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Exploring the Vicious Cycle of Pediatric Asthma and Anxiety

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EXPLORING THE VICIOUS CYCLE OF PEDIATRIC ASTHMA AND ANXIETY

by

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A dissertation submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Nursing
in the College of Nursing
and in the Burnett Honors College
at the University of Central Florida
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Abstract

Asthma is the most common chronic disease of childhood. Children diagnosed with asthma are twice as likely to have a comorbid anxiety disorder as their non-asthmatic peers. The presence of both asthma and anxiety in the pediatric patient creates an environment of poor asthma control, and places them at risk for a variety of negative health events. Little is known about comorbid anxiety's role in asthma health maintenance. Research has identified the link between these two conditions but causation is difficult to conclude. The aim of this thesis is to assess the current state of the science regarding pediatric asthma and anxiety. This integrated review of the literature will identify the factors contributing to the vicious cycle of pediatric anxiety and asthma. Recommendations for practice and future research will be made.

Dedication

To my mother, my confidant, my most steadfast supporter, and my very best friend- I am tremendously grateful for your unconditional love, sage advice, and absolute selflessness. You bring brilliant light and positivity to this world. I owe it all to you.

To Robbie, my study buddy, my enthusiastic explorer and lover of life- I was unaware of just how badly I needed you, until you appeared in my life. Thank you for dragging me kicking and screaming through this project, lending me a patient ear, and giving me concrete to stand on. You are my rock.

To my friends, my chosen family- I am thankful for the outlet of stress you provided these past few years. Laughter is the best treatment for any overwhelming task and you all have provided me with revitalizing fun. Thank you.

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Background

Asthma is one of the most common chronic diseases in the world and prevalence continues to rise, especially in the pediatric population (Centers for Disease Control and Prevention [CDC], 2011). Asthma is characterized by bronchoconstriction and inflammation of the airway (National Heart Lung and Blood Institute [NHLBI], 2007). In 2001, 25.7 million people or 7.3% of the population were affected by asthma. Today, 8.4% of the population is affected with asthma and that number is rising (CDC, 2011). In the United States, one in every 10 children has asthma (Hennessy-Harstad, 2013).

Asthma affects the pediatric population adversely every year and is the third leading cause for the hospitalization of children aged 15 and under (Hall, DeFrances, Williams, Golosinskiy, & Schwartzman, 2010). In addition, asthma related absences from school make up 10.5 million school days missed annually in children ages 5-17 years (CDC, 2011). Asthma is costly, and according to the CDC, poor asthma control is associated with healthcare costs of \$56 billion each year (2011). The National Heart Lung and Blood Institute (NHLBI) defines well controlled asthma as: Symptoms no more than twice/week, nighttime awakenings no more than twice/monthly, no interference with normal activity, use of short-acting beta2 agonist inhaler for symptom control no more than twice/weekly, peak flow greater than 80% of personal best, and exacerbations no greater than once per year. Asthma control is the prevention of asthma exacerbations and asthma related functional deficits. Asthma control is accomplished through the utilization of prophylactic

medications, the avoidance of individual triggers, and the development of an asthma action plan in the event of an exacerbation. Collectively, asthma control is the goal of empowering the affected asthmatic and their family to gain control over this chronic disease (CDC, 2013).

Extensive research has identified possible asthma triggers in an effort to promote asthma control. Some commonly identified triggers include: smoke, pollen, dust, diet, animal dander, strong scents, and exercise (American Lung Association [ALA], 2013). The ALA has documented that strong emotions such as stress and anxiety should be considered potential triggers of asthma (2013).

Additionally, children diagnosed with asthma are two to three times more likely to develop an anxiety disorder than their healthy (non-asthmatic) peers (Ross, Davis, & Hogg, 2007). According to the NIMH, 8% of adolescents age 13-18 years have an anxiety disorder, with symptoms initially surfacing around the age of six. Of these 8%, only 18% have received mental health care. This means that there is a significant portion of the pediatric population struggling with an undetected anxiety disorder.

