, exhibit problem behaviors externally (Achenbach & Edelbrock, 1983; APA, 2000), or exhibit problem behaviors internally (Achenbach & Edelbrock, 1983; APA, 2000) when confronted with the stress of asthma (Walker, 2013). The potential barriers provided by child problem behaviors may be influenced by the severity of asthma experienced by a child, and may mediate asthma severity on the emotional functioning QOL in school-aged children who have asthma (Stuifbergen et al., 2005; Walker, 2013).

Parental Emotional Responses

Emotional responses in parents have been positively correlated to emotional responses in their children who have asthma (Waxmonsky et al., 2006). Caretakers of

children who had more severe asthma symptoms were reported to have more anxiety, $M = 20.4$, $SD = 20.2$, when compared to caretakers of children who had less severe asthma symptoms, $M = 13.2$, $SD = 14.3$, $p < .01$ (Silver et al., 2005). Children's asthma symptoms were reported to decrease as their mothers' emotional well-being improved (Brown et al., 2008) and pediatric quality of life was reportedly affected by caregiving load (the number of individuals for whom the caregiver had served as a primary caregiver) combined with the effects of parent-child conflict (Murdock et al., 2012). Negative maternal emotional responses have been linked to decreased self-efficacy in coping with their child's asthma episodes (Bartlett et al., 2001, 2004), increased use of health services (Brown et al., 2006), and lower warmth/involvement and greater hostility scores when doing interaction tasks (Celano et al., 2008). Asthma symptoms decreased in children who had asthma, as did rates of unscheduled asthma visits when caregivers of children who had asthma were treated successfully for depression (Brown et al., 2008).

In one study ($N = 193$; caretakers, 86% mothers; children ages 2-12; 64% Hispanic, 34% African American) caretakers of children who had moderate to severe asthma symptoms had anxiety scores that were significantly higher ($M = 20.4$, $SD = 20.2$) than caretakers of children that reported mild to mild intermittent symptoms, $M = 13.2$, $SD = 14.3$, $p < .01$ (Silver et al., 2005). Additionally, hierarchical multiple regression analysis found that the factor *receiving assistance* was the only significant predictor of caretaker anxiety, $\beta = .16$, $p < .05$ (Silver et al., 2005).

In one study ($N = 101$ families; ages of children who had asthma 6-11 years; 93% African American) the relationship between depression in caregivers of children who had

asthma and parenting behaviors was observed (Celano et al., 2008). Most (90%) of the caregivers in the study were mothers. Families were videotaped in a clinic setting as they engaged in structured interaction tasks lasting 5 minutes each (Celano et al., 2008). The three tasks that were measured were the *loss* task, the *conflict* task, and the *cohesion* task. The mechanics of the tasks involved story telling as well as disagreement resolution for the families. Coding scales ranged from 1-9, 1 being no evidence of the behavior, and 9 being high intensity of the behavior. The three parental behaviors that were assessed with these observational ratings were disciplinary skill, hostility, and warmth. Caregiver moderate to severe depressive symptoms were found to be significantly associated with greater hostility scores during the loss and conflict tasks when using a macro-analytic observational coding system, $F(2,198) = 3.45, p = .03$ (Celano et al., 2008).

Relationships between caregiver emotional responses and child quality of life have also been reported ($N = 45$ children who had asthma; ages 7-12 years; 38% African American, 38% Hispanic, 9% Multiracial, 9% White, 6% not reported) (Murdock et al., 2012). In cases of higher levels of parent-child conflict, caregiving load (the number of children and adults for whom the caregiver served) accounted for 47% of the variance in pediatric quality of life, $\beta = -.68, p = .01$ and higher caregiving load was associated with lower pediatric QOL. Conversely, when parent-child conflict was lower, caregiving load accounted for 32% of the variance in pediatric quality of life, $\beta = .57, p = .04$ and caregiver load was associated with higher pediatric QOL. Caregiver's subjective SES was also found to be inversely and significantly associated with caregiver-child conflict, r

(43) = $-.38, p < .01$. Caregiver child-conflict was also directly and significantly associated with family activity restrictions, $r(43) = .46, p < .01$ (Murdock et al., 2012).

Two similar studies conducted by Brown et al. (2006, 2008) focused on the psychiatric symptomatology of caregivers of children who had asthma. In 2006, Brown et al. studied 175 caregivers of children who had asthma (15.4% White, 57.7% African American, 26.3% Hispanic) to determine the prevalence of psychiatric symptoms in caregivers and the relationship of their symptom prevalence to their use of health care services for their children's asthma. Findings included significant correlations between somatic, anxiety, and depression scores of caregivers and asthma related hospitalizations, $r(173) = [0.21, p < .01; 0.21, p < .01; 0.16, p < .05]$, respectively. No significant correlations were found between unscheduled clinic appointments or ED visits and somatic, depression, and anxiety scores (Brown et al., 2006). Additionally, depression in a caregiver was associated with a significant increase (58%) in unscheduled clinic visits for the child, but not in a significant increase in ED visits or hospitalizations. Anxiety in a caregiver was associated with a significant increase (31%) in asthma-related hospitalizations, but not in a significant increase in ED visits, or unscheduled clinic visits (Brown et al., 2006).

The second similar study by Brown et al. (2008) was a quasi-experimental study to examine the impact of anti-depressant treatment on the depression of caregivers and the child's asthma symptoms ($N = 8$; children who had asthma, ages 5-16, 2 = Caucasian, 5 = African American, 1 = Hispanic). Statistical analysis included use of paired Student t -tests using all eight participants. Pearson's correlation coefficient was also used to

examine correlations between outcome measure changes. Findings included the reduction of depressive symptoms of caregivers and improvement in child asthma symptoms, as well as a trend toward the decrease of unscheduled visits related to asthma symptoms, $p = 0.07$ (Brown et al., 2008). Study limitations included the small number of participants, and only 2 completers for the entire 24 week study (Brown et al., 2008).

Studies that focus on the emotional responses of parents or caregivers of children who have asthma generally report higher anxiety, depression, and hostility scores for these parents when compared to controls. Studies such as these also report associations between the emotional responses of parents or caregivers and increased medical service use. A most pronounced question that consistently surfaces when considering such reports regards the temporality of these variables. Does the potentially arduous task of caring for a child who has asthma influence increased parental emotions, which in turn influences asthma management, and ultimately leads to increased medical service use? Or do psychiatric disorders in parents or caregivers of children who have asthma precede their emotional responses, and thus influence the level of care given to school-aged children, ultimately leading to increased medical service use? This is an area that continues to be studied (Richardson et al., 2006; Waxmonsky et al., 2006) and a question that resurfaces when discussing the emotional responses of parents and how they potentially influence the emotional responses of children, and certainly their emotional functioning QOL.

The emotional functioning QOL of caregivers may be viewed as a potential resource factor. Higher levels of emotional functioning QOL could potentially be a

greater resource factor and lower levels of emotional functioning QOL could potentially be a lesser resource factor. The higher the level of caregiver emotional functioning QOL may also bring with it a higher potential to enhance the emotional functioning QOL in the child who has asthma. If caregivers of children who have asthma have less frequent feelings of worry and concern regarding their children's asthma or higher levels of asthma related emotional functioning QOL, their resultant attitudes and actions could potentially positively affect the emotional functioning QOL of their children. In other words, their children may also have less frequent feelings of worry and concern regarding their asthma due to the influence of their parents. Thus, the emotional functioning QOL of the caregivers could be presented as a graduated resource factor, or a factor that has the potential to positively influence the emotional functioning QOL of children who have asthma. As has been discussed previously, using a previously tested theory related to chronic illness (Stuifbergen et al., 2005), the emotional responses of caregivers, or their emotional functioning QOL, may be viewed as a potential mediating factor of asthma severity on the emotional functioning QOL of children who have asthma (Stuifbergen et al., 2005; Walker, 2013).

Asthma Risk Factors

Asthma risk factors in school-aged children such as race/ethnicity and SES are variables that help to identify these children as more susceptible to the exacerbations of asthma (Horner et al., 2002). Prevalence, morbidity, and mortality rates, (Akinbami et al., 2009; ALA, 2012) as well as asthma related QOL emotional functioning scores (Horner et al., 2012) are some of the methods that have been used to study childhood asthma

while considering race/ethnicity and SES. Race/ethnicity and SES were selected as risk factors in this study due to how asthma affects minorities and the poor in a disparate manner (Barr, 2008; Berg et al., 2007; Lee et al., 2006).

Race/Ethnicity

Studies on minority children report them to be disproportionality affected by asthma. Minority children were reported to have asthma prevalence rates 60% higher than children who are not minorities (CDC, 2012a). Black children were reported to be 1.6 times more likely to have current asthma when compared to white children. When considering Hispanic ethnicity combined with race, Puerto Rican children were found to be 2.4 times more likely to have current asthma than non-Hispanic white children. Interestingly, Mexican children were reported to have comparably low asthma prevalence rates by these same comparisons (Akinbami et al., 2009).

The overall picture related to minority children and asthma appears even more vivid when considering morbidity and mortality factors. Information from the National Health Interview Survey, 2001-2011, reported blacks (all ages) with 47% higher asthma attack prevalence rates when compared to whites (ALA, 2012). Data specific to asthma and children reported non-Hispanic black children's ED visit and death rates as 4.1 and 7.6 (respectively) times higher than those of non-Hispanic white children (Akinbami et al., 2009; CDC, 2012d). Additionally, morbidity disparities included black children's asthma related hospitalization rates being 3 times higher than those of white children (Akinbami et al., 2009). Conversely yet consistently, rates of nonemergency ambulatory

health care use by non-Hispanic black children were reported as almost 20% lower when compared to non-Hispanic white children (Akinbami et al., 2009).

Another important issue related to minority children and asthma includes their limited inclusion in important childhood asthma research studies (Bush et al., 2007; Friedman, 2007; Katon et al., 2007; Klinnert et al., 2001; Richardson et al., 2006). The validation of this problem is harder to identify, yet appears highly probable in cases where childhood asthma researchers simply fail to include ethnicity and/or race in their study demographics (Blackman & Gurka, 2007). Reasonably, more studies which include minority children, who carry much of the burden of asthma, are needed to address this deficit.

In one study ($N = 183$ rural school-aged who had asthma; Mean age = 8.78 years, $SD = 1.24$; 46% Hispanic (all but one were Mexican American), 31% White, 22% African American) Hispanic and African children reported that they were more bothered by their asthma symptoms than were non-Hispanic White children. Hispanic school-aged children in this same study had worse emotional functioning QOL scores than non-Hispanic black and white children, $F(2, 177) = 5.25, p < .01$ (Horner et al., 2012).

Socio-economic Status

Socioeconomic status (SES) is another important area of focus when studying childhood asthma. Prevalence of asthma has been reported to be higher in families considered poor (100% of the poverty level; 11.2%) when compared to the near poor (100% to less than 200% of poverty level; 8.7%), and those considered not poor (200%

of poverty level or above; 7.3%) (Akinbami et al., 2011). Poor children have been reported more likely to have been diagnosed with asthma (17%), than children who are not poor (12%) (USDHHS, 2010).

In two different studies, socio-economic status was reported to be unassociated with frequency of health care services use by mothers for childhood asthma (Bartlett et al., 2001; Brown et al., 2006). Socio-economic status in studies of childhood asthma is determined with various non-standardized methods and some studies do not present SES in their reports. Studies of childhood asthma may use Medicaid usage, perception of participants or researchers, college education, occupations of parents, special computations, or household income to determine SES (Walker, 2012). The various methods used to determine SES create difficulty in comparing findings across studies when investigating its influence as a potential interactive variable to the effects of asthma severity on child emotional functioning QOL.

Emotional Responses and Emotional Functioning QOL

Quality of life as it relates to chronic illness has been defined as “the combination of objectively and subjectively indicated well-being in multiple domains of life considered salient in one’s culture and time, while adhering to universal standards of human rights” (Koot, 2001, p.6). Health related QOL pertains to how one perceives one’s health due to an illness (Juniper, 1997). More specific to asthma and children, asthma-related QOL may be defined as “the perceived impact of asthma on a patient’s QOL” (Wilson et al., 2012) or on a child’s QOL.

Recommended child-asthma QOL instruments generally attempt to measure a dimension of emotional impairment in children (Wilson et al., 2012) including anxious and/or depressive symptoms (French, 2001, p.245). These are commonly reported emotional responses in the literature (Goldberg, 2011; Katon et al., 2006; Koinis-Mitchell et al., 2009). Elizabeth Juniper's Pediatric Asthma and Pediatric Asthma Caregiver's Quality of Life questionnaires (PAQLQ, PACQLQ respectively) both contain emotional functioning subsets related to childhood asthma (Juniper et al., 1996a, 1996b). The PAQLQ and the PACQLQ, which have subscales that measure emotional functioning QOL, do not actually measure anxiety or depression in caregivers and children. They do however attempt to identify a subset of anxious and depressive symptoms by measuring emotional responses such as worry or fear as they relate to asthma.

There is a relative paucity of studies that address the asthma related emotional functioning QOL of school-aged children who have asthma. This is partially due to where and how studies are conducted. Many studies that address childhood asthma and quality of life are conducted in foreign countries (Al-Akour & Khader, 2008; Dean et al., 2010; Garcia-Marcos et al., 2007; Lahaye et al., 2012; Rydström, Dalheim-Englund, Holritz-Rasmusseen, Möller, & Sandman, 2005; Yang, Chen, Chiang, & Chang, 2005), thus limiting their generalizability to children in the United States. In other studies conducted in the United States that focus on the QOL of children who have asthma, the emotional functioning component of asthma related QOL is not specifically reported (Daniel et al., 2012; Murdock et al., 2012; Swartz, 2010) or a QOL tool specific to asthma is not used (Dean et al., 2010). However, there are limited studies that do address the emotional

functioning component of asthma related QOL when addressing children who have asthma. The following is a report of studies in the literature that have reported results for the emotional functioning component when measuring QOL in children who have asthma.

In a study investigating QOL in school-aged children who had asthma ($N = 835$; grades 3-5; 97% African American) the researchers sought to explore the associations between peer interactions and emotional quality of life in urban school-aged children who had asthma (Petteway, Valerio, & Patel, 2011). Females were more likely to talk about their asthma to friends, $p < .05$ and were also more likely to report feeling left out, concerned, worried, and troubled due to their asthma than were males, $p < .05$. School-aged males in this same study were more likely to report feeling uncomfortable because of their asthma in the past week than were female school-aged children, $p < .05$. An important finding in this study was significant differences in the emotional functioning QOL when comparing male and female school-aged children who had asthma (Petteway et al., 2011).

In a study of rural children and quality of life ($N = 201$; grades K-4 at recruitment time; 56% White, 35.7% African American, 8.6% Other), the researchers examined the relationships between parent and child QOL and described relationships of asthma severity, asthma education, and missed work days to QOL in both rural children who had asthma and the caregivers of these children (Walker et al., 2008). Reports of this study included child and parent QOL scores showing no significant correlations to each other. A significant association was reported between asthma related child emotional

functioning and parentally reported school days missed, $p = .03$; increased missed school days was found to be associated with decreased child emotional functioning QOL, $p = .03$. Pearson correlation coefficients were not reported by the researchers (Walker et al., 2008).

Another study of rural school-aged children who had asthma ($N = 183$; ages 6-12; 31% White, 22% African American, 46% Hispanic) sought to explore relationships among demographic factors, children's asthma self-management, children's coping, and QOL. Findings from the study included ethnic differences in asthma related emotional functioning QOL scores in school-aged children who had asthma. The study reported worse emotional functioning QOL scores for Hispanic school-aged children when compared to non-Hispanic black and white children who had asthma, $F(2, 177) = 5.25$, $p < .01$ (Horner et al., 2012).

Summary

This chapter presented a review of the literature that supports the use of a theoretical framework to study the effects of asthma severity on child emotional functioning QOL in children who have asthma. The theoretical framework presented in this chapter was patterned after other theoretical models of chronic illness (Stuifbergen et al., 2000, 2005) that posit that the effects of chronic illness severity on QOL are mediated by resource and barrier factors. Potential resource and barrier factors were identified by this researcher after an extensive review of the literature and include: (a) asthma morbidity factors which include child hospitalizations, child ED visits, and child school absences; (b) child behavior factors which include internalizing and externalizing

behaviors, and (c) caregiver emotional functioning QOL. Literature supporting the use of these potential resource and barrier factors in the theoretical model presented by this researcher was also presented in this chapter. Moderating factors or factors that may affect the direction or the strength of the association between the predictor, asthma severity, and the dependent variable, asthma related child emotional functioning QOL were then presented. The moderators that were presented in this paper were race/ethnicity and SES. A final segment of the chapter discussed the rationale for the use of asthma related emotional functioning scale to measure the emotional responses of both children and their parents or caregivers. Limited studies that have specifically reported emotional functioning QOL scores were also presented.

Chapter 3

Methodology

The purpose of this chapter is to present the methodology that was used in this dissertation study, which was part of a larger ongoing parent study (Horner: R01NR007770). The first section of this chapter will present details of the parent study. The second section contains a description of the research design, sampling methods, consent and protection of human subjects, instrumentation, and data analysis of this study.

Parent Study: ACT

The dissertation study was an exploratory, descriptive, cross-sectional, correlational study using data from a subsample of the parent Asthma in Central Texas Project (ACT) with two additional variables. The parent project was the longitudinal ACT project conducted by Dr. Sharon Horner, with funding from the National Institutes of Health, National Institute for Nursing Research (R01NR007770). The ACT project was a stratified randomized control trial intervention with a focus on improving asthma management behaviors in parents and children. The goals of the ACT study also included the reduction of lung inflammation and frequency and duration of asthma symptoms.

Sample Pool: ACT

The ACT study was a 5 year study. Each year of the study had 4 data collection points. The sample pool for the dissertation study contained children in year 4 of the 5 year study. The sample pool was composed of school-aged girls and boys in grades 2-5

with a history of asthma documented on their school records in rural school districts of central Texas. Inclusion criteria for these participants were: (a) parental report that child has an asthma diagnosis made by a medical provider; (b) in the last 12 months has had asthma symptoms; (c) does not have co-morbidity that would prevent participation in study classes, and (d) speaks either the English or Spanish language. Additionally, the parent/guardian who was asked to participate in the study was the caregiver who managed the health of the child in the home.

The parents in year 4 of the ACT study were healthy adults who lived in Hays Consolidated Independent School District in Central Texas and had a child who had asthma. It was permissible for either mothers or fathers to participate in the caregiver questionnaires of the study, but most of the parents who participated in the study were females or mothers. Surveys were provided in either Spanish or English, so caregivers in the study could answer the survey in their desired language.

Children were randomized into one of the three groups in the ACT study. Seventeen participated in a School-Home asthma treatment group where children were taught during 15 minute lunch breaks at school by lay health educators. Children could attend a total of 16 sessions. Content in this treatment group included pathophysiology of asthma, an asthma plan or step-by-step approach for children to use in response to asthma symptoms, scenarios that addressed management of rural triggers to asthma, problem solving techniques when encountering difficulties with asthma (e.g. what to do when they are alone and have an asthma exacerbation), and skills training with placebo meter dose inhalers and peak flow meters. Forty-eight children participated in a Camp-Workshop

asthma treatment group, where the same content was taught in a one day camp setting. Twenty children participated in an In-school attention-control group, where health promotion topics such as nutrition, hand washing, and exercise were taught. The total children in an asthma treatment group were 65 children or 76.5%.

Hays County had a population of approximately 164,050 (Greater San Marcos Partnership, 2013) and is considered to be one of the fastest growing counties in the State of Texas (Hays County Government, 2011). Hays Consolidated Independent School District (HCISD) serves over 221 square rural district miles in northern Hays County, Texas. Five towns served by HCISD were Buda, Driftwood, Kyle, Neiderwald, and Uhland as well as unincorporated communities. Some of the occupations of residents of this school district included farm work and highway service. Other residents commuted to San Marcos or Austin for employment. The Hays County Family Clinic provided medical services and both acute and chronic care for patients who had no primary care provider. Additionally, they had a family nurse practitioner and licensed vocational nurse on staff (HCG, 2011).

Recruitment: ACT

The process for recruitment into the ACT parent study was as follows: Undergraduate research assistants (URAs), working under the supervision of the school nurses identified children in grades 2-5 who also had a history of asthma. A one page invitation letter, signed by the school nurse was then sent by the URAs to 663 parents informing them about the study. An enclosed stamped response post-card was included in

the letter, with a return address to the school nurse. Parents were asked to respond via this post-card if they were willing to be contacted regarding the study. After a period of 2 weeks, the URAs attempted to follow-up with non-responding families. Of the 663 parents from the Hays Consolidated Independent School District that were originally contacted, 241 responded and agreed to be contacted to receive more information about the study. Of the 241 who responded a total of 99 enrolled in the study. Of the 99 enrolled in the study, 87 completed the survey instruments.

Research Design

The research design for this study was exploratory, descriptive, cross-sectional, and correlational using data from a subsample of the ACT study with two additional variables. The use of a correlational design allows researchers to consider several variables and their relationships to a dependent variable, or often a real life situation of study focus (Polit & Beck, 2008). The correlational research design of this study assisted this researcher to more fully describe the relationships of factors associated with the emotional functioning QOL in school-aged children who have asthma. In this particular case, the use of the correlational research design uncovered answers to which variables, and combination of variables affected asthma related child emotional functioning in asthma. Findings from this study also lead this researcher to offer suggestions of intervention strategies for clinicians working with the emotional QOL component associated with asthma (Polit & Beck, 2008).

Sampling Methods

Sample

The population of interest in this study was school-aged children (ages 6-12) and parents of children who have asthma. The participants in this study were recruited from participants already enrolled in year 4 of the ACT study at The University of Texas at Austin. The 87 children enrolled in the ACT study were of diverse racial/ethnic and SES backgrounds. Mean age of these children was 8.74, $SD = 1.22$. Of these children, 53% were Hispanic, 31% were White-non-Hispanic, and 8% were African American non-Hispanic.

Recruitment

The parents and children were already participants in the ACT Study. Thus, the parents and children already met the study inclusion criteria of this study which was identical to the inclusion criteria of the ACT study. An additional small survey regarding their children's behaviors that contained 28 items was added to the standard survey book already being filled out by the parents at the Time 4 home visit. Parents were informed by the Research Assistants (RAs) that there were to be additional items regarding their children's behaviors added to the standard survey booklet that should take no longer than an additional 5 minutes to complete. As is standard, parents had the right to not answer the additional questions if they did not wish to do so, which was stated on the original consent form. Parents were given a \$10.00 gift card for taking time to complete the extra survey questions.

Power Analysis

A recent and extensive review of the literature of studies that examined the relationship between asthma severity and pediatric quality of life reported that inconsistent statistics have prevented researchers from accurately defining effect sizes in these studies (Everhart & Fiese, 2009). This researcher attempted to use accurate statistical reporting to add data regarding effect sizes to the body of research that examines asthma severity and child emotional functioning quality of life (Horner et al., 2012). Using 9 predictor variables with $\alpha = .05$, power at .8, and a medium effect size of 0.15, 68 participants were needed for adequate statistical power (Cohen, 1992; Warner, 2008). At Time 4 of the ACT study, 87 school-aged children and their caregivers completed booklets. Upon review of the booklets, 85 school-aged children and their caregivers met the sample inclusion criteria, and thus this study was able to meet the criteria for adequate power (Cohen, 1992; Warner, 2008).

Consent and Protection of Human Subjects

Institutional Review Board (IRB) Approval

The research project was approved by The University of Texas IRB before it was conducted. The primary goals of the IRB are to minimize risk to human subjects, promote the equity in research of human subjects, and ensure that all participants consent and are fully informed regarding the research and the potential risks associated with the research (The University of Texas at Austin, (2013). IRB approval was sought and received to amend the ACT study by adding an additional survey instrument regarding child

behaviors as part of the dissertation study. An additional incentive of \$10.00 was also offered to participants who accepted this change of protocol and agreed to answer the additional survey items.

Consent

Consent to participate in the study was already given by the participants before the first data collection was conducted at time 1 of the ACT study. The questions regarding their children's behavior as it related to asthma was covered by the original consent form. An additional consent form was not necessary. However, parents were informed of and asked to complete the additional questions in the Behavior Problems Index measure. Implied consent was assumed if parents answered the additional questions.

Data Collection

Data regarding race/ethnicity, and SES were gathered routinely by the RAs at year 4, data collection time 1 in the ACT study. Asthma related caregiver emotional functioning QOL, asthma related child emotional functioning QOL, child behaviors, and asthma severity was gathered at year 4, data collection time 4 (approximately July through August of 2013), of the ACT study. Asthma morbidity factors (number of child ED visits and number of child hospitalizations) was gathered at data collection time 4 and was determined from the three preceding months (from June 2013 through August of 2013) of parent recall. Information regarding child missed school days was gathered by asking parents to recollect their children's absences from February to May 2013, which

was collected at time 3 of the study. Child absences could not be collected at time 4 of the study because children were not in school during the months of June-August, which are the months at time 4 data collection that parents were asked to recall events related to their children and their experiences with asthma.