Anxiety is defined as a group of disorders that are characterized by excessive irrational fear and dread. One component of many anxiety disorders is panic attacks. Panic attacks are episodes of sudden terror characterized by feelings of impending doom usually lasting less than ten minutes. Panic disorders are typified by feelings of breathlessness (hyperventilation), pounding heartbeat, dizziness, and loss of control (National Institute of Mental Health [NIMH], 2013). Prolonged feelings of anxiousness can result in difficulty controlling stress and anxiety levels, resulting in a change in everyday activities (NIMH,

2013). One study conducted on 82 pediatric asthmatic patients found a prevalence rate of 35% or 29 children with at least one DSM IV anxiety disorder (Vila, Nollet-Clemençon, de Blic, Mouren-Simeoni, & Scheinmann, 2000). The likelihood of the pediatric asthmatic population to have a co-morbid anxiety disorder has recently been the subject of increased scrutiny given these prevalence data.

Problem

Undetected anxiety is a problem in the pediatric population; the probability of the pediatric asthma patient to have a comorbid anxiety disorder requires attention. Pediatric asthma morbidity and mortality rates have risen in recent years, signifying the need to update control and prevention measures. The presence of comorbid anxiety in the asthma patient has been found to be associated with greater functional impairment than those without comorbid anxiety (McCauley, Katon, Russo, Richardson, & Lozano, 2007). Therefore, it is imperative to explore the relationship between asthma and anxiety.

From the cognitive theory perspective, “the unpredictable and longitudinal experience with asthma attacks may generate fearful or catastrophic beliefs which provoke panic attacks and anticipatory anxiety” (Lu, et al., 2012, p. 712). Therefore, it can be argued that living with an erratic, chronic condition in childhood may be anxiety inducing in itself. Additionally, anxiety disorders may follow an unpredictable course as well. The presence of feelings of anxiousness and worry in generalized anxiety disorder (GAD) are frequently not attributable to one specific trigger or topic (NIMH, 2013). The ambiguous etiology of anxiety disorders and panic attacks combined with the volatile nature of asthma exacerbations sets the stage for an incessant cycle.

Dysregulation of the autonomic nervous system, as in anxiety, has been also found to be associated with an increased risk of bronchoconstriction (Lavoie, Boudreau, Plourde, Campbell, & Bacon, 2011). Bronchoconstriction is the primary mechanism in asthma leading to dyspnea and ensuing rescue medication use. The overlap of this symptom seemingly contributes to the ongoing exacerbation of both chronic asthma and anxiety.

Moreover, according to the CDC, hyperventilation can be caused by strong emotions (2012). Anxiety disorders often are accompanied by strong emotions and in some cases, panic attacks. According to the NIMH, panic attacks frequently involve a vicious cycle of panic inducing breathlessness followed by panic resulting from breathlessness (2013). With the primary symptom of asthma being breathlessness, it can be inferred that the addition of anxiety disorders and panic attacks to an asthmatic's problem list further perpetuates an already vicious cycle.

In order to effectively treat these patients struggling with asthma and anxiety, the interaction of these two conditions with each other must be examined. Little is known about co-morbid anxiety's role in asthma health maintenance and outcomes. The link between these conditions has been identified but causation is difficult to conclude. The likelihood of these disorders to occur together is evident, however the underlying influencing factors are not well defined.

Purpose

The aim of this thesis is to assess the current state of the science regarding pediatric anxiety and asthma by providing an integrated review of the literature. This integrated review of the literature will identify the factors contributing to the vicious cycle of pediatric anxiety and asthma. Recommendations for future practice and research will be made based upon the current state of the science.

Methods

The researcher analyzed the current research on the relationship between pediatric asthma and anxiety to determine underlying factors influencing the cyclical relationship of these comorbid conditions. Databases used to find research studies included MEDLINE EBSCOHost, CINAHL, PsycInfo, Academic Search Premiere, and the Cochrane Database. Databases were accessed electronically through the UCF library to find original research studies, peer reviewed journal studies, literature reviews, and published dissertations. Abstracts of studies were screened to evaluate the conceptual relevance to this review. Following an initial search and collection of studies, an ancestry search was performed as well.

The following terms were used to search the databases: pediatri* OR adolescen* AND anxiety, AND asthma. Using those search terms, 253 studies were found. Specific inclusion and exclusion criteria were identified to ensure that the studies collected would be applicable to this literature review. In 2003, the NHLBI implemented new asthma guidelines; therefore date parameters of January 2004 to present were entered. To be included, studies needed to be written in English or translated into English. International studies from countries other than the United States were included. However they were assessed thoroughly to account for cultural and societal variables that may not be applicable to this literature review. Studies were required to be focused on the pediatric asthmatic population (7-17 years old).