Total Time Burden

The participants were asked to fill out a survey on their children's behaviors that took approximately 5 minutes. The total time at time 4 for the regular visit, with the addition of the survey of their children's behaviors was approximately 25 minutes.

Data Management: Privacy, Confidentiality, Benefits, Risks to Participants

Privacy of the participants was maintained by administering the surveys in the privacy of the home of the participants. Due to the written nature of the survey method, the overall privacy and of the participants had high potential of being achieved, as their responses were most likely not audible.

Confidentiality was maintained by removing all personal identifiers from the survey instruments. Data were recorded on computers with high assurance passwords. Survey instruments were kept in locked file cabinets when not in use.

There were no known risks to children or to the parents of children as a result of measuring child behaviors as they relate to childhood asthma. If there were risks associated with participation in completing the survey instruments, they were not greater than those encountered in everyday life. In most cases the extra survey items did not take

longer than 5 minutes to complete so that families were not overburdened by answering the added items.

Although it is highly unlikely that participants received direct benefits from completing the survey instruments, it is possible that they may have gained some benefit from sharing aspects of their child's health. The benefits to society were minimal, but the data collected from this study may be used in the future to develop asthma interventions to benefit children and their parents. The research questions included queries regarding mediators and moderators. Moderating and/or mediating influences, when discovered, often guide researchers to areas of focus in future research. This means that the benefits of involvement in the study could have long term benefits in the future for the parents and children of the study as well as other parents and children who suffer the effects of asthma.

Instrumentation

The instruments that were used in the dissertation study that were also part of the ACT project are as follows: Hollingshead Four Factor Index (Hollingshead, 1975), The Severity of Chronic Asthma Scale (Horner et al., 2006), Caregiver Emotional Functioning QOL (Juniper et al., 1996a), and Child Emotional Functioning QOL (Juniper et al., 1996b). Data for frequency of child ED visits, child hospitalizations, and child missed school days were also part of the routine data collection of the ACT and were used in the dissertation study. The one additional instrument that was added for the dissertation study was the Behavior Problems Index (Guttmanova et al., 2007; Peterson & Zill, 1986).

Hollingshead Four Factor Index

The Hollingshead Four Factor Index (Hollingshead, 1975) takes into account gender, occupation level(s), marital status, and education of parents when determining SES. Calculation of SES is performed by the multiplication of a scale score for an individual's occupation by a factor weight of 5, and the multiplication of a scale score for an individual's education by a factor weight of 3. A total SES score is then determined by the addition of these two products.

Educational scale scores are determined by years of schooling, with scoring levels ranging from 1-7. An educational scale score of 7 represents the highest education or graduate level training, and a scale score of 1 represents the least education or less than seventh grade education. Occupational scale scores are determined using scoring levels from 1-9, with a scale score of 9 representing higher paying executive and major professional occupations, and a scale score of 1 representing lower paying occupations such as maids, servants, and janitors. When more than one spouse is gainfully employed, their total scores are first calculated individually and then divided by 2 to obtain an overall family SES score. Socio-economic scores range from 8-63 using this calculation method and fall into five major social strata categories (Hollingshead, 1975). The index has demonstrated internal consistency in a study of 183 rural school-aged children who had asthma, $\alpha = .69$ (Horner et al., 2012). Validity has been supported with correlations to intellectual and academic measures. Using a sample of 140 participants from both the United States and Canada, Hollingshead Four Factor Analysis scores correlated significantly with IQ scores, $r = .43$, $p < .0025$, reading achievement scores, $r = .27$, $p < .0025$.

.0025, spelling achievement scores, $r = .17$, $p < .05$ and math achievement scores, $r = .17$, $p < .05$ (Cirino et al., 2002).

Asthma Severity: ACT Instrument

The SCA (Horner et al., 2006) is a 3-item, 4-point ordinal scale that aligns with current clinical guidelines for the assessment of asthma severity (USDHHS, 2007). Parents rate the frequency of their child's daytime and nighttime asthma symptoms and days their child had limited activity in the past month. Responses for frequency of symptoms range from 1 = "2 times or fewer (0-2) each month" to 4 = "all the time"; limited activities range from 1 = "no limits" in the past month to 4 = "no activities" in the past month. Higher scores indicate higher asthma severity. The scale has demonstrated good item-to-total correlations (0.64 - 0.81) in a school- aged sample of 94 children (58 male, 36 female, mean age was 9.04, $SD = 1.23$, 24% African American, 27% White, and 49% Hispanic), and significant correlations with ED visits, $r = .39$, $p < .01$, child hospitalizations, $r = .38$, $p < .01$, and absenteeism, $r = .32$, $p < .01$ (Horner et al., 2006) (see Appendix A).

Child Medical Services Use and Child School Absences: ACT Data Collection

Frequency of child ED visits, child hospitalizations, and child school absences due to asthma was collected by the ACT study at data collection Times 1, 2, 3, and 4. The data that were used for data analysis in the study was the parents' recollection of child ED visits, child hospitalizations during the period from June through August of 2013 which was collected during time 4 of the ACT study. The data regarding child school

absences were taken from the parent's recollection of their children's absences from February to May 2013 which was collected at time 3 of the study. Parent recollection of child missed school days could not be collected at time 4 of the study because the children were not in school during the months of June-August which was the period of time that the parents were asked to recollect other data such as ED visits and child hospitalizations. The fact that school absences slightly differ in time frame from the measurement of the other variables is a limitation of the study.

Behavior Problems Index (BPI): Instrument Added to Study

The BPI is a 28 item, 3 point ordinal parent response scale that addresses type, range, and frequency of children's behaviors and is used with children from ages 4 - 17 (Guttmanova et al., 2007; Peterson & Zill, 1986). Many of the items were developed using the Achenbach Behavior Problems Checklist (Achenbach & Edelbrock, 1983; Achenbach & Rescoria, 2001); each behavior is rated as: often true = 1, sometimes true = 2, not true = 3. Higher scores indicate more behavioral problems. The Spanish version of the BPI that was used in this study has been used by the U.S. Bureau of Labor Statistics successfully from 1997 to present (National Longitudinal Surveys, [NLS], 2013). The BPI has an externalizing behavior subscale of 17 items and an internalizing behavior subscale of 7 items. Three items are unique in that they load simultaneously for both internalizing and externalizing behaviors, and 1 item in the scale does not load on either of the externalizing or internalizing dimensions. The item that does not load on either of the internalizing or externalizing subscales is used by researchers when different

categories other than internalizing and externalizing behaviors are used to study child problem behaviors.

In a study of 11,840 children (ages 5-17) using data from the 1988 National Health Interview Survey (NHIS) and its associated Child Health Supplement (CHS) internal consistency was calculated at .91 for children ages 5-11 (Brand & Brinich, 1999). In another study of 1,792 children, internal consistency was demonstrated with $\alpha = .88$ for the externalizing subscale, $\alpha = .77$ for the internalizing subscale (Parcel & Menaghan, 1988). The tool has been used with children ages 4-10 who have asthma, demonstrating good internal consistency for the overall tool, $\alpha = .90$; the externalizing subscale $\alpha = .87$, as well as the internalizing subscale, $\alpha = .79$ (Fagnano, Conn, & Halterman, 2008).

Initial research with the BPI was conducted to test for construct validity using the theoretical model that children would have more behavioral problems if they also had problems with family background characteristics. Evidence for construct validity was demonstrated by significant (.05 or better), through low to moderate bivariate correlations that were found between child behavior problems and family background characteristics. Some family background characteristic variables that were significantly correlated with externalizing and internalizing behavior problems were mother's educational attainment, $r(1790) = -.07$, $-.04$, and mother's cognitive achievement, $r(1790) = -.13$, $-.14$, respectively (Parcel & Menaghan, 1988) (see Appendix A).

Caregiver Emotional Functioning QOL: ACT Instrument

This 9 item subscale of Juniper's PACQLQ uses a 7 point response scale (1 = all of the time to 7 = none of the time) measuring caregiver emotional functioning related to their children's asthma. Higher scores indicate greater emotional functioning QOL. Content validity was supported through interviews with healthcare workers and parents of children who had asthma (Olson & Asmussen, 1999). Construct validity was supported by reports by parents of changes in asthma burden and concordant changes in their scores on the PACQLQ (Olson & Asmussen, 1999). In a study of 52 Canadian caregivers of children ages 7-17 years, reliability was supported with an intra-class correlation coefficient for the emotional functioning subset at .80 (Juniper et al., 1996a). In a study of 787 caregivers of children who had asthma, internal consistency was supported with $\alpha = .87$ for Latino caregivers, and $\alpha = .85$ for non-Latino caregivers (Everhart et al., 2012). Additionally, the PACQLQ has been validated for use with families that speak Spanish (Canino et al., 2008).

Child Emotional Functioning QOL: ACT Instrument

This 8 item subscale of Juniper's PAQLQ was revised from a 7 to 5-point Likert response set (1 = never; 5 = always) for children's ease of understanding (Horner et al., 2012); the Spanish translated version used by Dr. Horner demonstrated good internal consistency, $\alpha = .83$. Higher scores indicate worse emotional functioning QOL. Questions focus on emotional experiences related to asthma in the last week (Juniper et al., 1996b; Petteway et al., 2011). Reliability has been supported with an intra-class correlation

coefficient of .89 (Horner et al., 2012); internal consistency has been demonstrated with $\alpha = .88$ (females; $N=119$); $\alpha = .90$ (males: $N = 153$) in children ages 7-17 (Wood et al., 2007).

Data Analysis

Before describing the process of data analysis that was used in this dissertation study, the data screening steps that were taken to properly conduct multiple regression analysis will be presented. Important steps in preparation and data screening prior to running multiple regression included: setting an acceptable alpha, checking for missing data, scale reliability assessments, and checking for any violations of assumptions, outliers, as well as the undue influence of outliers.

Data Screening

Alpha Level, Reliability Checks, and Missing Data

The nominal alpha level or level of significance that was selected for this study was .05 (Field, 2009; Warner, 2008). This alpha level has been used in similar studies in order to achieve adequate power when studying the relationship between asthma severity and child emotional functioning QOL (Horner et al., 2012). Reliability checks of all survey instruments were made using Cronbach's alpha (Field, 2009).

Checking Assumptions

The first assumption that was checked in the data screening process was that the outcome variable (asthma related child emotional functioning QOL), was normally distributed (Field, 2009; Miles & Shevlin, 2006; Warner, 2008). The emotional

functioning subset that was used in this study was a revised version of Elizabeth Juniper's emotional functioning pediatric asthma quality of life (PAQOL) scale (Juniper et al., 1996a) and used a 5-point Likert scale (Horner et al., 2012). It thus met the assumption of being quantitative in nature due to it being interval/ratio in nature (Polit & Beck, 2008). Another related assumption was that the predictor variables needed to be quantitative or categorical (dummy) variables (Field, 2009; Miles & Shevlin, 2006; Warner, 2008). The predictor variables and their levels of measurement for the study were as follows: (a) an interval/ratio measure of SES was calculated using the Hollingshead Four Factor Analysis (Hollingshed, 1975); (b) a nominal, four-category race/ethnicity variable, defined as non-Hispanic white, non-Hispanic black, Hispanic, and Other was recoded into 3 dummy variables; (c) asthma severity is an ordinal response scale and was used as interval/ratio level data; (d) caregiver emotional functioning QOL is a 9 item ordinal response sub-scale and was used as interval /ratio data; (e) child internalizing behaviors is a 7 item ordinal response sub-scale and was used as interval/ratio data; (f) child externalizing behaviors is a 17 item ordinal response sub-scale and was used as interval/ratio data; (g) total/average child hospitalizations and child ED visits were both interval/ratio data, and (h) total/average school absences (child missed school days) were interval/ratio data.

The assumption of linearity was checked by running bivariate scatterplots using SPSS for all possible combinations of variables and was met (Field, 2009). The assumption of homoscedasticity was tested in this study through the examination of bivariate scatterplots between the outcome variable and each of the predictor variables

and was met. Additionally, SPSS was also used to check the scatterplot of both the residuals (ZRESID), which are the differences between the outcome values predicted by the regression model, and the outcome values observed in the sample and the predicted values (ZPRED) (Field, 2009). The ZRESID and ZPRED graph showed evenly distributed dots around zero, meeting the assumptions of both linearity and homoscedasticity (Field, 2009).

The assumption of normally distributed errors was tested by running a histogram, a probability-probability (P-P) plot, and a scatterplot. Using a feature of SPSS and superimposing a normal curve over the histogram was used to give the researcher an idea as to whether the residual distribution was normal (Miles & Shevlin, 2006; Warner, 2008). The histogram and P-P plot illustrated that the assumption had been met by showing relative linearity and normal distribution of errors.

Two statistical diagnostic tests often used side by side when using SPSS to test multicollinearity are the variance inflation factor (VIF) and the tolerance level. If the VIF level had read at 10 or above, the possibility of multicollinearity would have been high. Conversely, as the tolerance level is a reciprocal of the VIF, if the tolerance level had been below .2, multicollinearity may have been a factor, as one of the assumptions necessary to conduct an effective regression test would have potentially be unmet (Field, 2009). If multicollinearity had been discovered between 2 predictor variables, the researcher would have thoughtfully chosen one of the two predictor variables to omit (Miles & Shevlin, 2006). VIF predictor variables ranged in value from 1.078 – 1.352,

indicating no multicollinearity. Tolerance values ranged from .729 - .916, indicating no multicollinearity (Field, 2009).

Checking for Outliers

The method that was used to check for outliers was to do casewise diagnostics using standardized residuals, or residuals converted into z scores to determine if there were residual outliers with an absolute value greater than 3 (Field, 2009). For the purposes of this study, outliers would have been omitted with an absolute value greater than 3 (Warner, 2008). Using SPSS and standardized residuals to execute casewise diagnostics, no dependent variable scores, or scores from the variable child emotional functioning QOL, were found to be outliers or with an absolute value greater than 3.

Research Question 1

Research Question 1 for this study was as follows: What are the relationships among asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors (i.e. child hospitalizations, child ED visits, child missed school days), and asthma related child emotional functioning QOL? In order to answer Research Question 1, bivariate correlations were run using Pearson product-moment correlation coefficient (Pearson r). Pearson's r is used to ascertain both the strength and direction of the relationship between two quantitative variables (Warner, 2008). Pearson's r statistics were run between all potential combinations of predictor variables as well as between all predictor variables and the outcome variable.

The strength and the direction of the correlations were next examined between each predictor variable and between each predictor variable and outcome variable using

an alpha of .05. Using Cohen's d Effect Size Index, the strength of the associations between the variables was then calculated (Cohen, 1992; Warner, 2008).

Research Question 2

Research question 2 of the study was as follows: To what extent do asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors (i.e., child hospitalizations, child ED visits, and child missed school days) account for the variance in asthma related child emotional functioning QOL? Research question 2 was addressed with the goal of evaluating a theoretical model partially derived while conducting an extensive literature review (Walker, 2012) and using multiple regression (Warner, 2008). The variables identified in the literature review that had potential of predicting asthma related child emotional functioning QOL were as follows: (a) asthma severity; (b) caregiver emotional functioning QOL; (c) child externalizing behaviors; (d) child internalizing behaviors; (e) asthma morbidity factor-child ED visits; (f) asthma morbidity factor- child hospitalizations, and (g) asthma morbidity factor- child school missed school days. The raw score version of the regression equation that was used in the multiple regression study is as follows:

$$Y' = b_0 + b_1X_1 + b_2X_2 \dots b_7X_7$$

(Asthma related child emotional functioning QOL = $b_0 + b_1$ *Asthma severity+ b_2 *Caregiver emotional functioning QOL + b_3 *Child internalizing problem behaviors + b_4 *Child externalizing problem behaviors + b_5 *Days absent due to asthma + b_6 *Times to emergency room due to asthma + b_7 *Days hospitalized due to asthma).

Interpreting this formula, one could say that b_1 is potentially representative of the predicted change in Y or the outcome variable (asthma related child emotional

functioning QOL) for a one unit of increase in X_1 or a predictor variable such as asthma severity. This formula also simultaneously controlled for all other predictor variables in the model (Miles & Shevlin, 2006; Warner, 2008). Dummy coding was first executed for race/ethnicity using the formula $k-1$, where k represented the number of groups represented by the categorical variable (Miles & Shevlin, 2006); in this case indicating the need for three dummy coded variables. Then, in an effort to answer RQ2, all of the above listed predictors were entered simultaneously into the regression model to ascertain the main effects of these individual predictors, as well as the proportion of variability explained by the total variables on asthma related child emotional functioning QOL in school-aged children who have asthma (Bennett, 2000). After running a simultaneous regression with all of the predictors in one block, the researcher then attempted to answer the question as to whether the overall multiple regression model significantly predicted the outcome variable or Y or was a good model fit (Warner, 2008). The F ratio was also examined to determine the overall model fit and was considered significant at the preselected α level of .05 (Polit & Beck, 2008). If the p value was equal to or less than .05, it demonstrated the possibility that child asthma emotional functioning QOL might have been predicted significantly better by chance than when using all the predictors to calculate child asthma emotional functioning QOL (Warner, 2008). The researcher then examined the amount of variance, or R^2 that was accounted for by the model. The researcher next examined the t ratios or the potential significance or importance of each predictor in the overall model. Larger t ratios were indicators that the relationship between the predictor and the outcome variable was less likely to be due to chance. The p

values were also examined to ascertain which predictors were potentially significant predictors of the outcome variable after controlling for other predictors (Field, 2009).

Research Question 3

Research question 3 for this study was as follows: To what extent do SES and race/ethnicity modify the relationship between asthma severity and asthma related child emotional functioning QOL? Moderator variables have the potential of affecting the strength or the direction of a relationship between a predictor and an outcome variable (Bennett, 2000; Polit & Beck, 2008).

The moderators of interest in this research study were race/ethnicity and SES. Race/ethnicity is a categorical variable that was dummy coded as is shown in Table 1.

Table 1: Dummy Coding for Race/Ethnicity

Dummy Code Name	D1 = White	D2 = Hispanic	D3 = African American
1 White	1	0	0
2 Hispanic	0	1	0
3 African American	0	0	1
4 Other	0	0	0

SES had been defined in the parent study and was defined in this study using Hollingshead Four Factor Index. It was a continuous variable and thus did not need dummy coding. The process for determining moderating effects of these two variables varied due to the differing types of variables used in the study, as SES was considered a continuous variable, and race/ethnicity was considered a categorical variable. The process

discussed in the following section is often called moderated multiple regression analysis (Aguinis, 2004).

The first potential moderator that was addressed using this analysis procedure was the continuous variable SES. The following are the regression equations that were used to test the interaction between SES and asthma severity as predictors of child emotional functioning QOL (Warner, 2008):

Equation used in Block 1: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity – centered variable) + $b_2 Z$ (Socio-economic status centered variable) + e

Equation used in Block 2: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity- centered variable) + $b_2 Z$ (socio-economic status centered variable) + $b_3 XZ$ (socio-economic status-centered variable * asthma severity centered variable) + e

In the above equations, Y = the dependent variable, a = intercept, b_1 = the coefficient relating the variable X to the dependent variable Y when Z equals 0 (Fairchild & MacKinnon, 2009), b_2 = the coefficient relating the potential moderator variable Z to the dependent variable Y when X equals 0 (Fairchild & MacKinnon, 2009), b_3 = the coefficient whose value is used to estimate the moderation effect, e = residuals or error in the regression equation (Aguinis, 2004; Fairchild & MacKinnon, 2009).

In the first step of the moderated multiple regression analysis the variables that were considered potential moderators were centered. The researcher then created a new

variable or product term by computing the product between the predictor asthma severity centered score and the centered score of SES (the suspected moderator variable); (Aguinis, 2004). This product term (socio-economic status-centered variable * asthma severity centered variable) was used in the second block of the moderated multiple regression analysis (Bennett, 2000).

After creating the product term, the next step in block 1 of the multiple regression moderator analysis was to first enter in the centered predictor variable (asthma severity) and the centered potential moderating variable (SES), as independent variables with the variable asthma related child emotional functioning QOL as the dependent or outcome variable (Aguinis, 2004).

In Block 2 of the regression procedure, the researcher then entered in the product term (socio-economic status-centered variable * asthma severity centered variable), as an additional predictor into the model (Bennett, 2000). After performing multiple regression with block 1 and 2 entered into the model, the researcher then examined the F ratio, the p value or the statistical significance of the model, and the R^2 change. The F ratio was useful to help determine if the regression model explained a significant portion of the variance in the outcome variable (Warner, 2008). The p value aided in determining if the results of the multiple regression were statistically significant (Warner, 2008). If the p value was less than the predetermined α of .05, and thus was statistically significant, then the R^2 change was examined. The R^2 change was examined to determine if there was a significant increase or decrease in asthma related child emotional functioning QOL above and beyond the variance that was explained by block 1 of the model which contained

asthma severity and SES as predictors of asthma related child emotional functioning QOL. A significant R^2 change may have implied a moderating effect or interaction effect between the variables asthma severity and SES when predicting the outcome variable asthma related child emotional functioning QOL (Aguinis, 2004).

Similarly, there were many steps involved when considering the potential moderator effects of the categorical variable *race/ethnicity* (Miles & Shevlin, 2006). Similar equations to the ones used to test the moderating effects of SES were used to consider the possible interaction effects between race/ethnicity and asthma severity as predictors of child emotional functioning QOL (Warner, 2008), and are as follows:

Equation used in Block 1: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity – centered variable) + $b_2 Z$ (Race/ethnicity-three dummy coded variables (White, Hispanic, African American)) + e

Equation used in Block 2: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity-centered variable) + $b_2 Z$ (Race/ethnicity-three dummy coded variables-White, Hispanic, African American) + $b_3 XZ$ (race/ethnicity-dummy coded variable White * asthma severity centered variable; race/ethnicity dummy coded variable Hispanic * asthma severity centered variable; race/ethnicity dummy coded variable African American * asthma severity centered variable) + e

In the above equations, Y = the dependent variable, a = intercept, b_1 = the coefficient relating the variable X to the dependent variable Y when Z equals 0 (Fairchild & MacKinnon, 2009), b_2 = the coefficient relating the potential moderator variable Z to

the dependent variable Y when X equals 0 (Fairchild & MacKinnon, 2009), b_3 = the coefficient whose value is used to estimate the moderation effect, e = residuals or error in the regression equation (Aguinis, 2004; Fairchild & MacKinnon, 2009).

The first step in testing for moderating effects was to dummy code the tri-level variable as follow: 0 = non-Hispanic white; 1 = non-Hispanic black; 2 = Hispanic; 3 = Other. Prior to creating the interaction term between the variables asthma severity and race/ethnicity, it was necessary to center the variable asthma severity. The researcher then created three dummy coded interaction terms by multiplying the centered asthma severity variable by the each dummy code for race/ethnicity (race/ethnicity-dummy coded variable White * asthma severity centered variable; race/ethnicity dummy coded variable Hispanic * asthma severity centered variable; race/ ethnicity dummy coded variable African American * asthma severity centered variable). The final next step in the moderator analysis was to run multiple regression with block 1 containing the three dummy coded variables representing race/ethnicity (White, Hispanic, African American), and the predictor variable asthma severity. The next step was to run block 2 of the model with the three dummy coded variables for race/ethnicity and asthma severity along with the added 3 interaction terms (race/ethnicity-dummy coded variable White * asthma severity centered variable; race/ethnicity dummy coded variable Hispanic * asthma severity centered variable; race/ ethnicity dummy coded variable African American * asthma severity centered variable). The R^2 change significance was then examined to determine whether there was an interaction effect or if there was a significant increase or decrease in asthma related child emotional functioning QOL above and beyond the

variance that was explained by asthma severity and race/ethnicity. An interaction effect would have implied a potential moderating effect of race/ethnicity to the effects of asthma severity on asthma related child emotional functioning QOL (Aguinis, 2004).

Research Question 4

Research question 4 for this study was as follows: To what extent does caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factors, (i.e., child hospitalizations, child ED visits, child missed school days) mediate the relationship between asthma severity and asthma related child emotional functioning QOL? Mediators have been defined as variables that determine how associations occur between predictor and outcome variables (Bennett, 2000; Warner, 2008).

There are 4 steps that were used to test for mediator effects between the predictor and the outcome variable (Miles & Shevlin, 2006). Step 1 was to demonstrate that the predictor variable was a significant predictor of the outcome variable when using multiple regression (Miles & Shevlin, 2006). Testing for mediator effects is only considered appropriate when a significant and direct effect between a predictor variable and an outcome variable has been previously discovered (Bennett, 2000; Miles & Shevlin, 2006). The significantly predictive power of the variable asthma severity on the outcome variable asthma related child emotional functioning QOL had already been reported in a previous study (Horner et al., 2012), and thus the relationship of these variables could appropriately be tested for mediating effects.

The second step in mediator analysis involved regressing the mediator variables on the predictor variable. One example of this was the regressing of caregiver emotional functioning QOL on asthma severity. Several models were tested regressing the other potential mediator variables on asthma severity. These other mediator variables were as follows: child internalizing behaviors, child externalizing behaviors, child ED visits, child hospitalizations, and child missed school days. Effects were next examined in step 3 to determine if the mediators that qualified as significant outcome variables to asthma severity also qualified as predictors of asthma related child emotional function QOL when controlling for asthma severity (Miles & Shevlin, 2006).