Studies were excluded if they focused on subjects who had other comorbidities other than asthma and anxiety. Additionally, studies were excluded if they concentrated

primarily on caregiver anxiety. Anxiety and depression are conditions that are frequently assessed and identified as occurring together; therefore studies were not immediately excluded if both of these conditions were studied in the pediatric asthmatic patient. In this case, exclusion criteria was altered so that if specific scales were used to assess anxiety and depression separately, then the study could be included and only the information regarding anxiety would be used. Studies that did not directly address anxiety and studies that evaluated the development of new anxiety scales were also excluded. After the review of literature, the researcher decided to include a pilot study on young adult asthmatics because the literature regarding anxiety sensitivity as it relates to asthma control in pediatric patients was very limited.

A total of 253 articles were identified initially from the electronic and hand searches, many with duplication among the databases and reference lists. Forty-three studies were excluded due to duplication. After review to ensure studies met PICO criteria, 184 were excluded leaving 26 studies. To narrow this number, Melnyk and Fineout-Overholt (2005) rating system was applied for the hierarchy of evidence to evaluate research:

Level 1: Evidence from a systematic review or meta-analysis or all relevant randomized controlled trials (RCTs)

Level II: Evidence obtained from well-designed RCT's

Level III: Evidence obtained from well-designed controlled trials without randomization

Level IV: Evidence from well-designed case-control or cohort studies

Level V: Evidence from systematic reviews of descriptive and qualitative studies

Level VI: Evidence from single descriptive or qualitative studies

Level VII: Evidence from the opinion of authorities and/or reports of expert committees (Melnyk & Fineout-Overholt, 2005,12).

Any study deemed as VII was not included in this integrated literature review. Using the tool, 26 studies were evaluated and 18 were excluded, leaving eight studies remaining. One study is Level II randomized control trial, four studies are well-designed Level IV studies, two systematic reviews are Level V, and one well-designed pilot study is determined Level VI. These eight studies met the inclusion criteria for this integrative literature review and exhibited moderate to high quality for validity. The remaining articles are considered to be valuable regarding the background and significance of asthma and anxiety.

Findings

The literature search revealed three reoccurring themes present in the research. The interplay of biological factors, psychological factors, and unrecognized anxiety are the three major mechanisms behind the cyclical nature of pediatric asthma and anxiety.

Biological Factors

Two studies addressed the underlying biological processes influencing the relationship of asthma and anxiety. Both of these studies were literature reviews featuring sections that offered biological theories to explain the incidence of pediatric asthma and anxiety to occur together.

Autonomic Nervous System

Peters and Fritz propose that the most likely biological mechanism that links the emotional processes of anxiety and exacerbations of asthma is mediation of the autonomic nervous system (ANS). The ANS is directly responsible for bronchoconstriction and the regulation of emotion. Anxiety is characterized by stress and emotional responses, while the chief problem in asthma is bronchoconstriction. It is conceivable that the dysregulation of the ANS due to anxiety could result in bronchoconstriction and an ensuing asthma exacerbation (Lavoie, Boudreau, Plourde, Campbell, & Bacon, 2011). One study was conducted on asthmatic pediatric patients in a laboratory in which their response to emotionally evocative movie scenes was monitored. This study found notable autonomic responses associated with an increase in airway reactivity and decrease in pulmonary function (Peters & Fritz, 2011). Another study was conducted to measure the asthmatic

patient's response to stress inducing events such as public speaking. Their pulmonary function was recorded before and after exposure to the stressful stimuli. The results showed that in 22% of the participants, significant bronchoconstriction resulted from the induction of stress (Peters & Fritz, 2011). Another consideration is the use of beta 2 agonists (such as albuterol) for the treatment of bronchoconstriction. While these medicines are useful for bronchodilation, they may exacerbate symptoms of anxiety through their arousal of the ANS (Katon, Richardson, Lozano, & McCauley, 2004).

Airway Resistance

In asthma, an increase in airway resistance is the result of bronchoconstriction and excess mucous production. The subsequent effort to overcome this increased resistance during respiration is the mechanism behind dyspnea in the asthmatic patient. Furthermore, experimental stress has been found to increase airway resistance in both pediatric asthmatics and their non-asthmatic peers. Asthmatic pediatric patients have a higher level of inherent airway resistance, so the induction of stress resulting from anxiety lends itself to a higher level of overall respiratory compromise (Katon et al, 2004). The experience of dyspnea may lead to feelings of anxiousness. However, anxiety may also cause the production of stress, ultimately triggering airway resistance and ensuing dyspnea. It seems that anxiety, airway resistance, and dyspnea each perpetuate the other. Since pediatric patients with asthma begin with higher inherent airway resistance, they are more likely to suffer significant airway changes resulting from the interaction of the aforementioned factors.

Psychological Factors

Six studies addressed the underlying psychological processes influencing the relationship of asthma and anxiety. Two literature reviews and 4 quantitative, descriptive studies contained psychological considerations for the pediatric patient with asthma and anxiety.

Symptom Perception

Symptom perception refers to the way in which an individual patient reports the experience of their disease specific symptoms. Chen and colleagues conducted a study on pediatric asthmatic patients to measure their anxiety levels and symptom perception during a metacholine challenge. Prior to the administration of metacholine, symptom perception, anxiety levels, and pulmonary function were recorded. This study found that prior to metacholine administration, increased levels of anxiety were associated with increased symptom perception after controlling for pulmonary function ($r = .26, p < .05$; Chen, Herman, Rodgers, Welker, & Strunk, 2006). From these results, it can be inferred that the higher the baseline anxiety levels of the patient are, the higher their symptom perception will also be. This suggests that the presence of anxiety in the pediatric asthma patient may lead to the perception of worsened or more abundant asthma related symptoms.

Three studies stated that over-perception of asthma symptoms puts the pediatric patient at risk for overmedication (Chen et al, 2006; Peters & Fritz, 2011; Lavoie et al, 2011). One study found a significant association between asthmatic adults with generalized

anxiety disorder (GAD) and bronchodilator rescue medication use in one week. This study concluded that those with GAD were likely to use their rescue bronchodilator medication at least ten times more often than those without GAD (Lavoie et al, 2010). The side effects of many bronchodilator medications are agitation and anxiety. Furthermore, inhaled steroids are a medication routinely used for the containment of asthma, and can contribute to heightened anxiety symptoms as well (Peters & Fritz, 2011). The phenomenon of overmedication due to the over-perception of symptoms has great potential to be a cyclical sub relationship in the pediatric patient with asthma and anxiety.

Anxiety Sensitivity

Anxiety sensitivity is defined as the “fear of arousal-related physical and psychological sensations” (McLeish, Zvolensky, & Luberto, 2010, p. 440). Anxiety sensitivity tells of a cognitive predisposition to experience increased risk of anxiety symptoms and panic attacks. Increased anxiety sensitivity presents as heightened awareness and fear of one’s response to the arousal that anxiety produces. The role of anxiety sensitivity in asthma is an up and coming area of research. Two of the studies reviewed in the literature search focused on the use of the childhood anxiety sensitivity index (ASI) to study the relationship of asthma and anxiety. The ASI is an 18-item self-report tool that measures the degree to which patients experience fear of anxiety symptoms and the negative consequences stemming from catastrophic thoughts. The ASI measures anxiety across three domains: physical concerns (fears of increased respirations/heart rate), cognitive concerns (fears of being mentally ill or “spacey”) and social concerns (fears of appearing

nervous). High anxiety sensitivity scores in asthma patients have been correlated with comorbid anxiety disorders (McCauley et al, 2007). Studying anxiety sensitivity is another outlet to understanding the interaction of anxiety in the pediatric asthmatic.

The Child Health Survey-Asthma (CHS-A) is used to assess the physical, emotional, and activity limitations associated with living with asthma. One study found that scores on the ASI and CHS-A emotional health scores are negatively correlated ($r = -.455, p < .01$; McCauley et al, 2007). This means that as the pediatric patient becomes more fearful of their anxiety symptoms, their asthma specific emotional health declines giving way to feelings of isolation, anger, and upset. This may translate into higher baseline anxiety levels due to the inability to effectively cope with their asthma.

One pilot study by McLeish, Zvolensky, and Luberto aimed to investigate this relationship further. They conducted a study on young adult asthmatics with the goal of examining the role of anxiety sensitivity on asthma control. The asthma control test (ACT) was used to measure the participant's asthma control. The researchers found that the physical concerns of the ASI were negatively correlated with asthma control ($r = -.35, p < .01$) (McLeish et al, 2010). These findings indicate that the more anxiety surrounding somatic concerns a patient possesses, the more likely they are to have poorly controlled asthma. This relationship is not yet well understood, but is likely due to the overlap of physical symptoms in asthma and anxiety. Asthma shares elements of the physical arousal that anxiety produces (increased heart rate and respiratory rate) and fearing these physical responses is likely to further potentiate negative physical responses.