Step 4 would have been conducted if and after mediator effects were determined in order to establish if the mediator effects were complete mediator effects or partial mediator effects (Miles & Shevlin, 2006). A complete mediating effect could potentially have been determined if and when the effect size of asthma severity on asthma related child emotional functioning QOL was zero when controlling for any of the above listed potential mediator variables. A partial mediator effect could have potentially been determined if the effect size between the predictor asthma severity and asthma related child emotional functioning QOL was reduced but not entirely eliminated when similarly controlling for mediators variables (Miles & Shevlin, 2006).

Finally, if needed, an additional analysis called the Sobel test would have been run to test for the indirect and direct effects. This test has been called a “formal significance test” (Preacher & Hayes, 2004, p.719) that can be used after it has been established that a mediator effect is present. The Sobel test is considered to be a more

thorough test because it allows researchers to look at the direct and indirect effects in a mediator analysis (Preacher & Hayes, 2004).

Summary

The methodology chapter of this research study began with an explanation of the recruitment procedures, sample details, and settings of both the parent and the dissertation study. The research design of the dissertation study was then described which included sampling methods and measures for the protection of human subjects. Instrumentation, which included specifics of the measurement tools, as well as reliability and validity measures, was then presented. The final portion of the methodology chapter was a detailed account of the data analysis that was used in the study of interest.

Chapter 4

Results

This chapter has three sections with the purpose of reporting the research study results. The first section will report the demographics of the study participants. The second section will offer descriptive statistics related to the variables of the study. The final and third section will present data analysis to address the research questions of the study.

Demographics of Study Participants

Eighty-seven caregivers and 87 children of caregivers initially completed the study surveys. However, two caregiver surveys and two corresponding children surveys were removed from the data set before analysis because the caregiver survey instruments had been filled out by a teenage sister and a visiting aunt who were not the official caregivers/guardians of the children in the study, and thus did not meet the sample inclusion criteria. The total number in the study that met eligibility criteria was 170 participants, $N = 85$ caregivers (guardians); $N = 85$ children of caregivers. Seventy-two (84.7 %) of the parents that filled out the survey instruments were mothers and twelve (14.1%) were fathers; one was a grandmother (1.2%). Mothers and one grandmother ranged in age from 25 to 55 years, $M = 37.03$, $SD = 5.968$. The grandmother's age was 47 years. The twelve fathers who filled out the survey at time 4 were not asked their ages, however the ages of their wives ranged from 29 to 55 years, $M = 39.58$, $SD = 7.128$.

Children ranged in age from 7 to 11 years, $M = 8.64$, $SD = 1.184$. The grade level of the children ranged from grades 2 through 5, $M = 3.35$, $SD = 1.131$. There were 25

(29.4%) 2nd graders, 24 (28.2%) 3rd graders, 17 (20.0%) 4th graders, and 19 (22.4%) 5th graders. The race/ethnicity of the children in the study was 52.9% Hispanic, 32.9% White, non-Hispanic, 7.1% African American non-Hispanic, and 7.1% other. There were 52 (61.2%) male children and 33 (38.8%) female children.

Using Hollingshead’s Four Factor Index, families in the study fell into the following social strata or SES categories ranging from 7.9% major business or professionals to 12.9% unskilled laborers or menial service workers. Educational levels of fathers ranged from 5.9 % with less than a 7th grade education to 5.9% holding a graduate degree. Details regarding SES as calculated by using Hollingshead’s Four Factor Index and educational levels of participants are provided in Tables 2 and 3.

Table 2: SES of Caregivers using Hollingshead’s Four Factor Index

Five Social Strata Categories	Scores	Re-categorized Scores	n	%
Major business and professional	66-55	66-55	6	7.9
Medium business, minor Professional, technical	54-40	54.50-40	27	31.8
Skilled craftsmen, clerical, sales workers	39-30	39.50-30	17	20.0
Machine operators, semiskilled workers	29-20	29.50-20	24	28.2
Unskilled laborers, menial service workers	19-8	19.50-8	11	12.9

Note: A conservative approach was used to re-categorized scores with 0.5 decimal points. Lower verses higher social strata ranges were selected for scores 54.50, 29.50, and 19.50.

Table 3: Educational Level of Caregivers

Educational Level	Mothers		Fathers	
	n	%	n	%
Less than 7th grade	4	4.7	5	5.9
Junior high school (9th grade)	4	4.7	6	7.1
Partial high school (10th or 11th grade)	4	4.7	5	5.9
High school graduate	25	29.4	23	27.1
Partial college/specialized training	17	20.0	28	32.9
Standard college or university graduate	24	28.2	13	15.3
Graduate degree	7	8.2	5	5.9

Descriptive Statistics of Variables

Descriptive Statistics for study measures are reported in Table 4. The number of days parents reported their children were hospitalized due to asthma from June through August of 2013 ranged from 0-1 days, $M = .01$, $SD = .108$. Only one child was hospitalized for 1 day during the report period and thus the variable *days hospitalized due to asthma* was removed from the data analysis as well as from subsequent research questions. The number of times parents reported their children had been to the emergency room for asthma care from June through August of 2013 ranged from 0-2 times, $M = .05$, $SD = .263$. Only 3 children went to the emergency room for asthma in this time frame, totaling only 4 emergency room visits. Due to the small number of children who went to the emergency room, the variable *times to the ER due to asthma* was also removed from the data analysis as well as from subsequent research questions. The number of times parents reported their children missed school because of asthma from February 2013 through May 2012 ranged from 0-4 days, $M = .45$, $SD = .970$. Eighteen children missed

school for a total of 28 missed school days. Due to this small number of children who missed school, this variable was transformed to a dichotomous variable for subsequent analysis, missed school days (yes, no) (Warner, 2008).

Table 4: Descriptive Statistics of Variables

Variable	N	Range	Minimum	Maximum	Mean	Std. Deviation	α
Child Problem Behaviors Total (24 items)	85	29.00	24.00	53.00	31.36	6.407	.889
Child Problem Behaviors Internalizing Subset (7 items)	85	6.00	7.00	13.00	8.40	1.575	.529
Child Problem Behaviors Externalizing Subset (17 items)	85	25.00	17.00	42.00	22.96	5.384	.889
QOL Child Emotional Functioning (8 items)	84	20.00	20.00	40.00	34.15	5.861	.790
QOL Caregiver Emotional Functioning (9 items)	85	45.00	18.00	63.00	55.61	9.456	.896

The total number of children in an asthma treatment group was 65 children or 76.5%. Because some children received an intervention, and others only received an attention control intervention, ANOVA was run to compare means of the three groups of children. No differences were found between the three groups on the following variables: child emotional functioning QOL, caregiver emotional functioning QOL, asthma severity, child problem behaviors - externalizing, child problem behaviors - internalizing, days absent due to asthma, days hospitalized due to asthma, times to the ER due to

asthma. An independent sample *t*-test was next run to compare the treatment group participants $N= 65$ to the control group, $N= 20$. No significant differences were found between these two groups.

Data Analysis

The Statistical Package for the Social Science (SPSS Statistics 20) was used to analyze the data collected in this study. Prior to performing the statistical analysis, data screening steps were taken to examine the data for entry errors, missing values, and outliers of undue influence. Entry errors were checked and corrected by returning to the original survey instruments if there was a questionable entry. The method that was used to check for outliers was to do casewise diagnostics using standardized residuals, or residuals converted into *z* scores to determine if there were residual outliers with an absolute value greater than 3 (Field, 2009). Using SPSS and standardized residuals to execute casewise diagnostics, no dependent variable scores, or scores from the variable child emotional functioning QOL, were found to be outliers or with an absolute value greater than 3. Other data screening checks included checking assumptions of linearity, normal distribution of errors, homoscedasticity, and multicollinearity. Reliability checks of all survey instruments were run using Cronbach's α . Child Problem Behaviors Internalizing subset showed weak internal consistency, $\alpha = .529$, (see Table 4) (Field, 2009).

In order to check for assumptions, a histogram, P-P plot, and plot of the regression standardized residual (*ZRESID) against the regression standardized predicted value (*ZPRED) was run using SPSS. The histogram and P-P plot showed relative

linearity and normal distribution of errors. The ZRESID and ZPRED graph had evenly disbursed dots around zero, thus meeting the assumption of both linearity and homoscedasticity (Field, 2009). Multicollinearity was checked using both the variance inflation factor (VIF) and tolerance values. VIF predictor variable values ranged from 1.078 - 1.352, which were under the value of 10, thus indicating no multicollinearity. Tolerance values ranged from .729 - .916 and were greater than the value of 0.1 also indicated no multicollinearity (Field, 2009).

Research Question 1

Research Question 1: What are the relationships among asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor - missed school days, and asthma related child emotional functioning QOL? In order to answer research question 1, bivariate correlations were run using Pearson's r for all variables except for the dichotomous variable *missed school days*, which was run with Spearman rho. The results are presented in Table 5. Child emotional functioning QOL scores were reverse coded so that higher scores represented less frequency of feelings such as worry, frustration, anger related to asthma or better QOL. Child problems behaviors (both internalizing and externalizing) scores were also reverse coded so that higher scores represented more child problem behaviors.

Asthma related child emotional functioning QOL was significantly and negatively correlated with asthma severity, externalizing child problem behaviors, and internalizing child problem behaviors. Greater asthma severity was associated with worse emotional

functioning in children related to asthma, $r = -.30$, $p < .01$. More externalizing, and internalizing, child problem behaviors were reported when children reported more negative feelings regarding their asthma, $r = -.43$, $p < .001$ and $r = -.26$, $p < .05$ respectively.

Caregiver emotional functioning QOL was significantly correlated with asthma severity, and with both children's externalizing and internalizing problem behaviors. Greater asthma severity was correlated with more caregiver negative feelings related to their children's asthma, $r = -.39$, $p < .001$. Greater externalizing and internalizing problem behaviors in children were associated with decreased caregiver emotional functioning QOL, $r = -.25$; $r = -.22$, $p < .05$ respectively.

Table 5: School-Aged Children's Emotional Functioning QOL

Variable	2	3	4	5	6
1) Child emotional functioning QOL	.15	-.30 **	-.43 ***	-.26*	.071
2) Caregiver emotional functioning QOL		-.39 ***	-.25 *	-.22 *	.105
3) Asthma severity			.06	.13	-.17
4) Child problem behaviors externalizing				.57 ***	-.102
5) Child problem behaviors internalizing					.004
6) Missed school days (yes, no) ^a					

Note: Pearson's r used for all correlations except for *missed school days*
 Key* = $< .05$; ** = $< .01$; *** = $< .001$; ^a = Spearman rho

Research Question 2

To what extent do asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor – missed school days, account for the variance in asthma related child emotional functioning QOL? Research question 2 was addressed using multiple regression (Warner, 2008). The variables used as potential predictors of asthma related child emotional functioning QOL in the regression models were as follows: (a) asthma severity; (b) caregiver emotional functioning QOL; (c) child externalizing behaviors; (d) child internalizing behaviors. These variables were retained as potential predictors of asthma related child emotional functioning QOL in the regression model due to their significant relationship with the outcome variable (see Table 5). The variable that was removed from the model due to its non-significant relationships with all other variables in the model was *missed school days*.

Multiple regression was run to ascertain the main effects of these individual predictors, as well as the proportion of variability explained by the total variables on asthma related child emotional functioning QOL in school-aged children who have asthma (Field, 2009; Warner, 2008). The model accounted for 26% of the variance in asthma related child emotional functioning. The model fit was good, $F(4, 79) = 7.051, p < .001$. Significant predictors of asthma related child emotional functioning QOL were as follows: asthma severity, $\beta = -.31, p < .01$; child externalizing problem behaviors, $\beta = -.43, p < .001$. The results of the regression analyses are shown in Table 6.

Table 6: Child Emotional Functioning QOL Regression Model

Variables	<i>B</i>	<i>SE</i>	β	<i>p</i>	<i>R</i> ²
Constant	55.603	6.774	-	<.001	
Asthma severity	-2.462	.84	-.31	.004	
Caregiver emotional functioning QOL	-.048	.07	-.08	.48	
Child problem behaviors externalizing	-.470	.13	-.43	<.001	
Child problem behaviors internalizing	.034	.44	.01	.94	
					.26

Note: *B* = unstandardized coefficient; β = standardized coefficient; *R*² = coefficient of determination or variance

Research Question 3

Research question 3: To what extent do SES and race/ethnicity modify the relationship between asthma severity and asthma related child emotional functioning QOL? Moderated multiple regression analysis was used to answer the first part of research question 3 to determine whether SES modified the relationship between asthma severity and asthma related child emotional functioning (Aguinis, 2004). A preliminary step before checking for moderators was to center the continuous predictor and moderator variables (Fairchild & MacKinnon, 2009; Miles & Shevlin, 2006). The variable SES was centered by taking each SES score and subtracting the mean of SES. The predictor variable asthma severity was centered by taking each asthma severity score and subtracting the mean of asthma severity. A check to be sure that the centered variables

had been accurately determined was made by running a descriptive check of the centered variables and finding their means to be zero, thus verifying their centeredness (Miles & Shevlin, 2006).