Cognitive Experience of Asthma and Comorbid Anxiety

Asthma and anxiety are lifelong conditions that have no cure. With proper treatment, both can be controlled and almost entirely contained however. The containment of these disorders requires great attention to possible triggers and environmental variables that may be influencing them. Three studies stated that the longitudinal and unpredictable nature of asthma is likely to induce a state of higher baseline anxiety related to the inability of the patient to predict exacerbations (Katon, et al, 2004; Peters & Fritz, 2011; Lavoie et al, 2010). Peters and Fritz discussed that asthma exacerbations frequently require medical intervention and hospitalization. These hospitalizations are likely to provoke additional anxiety in the pediatric patient, during an already anxiety inducing experience. If this sequence of events is repeated over time, it is likely that an anxiety disorder may develop. At the same time, dyspnea is a principal symptom of panic attacks and can progress into hyperventilation. Hyperventilation may act as an irritant to asthmatic airways and further promote bronchoconstriction (Peters & Fritz, 2011).

Anxiety is characterized by chronic worry and fear, sometimes resulting in panic attacks. If these panic attacks occur frequently, the patient may be diagnosed with panic disorder. The course of panic disorder is similar to that of asthma in regards to its unpredictable nature and importance of monitoring for triggers (Katon et al, 2004). The environment of a pediatric patient with both asthma and panic disorder is likely one of constant anticipatory anxiety and confusion of which symptoms are being caused by which disorder.

Unrecognized Anxiety

Six of the studies addressed unrecognized anxiety as one of the chief influencing factors in the relationship between asthma and anxiety (Peters & Fritz, 2011; Katon et al, 2004; Katon et al, 2006; McCauley et al, 2007; Burkhart & Rayens, 2005; Lavoie et al, 2011). Katon and colleagues found that 9% of 781 asthmatic youth (or 73) screened positive for having a comorbid anxiety disorder. Of these 73 youths, only 11 had been diagnosed with an anxiety disorder, according to their medical chart. This is a recognition rate of 7.2% (Katon et al, 2006). Unrecognized anxiety is detrimental to the pediatric asthmatic primarily because it complicates the effort to attain asthma control. The significant airway changes occurring unpredictably in conjunction with these disorders may undermine the youth's self-confidence in learning to master the management of their asthma. Moreover, these patients may have an impaired ability to sleep, trouble concentrating, and difficulty making decisions due to their high baseline anxiety levels. This further suggests that they may be unable to make appropriate self-management decisions, further disrupting the control of their asthma (Lavoie, et al, 2011). Lack of confidence, repeated frightening episodes of breathlessness, and ineffective self-management may lead the pediatric patient to feel that they are not controlling their asthma well, ultimately affecting their likelihood to adhere to their asthma management plan (McCauley et al, 2007).

Burkhart and Rayens conducted a study in order to further understand the relationship of unrecognized anxiety on asthma management plan adherence. They studied the pediatric asthmatic's health locus of control and self-concept as they relate to asthma adherence. Health locus of control is defined as the "perception that a health outcome will

be largely determined by the individual's own actions (internal health locus of control) or by outside forces (external health locus of control) beyond the individual's control" (Burkhart & Rayens, 2005). They found that the higher the pediatric patient's internal locus of control and self-concept are, the more adherent to their asthma management plan they are. Additionally, they found that patients with low anxiety levels were more likely to be adherent (Burkhart & Rayens, 2005). It is unlikely that patients that are experiencing difficulties with managing their asthma and anxiety have a high internal health locus of control, as they are likely struggling with controlling both chronic conditions.

Lavoie and colleagues conducted a study on 794 asthmatic adults to explore the association of GAD with asthma control, quality of life, and asthma specific self-efficacy. Asthma specific self-efficacy is very similar to an internal health locus of control, as it is defined as the amount of confidence that an individual has in "their ability to control or manage their asthma symptoms in different environments or under different conditions" (Lavoie et al, 2011). Both an internal locus of control and high asthma specific self-efficacy result from repeated cognitive experiences with managing asthma exacerbations successfully and without complication. Lavoie and colleagues found that the presence of GAD was associated with low asthma specific self-efficacy. The significant association of low self-efficacy and GAD suggests that the presence of an anxiety disorder complicates the patient's ability to attain asthma control and furthermore decreases their confidence that their self-care actions are proving to be effective. They also found that after adjusting the results for self-efficacy, the association between asthma morbidity and GAD was no longer significant. These results suggest that patients with low asthma specific self-efficacy may be

delaying or simply not engaging in behaviors to control their asthma resulting in worse asthma morbidity. The rationale behind this choice to be non-adherent is likely due to the patient's uncertainty that management actions such as taking medications, monitoring peak flow, and removing allergens from the home are actually effective at controlling asthma symptoms (Lavoie et al, 2011).