The next step executed in the moderator analysis was to create a product term using the centered variable SES and the centered main predictor variable asthma severity (Miles & Shevlin, 2006). The following are the two regression equations that were used to test the interaction between SES and asthma severity as predictors of child emotional functioning QOL (Warner, 2008).

Equation used in Block 1: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity - centered variable) + $b_2 Z$ (Socio-economic status centered variable) + e

Equation used in Block 2: Y (Asthma related child emotional functioning QOL)
 $= a + b_1 X$ (asthma severity - centered variable) + $b_2 Z$ (socio-economic status centered variable) + $b_3 XZ$ (socio-economic status-centered variable * asthma severity centered variable) + e

In the above equations, Y = the dependent variable, a = intercept, b_1 = the coefficient relating the variable X to the dependent variable Y when Z equals 0 (Fairchild & MacKinnon, 2009), b_2 = the coefficient relating the potential moderator variable Z to the dependent variable Y when X equals 0 (Fairchild & MacKinnon, 2009), b_3 = the coefficient whose value is used to estimate the moderation effect, e = residuals or error in the regression equation (Aguinis, 2004; Fairchild & MacKinnon, 2009).

In block 1 of the moderator analysis, asthma severity and SES were entered as the independent variables and asthma related child emotional functioning QOL was entered as the dependent variable. In Block 2 of the moderator analysis procedure, the product term was added as an additional predictor into the model (Bennett, 2000). A moderator effect would have been considered present if the interaction between SES and asthma severity had explained a statistically significant amount of variance in child emotional functioning QOL (Bennett, 2000). After executing the regression analysis with block 1 and 2 entered into the model, the following interpretation was made and is presented in table 7. Model 1 demonstrates a good model fit, $F(2, 81) = 5.450, p = .006$; 11.9% of the variance in asthma related child emotional functioning QOL was explained by asthma severity and SES, $R^2 = .119$. Model 2 illustrates the results after adding the product term (socio-economic status-centered * asthma severity centered) into the model. After adding the product term in model 2, the R^2 change was .000, $F(1, 80) = .002, p = .97$. This represented a non-significant change in the R^2 ; there was no evidence of moderating effect of SES or an interaction effect between the variables asthma severity and SES when predicting the outcome variable asthma related child emotional functioning QOL (Aguinis, 2004).

Table 7: Model Summary using SES as a Potential Moderator

Model	<i>R</i>	R^2	<i>Adjusted R²</i>	<i>SE</i>	$R^2\Delta$	<i>F</i> Δ	<i>Sig. F Change</i>
1	.344	.119	.097	5.570	.119	5.450	.006
2	.344	.119	.086	5.604	.000	.002	.966

The next variable that was considered as a potential moderator to asthma severity when predicting asthma related child emotional functioning QOL was the variable race/ethnicity. Race/ethnicity is a categorical variable and thus required dummy coding. The three dummy coded variables that were created were White, Hispanic, and African American. Each dummy coded variable was then used to create three product terms by individually multiplying them with the centered main predictor variable asthma severity, thus rendering the following three variables: (a) asthma severity * White; (b) asthma severity * Hispanic and (c) asthma severity * African American (Warner, 2008).

The following are the two regression equations that were used to test the interaction between race/ethnicity and asthma severity as predictors of child emotional functioning QOL:

Equation used in Block 1: Y (Asthma related child emotional functioning QOL) = $a + b_1 X$ (asthma severity - centered variable) + $b_2 Z$ (Race/ethnicity-three dummy coded variables (White, Hispanic, African American)) + e

Equation used in Block 2: Y (Asthma related child emotional functioning QOL) = $a + b_1 X$ (asthma severity-centered variable) + $b_2 Z$ (Race/ethnicity-three dummy coded variables-White, Hispanic, African American) + $b_3 XZ$ (race/ethnicity-dummy coded variable White * asthma severity centered variable; race/ethnicity dummy coded variable Hispanic * asthma severity centered variable; race/ethnicity dummy coded variable African American * asthma severity centered variable) + e

In the above equations, Y = the dependent variable, a = intercept, b_1 = the coefficient relating the variable X to the dependent variable Y when Z equals 0 (Fairchild & MacKinnon, 2009), b_2 = the coefficient relating the potential moderator variable Z to the dependent variable Y when X equals 0 (Fairchild & MacKinnon, 2009), b_3 = the coefficient whose value is used to estimate the moderation effect, e = residuals or error in the regression equation (Aguinis, 2004; Fairchild & MacKinnon, 2009).

In block 1 of the moderator analysis, asthma severity and the three dummy codes for White, Hispanic, and African American race/ethnicity were entered as independent variables; asthma related child emotional functioning QOL was entered as the dependent variable. In Block 2 of the moderator analysis, the three product terms which consisted of (asthma severity * White), (asthma severity * Hispanic), and (asthma severity * African American) were added as additional predictors into the model (Bennett, 2000). A moderator effect would have been present if the interaction between race/ethnicity and asthma severity would have explained a statistically significant amount of variance in child emotional functioning QOL (Bennett, 2000). After executing the regression analysis with block 1 and 2 entered into the model, the following interpretation was made.

As shown in table 8, Model 1 demonstrates a good model fit, $F(4, 79) = 2.695, p < .05$; 12% of the variance in asthma related child emotional functioning QOL is explained by asthma severity and race/ethnicity, $R^2 = .120$. Model 2 illustrates the results after adding the product terms, (a) asthma severity * White; (b) asthma severity * Hispanic, (c) asthma severity * African American into the model. After adding the three product terms in model 2, the R^2 change was .007, $F(3, 76) = .200, p = .90$. This

represented a non-significant change in the R^2 ; there was no evidence of moderating effect of race/ethnicity or an interaction effect between the variables asthma severity and race/ethnicity when predicting the outcome variable asthma related child emotional functioning QOL (Aguinis, 2004). A summary of models 1 and 2, which tested for the moderator or the interaction effects of race/ethnicity on asthma severity as a predictor of asthma related child emotional functioning QOL is shown in table 8.

Table 8: Model Summary using Race/Ethnicity as a Potential Moderator

Model	<i>R</i>	R^2	<i>Adjusted R²</i>	<i>SE</i>	$R^2\Delta$	<i>F</i> Δ	<i>Sig. F Change</i>
1	.347	.120	.076	5.635	.120	2.695	.037
2	.356	.127	.047	5.723	.007	.200	.896

Research Question 4

To what extent does caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor - missed school days, mediate the relationship between asthma severity and asthma related child emotional functioning QOL?

The first goal of this researcher was to determine if asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor – missed school days, were significant predictors of asthma related child emotional functioning QOL when using multiple regression (Miles & Shevlin, 2006). The variables used as potential predictors of asthma related child emotional functioning were as follows: (a) asthma severity; (b) caregiver emotional functioning QOL; (c) child externalizing behaviors, and (d) child internalizing behaviors. These variables were

retained as potential predictors of asthma related child emotional functioning QOL in the regression model due to their significant relationship with the outcome variable as was previously determined using bivariate correlations. The variable that was removed from the model due to its non-significant relationship with the outcome variable as was determined with bivariate correlation was *missed school days*. The four steps to mediation analysis described in Miles & Shevlin (2006) will be used as a way to organize the following report.

Step 1: “Show that X is a significant predictor of Y , using regression” (Miles & Shevlin, 2006, p. 188). For the purposes of this study X was first represented by the predictor variable asthma severity, and Y was represented by the outcome variable asthma related child emotional functioning QOL. The significantly predictive power of the variable asthma severity on the outcome variable asthma related child emotional functioning QOL has already been reported in a previous study (Horner et al., 2012), thus meeting the appropriateness of testing the relationship between these variables for mediating effects. Additionally, the predictive power of asthma severity in relation to asthma related child emotional functioning QOL was also supported in this study, $\beta = -.309, p < .01$. The other variable that met the criteria of step 1, as it was found to be a significant predictor of asthma related child emotional functioning QOL, was child externalizing behaviors, $\beta = -.432, p < .001$.

Step 2: “Show that X is a significant predictor of M using regression” (Miles & Shevlin, 2006, p. 188). For the purposes of this study X was represented by the main predictor variable asthma severity, and M , which stands for the potential mediator, was

represented by the following potential mediator variables: (a) caregiver emotional functioning QOL; (b) child externalizing behaviors, and (c) child internalizing behaviors. Considering step 2 of the Miles & Shevlin mediation analysis (2006), the next goal of this researcher was to determine whether the variables that were significant predictors of asthma related child emotional functioning were also significant outcome variables of asthma severity when running multiple regression. Only one potential mediator variable met this criteria which was caregiver emotional functioning QOL, $\beta = -.389, p < .001$.

Step 3: “Show that *M* is a significant predictor of *Y*, when we control for *X*” (Miles & Shevlin, 2006, p. 188). For the purposes of this study, *M* represented the potential mediator caregiver emotional functioning QOL and *Y* represented the outcome variable asthma related child emotional functioning QOL. Using multiple regression analysis, caregiver emotional functioning QOL was determined to be a non-significant predictor of asthma related child emotional functioning QOL, and thus did not meet step 3 of the mediator criteria (Miles & Shevlin, 2006). Due to these findings, the final step to mediator analysis, or step 4 which is to check for complete or partial mediator effects (Miles & Shevlin, 2006), as well as the Sobel test, which is used to test for indirect and direct effects (Baron & Kenny, 1986), were not run.

Chapter 5

Discussion and Conclusions

The purpose of this exploratory, descriptive, cross-sectional, correlational study was to explore the influence of factors identified in the literature, on school-aged children's emotional responses to asthma. Guiding this study was a theoretical model that proposed that the impact of chronic illness severity on QOL is potentially mediated by both resource and barrier factors (Stuifbergen & Rogers, 1997). The population of interest was 85 school-aged children (ages 6-12) and parents of children who have asthma that were recruited from participants already enrolled in year 4 of the ACT study at The University of Texas at Austin.

Discussion of Findings

Research Question 1 :What are the relationships among asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor - child missed school days, and asthma related child emotional functioning QOL?

The variable *days hospitalized due to asthma* was removed earlier from the research study due to there being only 1 child who visited the hospital during the report period. Similarly, the variable *times to ER due to asthma* was removed from the research study as only 3 children went to the emergency room during the report period. There were no significant correlations found between the variable *missed school days* and other variables in the study. Significant inverse correlations were found between asthma related

child emotional functioning QOL and each of the following variables: (a) asthma severity; (b) child internalizing behaviors, and (c) child externalizing behaviors. Asthma related emotional functioning QOL in children decreased in our study as their asthma severity increased. Decreased emotional functioning related to their asthma could have been a logical consequence to children who potentially had more asthma exacerbations. Decreased emotional functioning may have also been influenced by the unique ways families responded and organized during times of asthmatic crisis. Families who were calm may have influenced better asthma related emotional functioning in their children, and conversely, families who responded in a more chaotic fashion may have contributed to a worse asthma related emotional functioning in their children (Fiese, Winter, Wamboldt, Anbar, & Wamboldt, 2010). The findings of this study are similar to reports in child asthma literature which extensively report asthma severity as being inversely related to pediatric QOL (Everhart & Fiese, 2009; Santos, Crespo, Silva, & Canavarro, 2012), although the subset emotional functioning QOL has rarely been addressed (Horner et al., 2012; Petteway et al., 2011; Walker et al., 2008).

Other study findings included children with more externalizing behavior problems (cheating, bullying, getting into trouble in school, arguing, irritability, difficulty paying attention, and easily their losing temper), also reporting more negative feelings related to their asthma. More internalizing behaviors (excessive dependency on others, crying, withdrawing, and non-involvement with others) were also reported in children who had more negative feelings regarding their asthma. One study similarly reported that children who more frequently expressed negative emotions also had more reported problem

behaviors (Slatcher & Trentacosta, 2012). One potential rationale for this is that children in our study may have used acting out or withdrawing behaviors as a way of handling their increased negative feelings regarding their asthma. The unique manner in which children responded to their feelings, either with externalizing or internalizing behaviors may have been due to their unique personalities and differing methods children used to handle and cope with their asthma (Lahayeab, Fantini-Hauwelc, Van Broeck,, Bodarte, & Luminetab, 2011).

Significant inverse relationships were also found between caregiver emotional functioning QOL and each of the following variables: (a) asthma severity; (b) child internalizing behaviors, and (c) child externalizing behaviors. Findings from this study implied that when children had greater asthma severity, or more daily asthma symptoms, limitations to activities, and/or nights disrupted due to their asthma, their caregivers may have had increased negative feelings related to asthma. Decreased emotional functioning for some caregivers in our study may have been related to their feeling tired, overwhelmed, or frightened as they performed the many tasks associated with their children's asthma (Walker, 2013).

Our study findings implying that negative feelings of caregivers related to their children's asthma intensified as asthma severity in their children worsened are similar to what has been reported previously in child asthma literature. Caregiver emotional functioning QOL has been reported as having an inverse relationship to child asthma severity (Walker et al., 2008), as well as children's frequency of asthma symptoms (a component of asthma severity) (Stelmach et al., 2012). Similarly, higher maternal stress

scores at baseline have been associated with higher asthma disease severity in children at a one year follow-up (Nagana et al., 2010). However, depressive symptoms in caregivers have also been reported unrelated to children's asthma severity (Szabo, Mezei, Kvari, & Cserhati, 2010).

Other study findings included negative relationships between caregiver emotional functioning QOL and children's internalizing and externalizing problem behaviors. In our study, as children's problem behaviors increased, so did negative feelings of caregivers toward their children's asthma. Because causality cannot be determined by correlation, it is interesting to consider if the lowered asthma related emotional functioning QOL of caregivers possibly influenced the problem behaviors of their children, or if the problem behaviors of their children possibly influenced the caregivers' lowered asthma related emotional functioning QOL. Similar to our study findings are studies reporting a positive correlation between family conflict and child behavioral and emotional problems in children who had asthma, $r = .43, p < .01$, (Santos et al., 2012) and reports that negative maternal expressions of emotions were positively correlated with child problem behaviors, $r = .52, p < .01$ (Slatcher & Trentacosta, 2012).

Research Question 2 : To what extent do asthma severity, caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor - missed school days, account for the variance in asthma related child emotional functioning QOL?

Asthma severity, caregiver emotional functioning QOL, child internalizing problem behaviors, and child externalizing problem behaviors were the potential

predictor variables used in the multiple regression model due to their previously determined significant relationship with asthma related child emotional functioning. After running a multiple regression model, the variables that were determined to be significant predictors of asthma related child emotional functioning and accounted for 26% of the variance were: (a) asthma severity, and (b) child externalizing problems. This means that children in our study who had worse asthma symptoms and more acting out behaviors might also have had more negative feelings such as fear of asthma attacks, anger, worry, and concern due to their asthma. However, it should be noted that there are other unidentified factors that may predict the negative feelings of children regarding their asthma, as 74% of the variance was unaccounted for by this model.

Asthma severity has been previously reported as a significant inverse predictor of asthma related child QOL (Everhart & Fiese, 2009; Santos et al., 2012). Increased acting out behaviors in children as their asthma severity increased has also previously been reported in the literature (Santos et al., 2012). What was unexpected about these results was that internalizing behaviors of children in our study (excessive dependency on others, crying, withdrawing, and non-involvement with others) were not found to be a significant predictor of asthma related child emotional functioning. This relationship was expected by this researcher because of current research demonstrating significant associations between internalizing behaviors and asthma in children (Verkleij et al., 2011; Winter et al., 2011). The low Cronbach's alpha score for the internalizing problems behavior measure ($\alpha = .529$), may have been a factor that influenced these findings. However, this study identified externalizing behaviors as a significant predictor of child

asthma related emotional functioning QOL, instead of the more frequently studied internalizing behaviors that have been targeted in current child asthma studies (Feldman et al., 2010; Verkleij et al., 2011; Winter et al., 2011).

Research Question 3 : To what extent do SES and race/ethnicity modify the relationship between asthma severity and asthma related child emotional functioning QOL?

This analysis was executed by this researcher because of the higher prevalence rates reported for both the poor and minorities (USDHHS, 2010), and higher mortality and morbidity rates reported for minorities when studying childhood asthma (Akinbami et al., 2009). Using moderator analysis (Aguinis, 2004; Warner, 2008), SES and race/ethnicity were determined to have no modifying effects or interaction effects on the relationship between asthma severity and asthma related child emotional functioning QOL.

The findings related to SES were similar to findings in the literature (Chen, Bloombert, Fischer, & Strunk, 2003), however it was unexpected that race/ethnicity had no modifying effect on the relationship between asthma severity and asthma related child emotional functioning QOL. Previous studies have reported significant associations between child asthma QOL and race/ethnicity. Worse asthma related emotional functioning QOL scores have been reported for school-aged Hispanic children when compared to non-Hispanic white and black children (Horner et al., 2012); higher QOL for non-Hispanic white children has been reported when compared to Hispanic and African American children who had asthma (Daniel et al., 2012). The lack of significant findings, demonstrating no moderator effects of race/ethnicity on the relationship between asthma

severity and asthma related child emotional function in our study may have been influenced by the unequal sample size of the subgroups (52.9% Hispanic, 32.9% White, non-Hispanic, 7.1% African American non-Hispanic, and 7.1% other) (Aguinis, 2004). The lack of moderator effects found in this study may also have been influenced by the homogeneity of part of the sample ($N=65$ received asthma intervention). Homogeneity may prevent a full range of values, and may negatively influence the ability of a multiple regression model to detect moderator effects (Bennett, 2000).

Research Question 4 : To what extent does caregiver emotional functioning QOL, child internalizing and externalizing behaviors, asthma morbidity factor - child missed school days mediate the relationship between asthma severity and asthma related child emotional functioning QOL?

The variable *missed school days* was removed from the analysis due to its non-significant relationship with other variables in the model. Using mediator analysis, (a) asthma severity and (b) child problem externalizing behaviors were determined to be significantly and inversely predictive of asthma related child emotional functioning QOL. However, child problem externalizing behaviors was determined to be a non-significant outcome variable of the main predictor, asthma severity. Thus, caregiver emotional functioning QOL, child internalizing and externalizing behaviors did not mediate the relationship between asthma severity and asthma related child emotional functioning QOL.

This finding was unexpected as these variables were identified through an extensive literature review (Walker, 2012) and a qualitative research study (Walker,

2013), and appeared to be potential resource or barrier factors using the theoretical model selected by this researcher (Stuifbergen et al., 2000). However, these findings may also simply signify that more exploratory research is needed to identify resource and barrier factors, or mediators to the relationship of asthma severity as a predictor of asthma related child emotional functioning QOL. Other factors reported in the literature that might qualify as potential barrier factors in future studies include: depressive and anxious symptoms in caregivers as well as in children who had asthma, developmental problems in children, family conflict, personal strain perceived by parents, children's problems in maintaining attention, negative life stressors, and negative family emotional climate. Other factors reported in the literature that might qualify as potential resource factors in future studies include: self-efficacy of caregivers to cope with asthma attacks, positive parenting styles, parent-child relational security, and children's ability to cope (Walker, 2012). These potential barrier and resource factors were not included in this study because data collection, except for two added variables, was part of another on-going study.

Conclusions

The findings from this study demonstrate that school-aged children's increased externalizing behaviors may be a potentially stronger predictor than school-aged children's internalizing behaviors of their decreased asthma related emotional functioning QOL. It may be possible that children who have asthma and also have more asthma related feelings of frustration and fear, and/or feelings of being different and left out (Juniper et al., 1996b) may also be driven to act out more than children who have less

emotional feelings related to asthma. These findings have similarity with previous studies that report more frequent recognition of emotional problems by parents and the health care system of children who have asthma and act out externally when compared to children who have asthma and only exhibit internalizing behaviors (Katon et al., 2006; Rockhill et al., 2007).

A possible reason for these somewhat different study findings, which highlight externalizing behaviors as a significant predictor of asthma related emotional functioning QOL, may be the somewhat unique and sole use of school-aged children in our study. This study did not combine reports of both school-aged children and adolescents in the statistical analysis which is a current common approach used by researchers when studying these problems (Bush et al., 2007; Goldberg, 2011; Koinis-Mitchell et al., 2009; Rockhill et al., 2007; Santos et al., 2012; Verkleij et al., 2011). Thus, it may have afforded a potentially more accurate report of school-aged children's emotional responses to the daily effects asthma, possibly accounting for the difference in the findings. Additionally, current literature supports the idea that younger children who have emotional difficulties related to anxiety and depression are often more likely to respond in an outward, irritable fashion, versus the more traditional sullen or internalizing fashion more commonly expressed by adolescents (National Institute of Mental Health [NIMH], 2013). This fact would account for the difference in the way our sample responded to the emotional effects of asthma when compared to many current studies that report more internalizing behaviors when studying children (often ranging from ages 0-17 years) who have asthma.

Study Limitations

Study limitations include the use of a sample in a southwestern state of the country, thus limiting generalizability to other regions of the country. School-aged children participated in one of three randomized groups in the ACT study. Sixty-five school-aged children in two groups received an asthma intervention, and 20 school-aged children in one group received an attention control intervention. The potential influence of the asthma intervention on the 65 participants is a limitation of the study. The variables *days hospitalized due to asthma* and *times to ER due to asthma* were unable to be considered in the study due to the small numbers of children who went to the hospital or the ER during the report period. Additionally, the internalizing behaviors instrument only yielded a Cronbach's alpha of .529 showing low internal consistency, or reliability in this study, thus possibly affecting the data analysis. It is also important to note that although the findings of this multiple regression study are considered statistically significant, they only account for 26% of the variance, demonstrating a need for further research and investigation.

Implications and Recommendations

Implications for Nursing Practice

Health care providers could potentially use the findings of this study to verify the importance of intervening with school-aged children who have asthma and who also exhibit problem behaviors such as impulsivity, temper tantrums, and getting into trouble (Guttmanova et al., 2007; Peterson & Zill, 1986). Understanding that externalizing

behaviors may be related to the emotional functioning QOL of school-aged children who have asthma may provide early cues for health care providers when working with these children. Problem behaviors in school-aged children who have asthma may mean that these children also have negative feelings regarding their asthma that need to be addressed. These findings suggest that it is important for health care providers to look at more than the physiological symptoms of school-aged children who have asthma when performing assessments and interventions. A more holistic approach would strongly support the routine assessment of the emotional impact of asthma on the school-aged child.

Health care providers should also consider educating and intervening with caregivers of school-aged children who have asthma (Swerczek et al., 2013; Tzeng, Chiang, Hsueh, Ma, & Fu, 2010). Educating parents regarding the potential of external behaviors influencing worse emotional functioning could indirectly, yet effectively work toward the mitigation of the negative emotional feelings in children regarding their asthma. Nursing educational interventions might include teaching parents to query their children regarding their asthma related feelings when they observe the problem behaviors of their children increasing. Parents could also be instructed on how to teach their children problem solving techniques when faced with negative situations concerning their asthma (Seid, Varni, Gidwani, Gelhard, & Slymen, 2010). As children learn to problem solve situations that influence feelings of worry, fear, or frustration associated with their asthma, their emotional functioning QOL may improve as well as their problem behaviors. Additionally, nursing interventions could include teaching parents to use role

playing to help children simulate methods of handling difficult situations their children may face when dealing with their asthma (Stewart, Masuda, Letourneau, Anderson, & McGhan, 2011). As parents learn to communicate and work appropriately with their school-aged children, acknowledging and working with the emotional component of their children's illness, their children may gain improved asthma related emotional functioning QOL over time as well as improvement of their problem behaviors.

Important in these recommendations is the fact that the nursing profession should enlist the help of trained professionals to assist school-aged children with problems related to their emotional functioning. It would be advisable for nurses to gather and have mental health resources, such as names and phone numbers of trained community professionals, available for school-aged children and their caregivers who are identified as having emotional difficulties associated with their asthma. Part of what is essential in this preparation is to approach asthma in a manner that addresses both the physiological as well as the emotional difficulties that are encountered by school-aged children and their caregivers due to asthma.

Implications for Nursing Education

The findings of this study imply that nursing faculty should educate nursing students how to perform more than routine physiological assessments when working with school-aged children who have asthma. A suggestion is to include methods that assess the emotional impact of asthma in school-aged children in nursing curriculums. This information could also be added to important nursing textbooks, many who currently do

not address more than the physiological assessment of asthma in school-aged children (Ignatavicius & Workman, 2010; Seidel et al., 2011). Our study results further imply that nurse educators should train nursing students to recognize that problem behaviors in school-aged children who have asthma may be associated with their negative feelings regarding their experiences with asthma (Juniper et al., 1996a). Concordantly, teaching nursing students appropriate interventions to use when working with school-aged children who have asthma could include training them to teach caregivers how to work with their children's issues related to asthma (Swerczek et al., 2013; Tzeng et al., 2010). Training nursing students to recognize the importance of the emotional impact of asthma on school-aged children could also have long term clinical effects. This is because as nursing students complete their education, they will ultimately become the health care providers that will work with school-aged children who have asthma.