The complex interaction of asthma and anxiety makes it more difficult to predict and manage exacerbations of each condition. Unrecognized anxiety is dangerous when introduced to this cycle because it lowers the patient's perception of their ability to control their disease status (low asthma specific self-efficacy and/or a low internal locus of control). The patient may attribute their inability to control their asthma to themselves as being ineffective managers, instead of recognizing that they have an underlying, complicating comorbidity. The ensuing decrease in adherence is of great concern to the pediatric asthmatic patient as adherence to the management plan is imperative for the achievement of well-controlled asthma.

Discussion

The biological and psychological factors of asthma and anxiety, in conjunction with a poor anxiety recognition rate are interwoven to create a tangled web of health variables. Each component of the interaction between these comorbidities is influencing, and possibly exacerbating the other. For example, biological factors point to increased ANS arousal in the pediatric patient with asthma and anxiety, along with increased bronchoconstriction and more airway resistance. This change in airway may in turn elicit additional anxiety. Psychological factors posit that over time, these repeated cognitive experiences with airway changes might lead to a higher baseline of general anxiety. Over-perception of symptoms is a psychological factor that often accompanies higher baseline anxiety. This over-perception may lead to overmedication, increasing ANS arousal and further perpetuating the anxiety levels of the pediatric patient. The exacerbation of biological factors by psychological factors and vice versa goes entirely untreated when the patient has not yet been screened for and diagnosed with anxiety. A poor perception of a patient's ability to control their asthma leads to low asthma specific self-efficacy and a low internal locus of control, leading to potentially decreased adherence, and worsened asthma control. This vicious cycle of high anxiety and poor asthma control is likely to be attributed to solely the patient's asthma, when there is actually an underlying or acquired mental health comorbidity complicating the disease process.

A host of negative outcomes have been associated with the presence of asthma and undetected anxiety in the pediatric asthmatic. In addition to the increased difficulty in obtaining asthma control, pediatric patients with both asthma and anxiety have more social

anxiety than their non-asthmatic peers. In one study of adolescents, those who were experiencing asthma symptoms were more likely to report social anxiety, possibly due to the exhibition of symptoms and/or taking medication in the presence of peers (Bruzzese, Fisher, Lemp, & Warner, 2009). Increased functional impairment has also been associated with the presence of asthma and anxiety. One study found that youth who reported more symptoms of anxiety also reported greater asthma-related functional impairment (McCauley et al, 2007).

The management of chronic pediatric disease is an ever-evolving task. As the pediatric patient ages, the disease may alter course, requiring adjustments in medications and management behaviors. According to psychologist Erik Erikson, each stage of life is associated with a different psychosocial task. In childhood, the successful completion of these tasks is aimed at attaining independence, initiative, competence, and a defined identity (Graves & Larkin, 2006). The disruption of these stages may result in unresolved psychosocial conflicts and prevent the patient from successfully progressing to the next stage. Chronic conditions such as asthma and anxiety may interrupt the psychosocial development of the patient, especially when these conditions are not well controlled or are not being treated properly (Knafl & Deatrck, 2003). For this reason, it is crucial to consider the impact of asthma and unrecognized anxiety on the pediatric patient's physical health, mental health, and development. Figure 1 represents a conceptual model to describe the adverse impact of unrecognized anxiety on the pediatric patient with asthma.

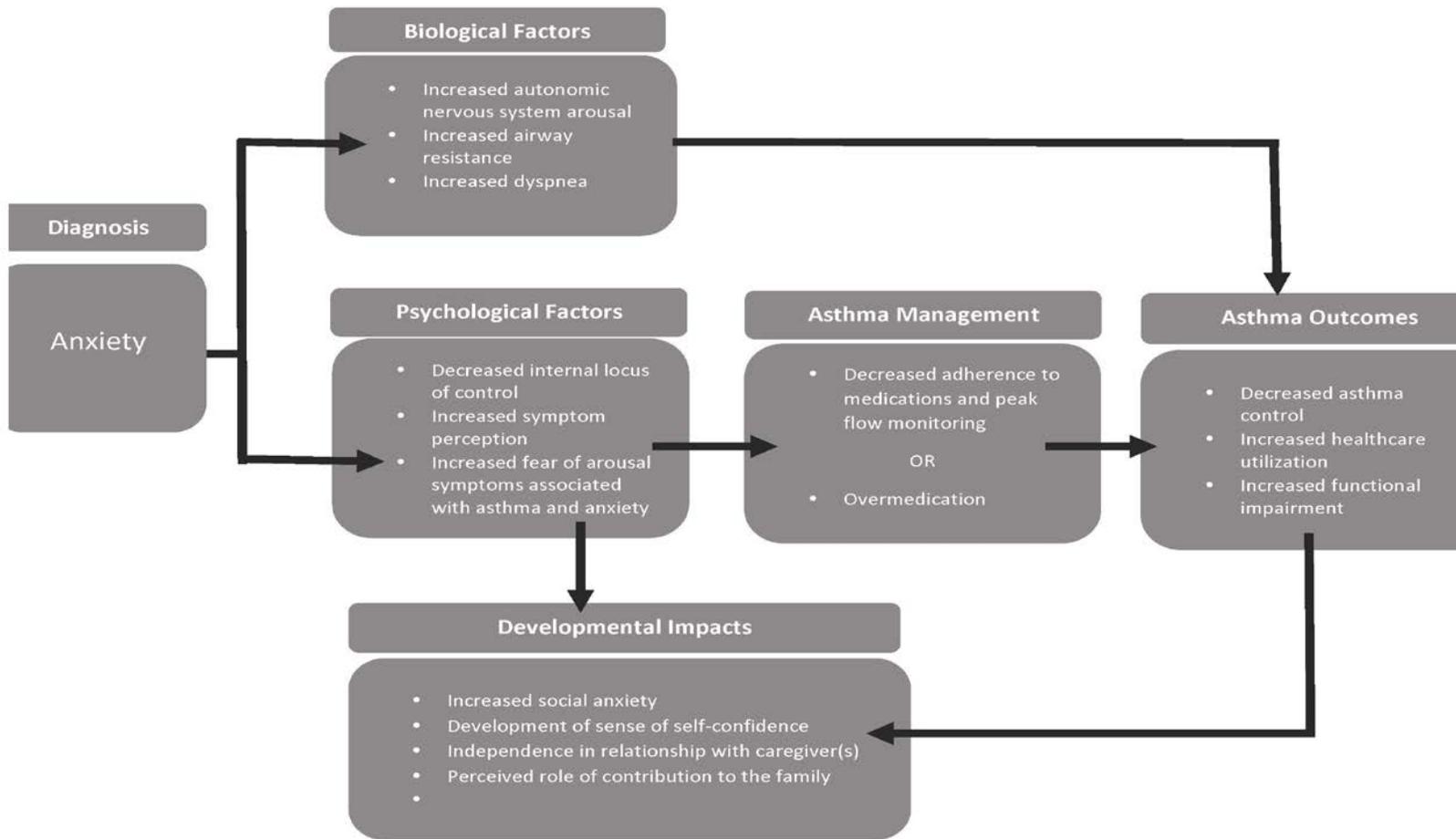


Figure 1: Adverse impact of unrecognized anxiety on pediatric asthma

Modified from Katon, Richardson, Lozano, & McCauley, 2004 "Adverse of Anxiety/Depressive Disorder and Asthma Comorbidity"

One cannot assess the pediatric patient without also considering the family. According to McQuaid and colleagues, the integration or lack of integration of the asthma management plan into the family's system has implications for asthma outcomes (2005). Because of this, the Family Management Style Framework (FMSF) may provide insight as to how a family deals with chronic childhood conditions such as asthma and anxiety (Knafl, Deatrack, & Gallo, 2008). The FMSF contains three components that are reliant upon one another and vary for each one of the family members. These components are: definition of situation (the way in which each individual family member defines fundamental aspects of the chronic condition), management behaviors (the behaviors each family member exhibits in an effort to manage the condition), and perceived consequences (each family member's perceptions of how the condition is impacting the family) (Hines, 2011). The interaction of these three components provides a foundation to describe the Family Management Style (FMS), or the pattern of the family's responses to each of these components. The overall goal of utilizing the FMSF to define FMS is to identify the family's strengths and weaknesses in regards to managing the pediatric patient's chronic condition in an effort to optimize both individual and family functioning (Knafl et al, 2008).