Implications for Nursing Research

Intervention research with focus on problem behaviors of school-aged children who have asthma would seem appropriate considering the findings of this study. Perhaps interventions could focus on determining the causes of the problem behaviors and strategizing how to improve the identified problems. Are children acting out because of being teased or singled out at school in relation to their asthma (Walker, 2013)? Are their problem behaviors a manifestation of their worry, anger, frustration, or concern related to their asthma symptoms? Interventions could include working with both school-aged

children who have asthma as well as their caregivers to ascertain how to improve school-aged children's emotional functioning QOL.

Teaching children and caregivers how to manage asthma may be one potential strategy to use to work toward decreasing negative emotional feelings associated with asthma (Juniper et al., 1996a). Additionally, interventions teaching effective coping strategies to children as well as caregivers could be beneficial in affecting the emotional functioning of school-aged children who have asthma (Horner et al., 2012). Education regarding asthma management techniques has been offered by researchers such as Dr. Sharon Horner in the Asthma in Central Texas Project (R01NR007770) to children who have asthma as well as their caregivers. Interventions such as these will most likely have a positive effect on the emotional functioning of both the caregivers and the children.

Continuing to focus on the specific age group of school-aged children versus combining results of adolescents with younger children is another suggestion for future nursing research. Data from these age-specific studies may enhance the ability of nursing researchers to design age appropriate intervention tools that work with problem behaviors as well as the root of problem behaviors of school-aged children who have asthma.

Other study considerations include enlisting larger sample sizes to test the model of asthma severity as a predictor of asthma related child emotional functioning QOL. Further study could include gathering qualitative information from school-aged children as well as their caregivers to identify other potential mediators or resource or barrier factors than those considered in the model presented in this study. Identified mediators may have the potential of becoming a future focused area of nursing intervention with the

potential of improving the emotional functioning of school-aged children who have asthma.

A final suggestion is for future nursing research to continue to consider the directionality of the model of asthma severity as a main predictor of asthma related child emotional functioning QOL. Studies that consider the potential of asthma related child emotional functioning QOL as a predictor of asthma severity also provide a potential model of study when considering the relationships between the variables asthma severity and asthma related child emotional functioning (Wood et al., 2006, 2007, 2008), as the answer of which variables precede the others has not yet been determined.

Summary

School-aged children may act out using externalizing behaviors versus displaying internalizing behaviors to predict the negative emotional impact of asthma in their lives. Moderators and mediators to the model of asthma severity as a main predictor of child emotional functioning QOL should continue to be investigated. Identifying moderators and mediators may assist health care providers in targeting and developing appropriate intervention tools to use when considering the emotional functioning QOL of school-aged children who have asthma.

Appendix A-Instruments

SCA- Severity of Chronic Asthma Scale

BPI- Behavior Problems Index

PACQLQ- Pediatric Asthma Caregiver's Quality of Life Questionnaire

PAQLQ- Pediatric Asthma Quality of Life Questionnaire

Severity of Chronic Asthma

In the past month, how many times each week has your child have asthma symptoms?
En el mes pasado cuantas veces ¿Ha tenido su niño síntomas del asma?

_____ 2 times or fewer (0-2) each week;
dos veces o menos dos veces a la semana

_____ more than 2 times/week;
mas que dos veces a la semana

_____ every day/ cada dia

_____ all the time/ todas los dias

In the past month, Has your child woken up at night with asthma symptoms?
En el mes pasado cuantas veces ¿Ha despertado su niño durante la noche con síntomas del asma?

_____ 2 times or less (0-2) each month;
dos veces o menos dose veces al mes

_____ 3-4 times a month;
3 a 4 veces al mes

_____ 5 or more times a month;
5 o mas veces al mes

_____ frequent/ mucho dias

In the past month, have asthma symptoms limited your child's activities?
En el mes pasado cuantas veces ¿Ha el sintomas del asma limita las actividades de su niño?

_____ no limits/ nunca limita

_____ symptoms when exercising and doing sports;
síntomas cuando con ejercicios fuerte y deportes

_____ no hard exercise, can only walk;
no ejercicios fuerte, solo camino

_____ no activities/ nunca actividade

Behavior Problems Index

CHILD BEHAVIORS SURVEY

INDICE DE PROBLEMAS DE CONDUCTA

These statements are about behavior problems many children have. As you read each item, think about your child's behavior over the last three months. Then circle the number that goes best with each item.

Estas afirmaciones son acerca de los problemas de conducta que muchos niños tienen. Cuando usted lea cada oración, decida cuál frase describe mejor la conducta de su niño(a) durante los últimos tres meses y marque con un círculo el número que corresponda a la respuesta que usted escoja.

Often True	Sometimes True	Not True
Frecuentemente cierto	A veces cierto	No es cierto
1	2	3

DIRECTIONS: PLEASE CIRCLE ONE ANSWER FOR EACH QUESTION

DIRECCIONES: MARQUE CON UN CÍRCULO UN NUMERO POR FAVOR

My child... El/Ella... ... has sudden changes in mood or feelings. ... tiene cambios repentinos de ánimo o de emociones.	1	2	3
... feels or complains that no one loves him/her. ... siente o se queja de que nadie lo (a) quiere.	1	2	3
... is rather high strung, tense and nervous. ... está algo excitable, tenso (a) y nervioso (a)	1	2	3
... cheats or tells lies. ... engaña o dice mentiras.	1	2	3
... is too fearful or anxious. ... está demasiado muy temeroso (a) o ansioso (a).	1	2	3

Often True Frecuentemente cierto 1	Sometimes True A veces cierto 2	Not True No es cierto 3		
My child... El/Ella... ... argues too much. ... discute demasiado.		1	2	3
... has difficulty concentrating, cannot pay attention for long. ... tiene dificultad para concentrarse, no puede prestar atención por mucho tiempo.		1	2	3
... is easily confused, seems to be in a fog. ... se confunde con facilidad, parece que estuviera en la nubes.		1	2	3
... bullies or is cruel or mean to others. ... intimida o es malo (a) o cruel con los demás.		1	2	3
... is disobedient at home. ... es desobediente en casa.		1	2	3
... does not seem to feel sorry after he/she misbehaves. ... no parece arrepentirse después de portarse mal.		1	2	3
... has trouble getting along with other children. ... le cuesta llevarse bien con otros niños.		1	2	3
... is impulsive, or acts without thinking. ... es impulsivo(a), o actúa sin pensar.		1	2	3

Often True Frecuentemente cierto 1	Sometimes True A veces cierto 2	Not True No es cierto 3		
My child... El/Ella... ... feels worthless or inferior. ... siente que no vale nada o que es inferior a los demás.	1	2	3	
... is not liked by other children. ... no es querido(a) por los otros niños.	1	2	3	
... has a lot of difficulty getting his/her mind off certain thoughts (has obsessions). ... tiene mucha dificultad para apartar de su mente ciertos pensamientos (tiene obsesiones).	1	2	3	
... is restless or overly active, cannot sit still. ... es inquieto(a) o demasiado activo(a), no puede quedarse quieto(a).	1	2	3	
... is stubborn, sullen, or irritable. ... es terco(a), malhumorado(a) o irritable.	1	2	3	
... has a very strong temper and loses it easily. ... tiene mal genio y pierde la calma con facilidad.	1	2	3	
... is unhappy, sad or depressed. ... se siente infeliz, triste o deprimido(a).	1	2	3	
... is withdrawn, does not get involved with others. ... es retraído(a), no se relaciona con los demás.	1	2	3	

Often True Frecuentemente cierto 1	Sometimes True A veces cierto 2	Not True No es cierto 3		
My child... El/Ella... ... breaks things on purpose or deliberately destroys his/her own or another's things. ... rompe cosas a propósito o destruye deliberadamente las cosas propias o ajenas.	1	2	3	
... clings to adults. ... se pega a los adultos.	1	2	3	
... cries too much. ... llora demasiado.	1	2	3	
... demands a lot of attention. ... exige mucha atención.	1	2	3	
... is too dependent on others. ... depende demasiado de los demás.	1	2	3	
... is disobedient at school. ... es desobediente en la escuela.	1	2	3	
... has trouble getting along with teachers. ... le cuesta llevarse bien con los maestros.	1	2	3	

Pediatric Asthma Caregiver's Quality of Life Questionnaire

Pediatric Asthma Caregiver's Quality of Life Questionnaire (Cuestionario de Calidad de Vida Para Padres de Hijos con Asma) is a licensed instrument and can be located on the following approved website: **<http://www.qoltech.co.uk/>**

Pediatric Asthma Quality of Life Questionnaire

Pediatric Asthma Quality of Life Questionnaire (Encuesta de la Calidad de Vida del Asma Pediátrica) is a licensed instrument and can be located on the following approved website: **<http://www.qoltech.co.uk/>**

Appendix B-IRB Approval Letter



OFFICE OF RESEARCH SUPPORT
THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 Mail Code A3200
(512) 471-8871 - FAX (512) 471-8873

FWA # 00002030

Date: 04/29/13
PI: Sharon D Horner
Dept: Nursing
Title: Asthma in Central Texas Project (ACT PROJECT)

Re: IRB Amendment Approval for Protocol Number 2003-06-0026

Dear Sharon D Horner:

In accordance with the Federal Regulations for review of research studies, the Institutional Review Board (IRB) reviewed your requested amendment to the above referenced protocol and found that it met the requirements for approval.

Approval for your study expires on 12/01/2013. Expires 12 a.m. [midnight] of this date.

The following requested changes were approved:
Add Child Behaviors Survey Instrument related to Asthma

- Continue to use the original approved consent form(s).
- Use the attached approved informed consent document(s).
- You have been granted a Waiver of Documentation of Consent according to 45 CFR 46.117 and/or 21 CFR 56.109(c)(1).
- You have been granted a Waiver of Informed Consent according to 45 CFR 46.116(d).

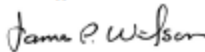
Responsibilities of the Principal Investigator:

1. Report immediately to the IRB any unanticipated problems.
2. Submit for review and approval by the IRB all modifications to the protocol or consent form(s). Ensure the proposed changes in the approved research are not applied without prior IRB review and approval, except when necessary to eliminate apparent immediate hazards to the subject. Changes in approved research implemented without IRB review and approval initiated to eliminate apparent immediate hazards to the subject must be promptly reported to the IRB, and will be reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the subjects continued welfare.

3. Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to participate.
4. Ensure that only persons formally approved by the IRB enroll subjects.
5. Use only a currently approved consent form, if applicable.
Note: Approval periods are for 12 months or less.
6. Protect the confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of subjects and their information.
7. Submit a Continuing Review Application for continuing review by the IRB. Federal regulations require IRB review of on-going projects no less than once a year a reminder letter will be sent to you two months before your expiration date. If a reminder is not received from Office of Research Support (ORS) about your upcoming continuing review, it is still the primary responsibility of the Principal Investigator not to conduct research activities on or after the expiration date. The Continuing Review Application must be submitted, reviewed and approved, before the expiration date.
8. Upon completion of the research study, a Closure Report must be submitted to the ORS.
9. Include the IRB study number on all future correspondence relating to this protocol.

If you have any questions contact the ORS by phone at (512) 471-8871 or via email at orsc@uts.cc.utexas.edu.

Sincerely,


James Wilson, Ph.D.
Institutional Review Board Chair

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Vita

Veronica Garcia Walker's work in the area of psychiatric mental health with children and adolescents has spanned over 20 years in a variety of settings including both in-patient and out-patient settings. In 2002, she was hired to manage two psychiatric neurobehavioral units that served adolescents and children at Meridell Achievement Center in Liberty Hill, Texas. Meridell is a specialized residential treatment center for children and adolescents. Ms. Garcia-Walker was recruited in 2006 from Meridell to teach mental health nursing courses in the graduate and undergraduate nursing programs at The University of Texas at Austin. At this time she also was invited to be an instructor for a course in health-professional Spanish language that included content on the Hispanic culture. The experiences she has gained in her clinical and teaching roles prepared her well for her doctoral study. In fall of 2010 Ms. Garcia-Walker enrolled fulltime as a PhD student at The University of Texas at Austin to conduct her research and complete her doctoral program studying the emotional responses of rural school-aged children who have asthma.

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