The management of a pediatric chronic condition is a complex task for the family. There are many developmental, psychological, and biological factors to consider. The importance of understanding and utilizing the FMSF is essential in the both the correct identification of the familial management factors at play and the holistic development of the treatment plan (Hines, 2011). Both asthma and anxiety are chronic conditions that have

overlapping symptoms and the potential to exacerbate each other. It is imperative to include the FMSF in future studies because pediatric chronic conditions impact the entire family. In order to further explore the relationship between anxiety and asthma, it is important to also explore the influence of the family on the chronic conditions and the impact of the chronic conditions on the family.

Recommendations for Practice

As previously stated, only 7.2% of pediatric asthmatic patients who screened positive for an anxiety disorder had been diagnosed according to their medical chart. This is a very low recognition rate. With as many as one in six (16.7%) pediatric asthmatics meeting criteria for a comorbid mental health disorder, it is of utmost importance to increase recognition rates (Katon et al, 2006). One recommendation is to begin screening pediatric asthmatics for comorbid anxiety. Screening should take place in the outpatient setting, as it is likely the ideal location for the most accurate screening results. Patients in the emergency department and inpatient hospital settings may exhibit false positive results because these settings are likely to induce a higher state of anxiety. One method to avoid false positive results in such settings is to use a screening tool that measures trait anxiety and the presence of anxiety disorders according to the months prior to hospitalization.

The Screen for Child Anxiety Related Emotional Disorders (SCARED) is a 41-item tool used to screen for anxiety disorders in the pediatric population. It includes statements like “I worry about other people liking me,” and asks the participant to rate on a scale of 0 (not true or hardly ever true) to 2 (very true or often true) how the given statement

applied to them in the previous three months. The SCARED is available in a child version (SCARED-C) and a caregiver version (SCARED-P). The SCARED has been found to demonstrate good convergent and divergent validity (Monga et al., 2000). The SCARED has also been found to be reliable and valid in cross-cultural samples (Hale, Crocetti, Raaijmakers, & Meeus, 2011). Six of the articles used for this integrated literature review addressed the importance of screening this population for comorbid anxiety, with three urging the importance of screening. Peters and Fritz recommend screening in the primary care setting with a clinical interview. They also recommend referring those at high risk to a psychiatrist for a full diagnostic interview (Peters & Fritz, 2011).

Early detection of the presence of an anxiety disorder and the role it has on asthma management can prevent overmedication, unnecessary escalation of treatment, and may improve asthma control (Marriage & Henderson, 2012). Additionally, anxiety screening and early detection can decrease healthcare utilization and consequently lower healthcare costs (Tibosch, Verhaak, & Merkus, 2011). Perhaps the most important reason to detect anxiety early in this population is to minimize the impact it has on the overall well being of the children and their families, allowing them to more effectively manage the chronic diseases together.

Recommendations for Research

Future research is needed regarding the biological processes behind asthma and anxiety's shared patterns of ANS arousal and airway resistance. A comparison between groups of asthmatics with and without a diagnosed anxiety disorder during exposure to anxiety arousing stimuli is warranted. Additionally, current anxiety treatment protocols

need to be evaluated for their effectiveness in treating anxiety as it relates to asthma control.

The findings of this literature review did not reveal any previous research of the family dynamic in regards to the management of pediatric asthma and anxiety. It is crucial to explore the family dynamic because the effective management of pediatric chronic conditions is dependent upon it (McQuaid, Walders, Kopel, Fritz, & Klinnert, 2005). The interaction of chronic asthma and anxiety is complex and the family's perceptions and behaviors likely play a key role in the management of these conditions. Because of this it is essential to examine the family management style (FMS) in the effort to maximize asthma control, anxiety containment, and harmony in the household environment.

Limitations

One of the limitations of this literature review is the search parameter of January 2004 to present. This parameter potentially excludes applicable studies conducted prior to this date. The selection of this parameter is due to the implementation of new asthma guidelines in 2003. An ancestry search of pertinent articles was conducted in order to minimize the impact of this date parameter on comprehensive data collection. Another limitation of this literature review is the inclusion of two studies conducted on the adult population. These well-designed Level IV and Level VI studies may not be applicable to the pediatric population, but were included in this review as they provided additional information regarding influencing factors of asthma and anxiety.

Summary

The presence of comorbid anxiety in the pediatric asthmatic patient sets the stage for a variety of ensuing adverse asthma outcomes. The interplay of psychological factors and biological factors negatively influence the experience of asthma in the child and complicate their management efforts. Anxiety must first be detected in this population to minimize the impact on the child's self-confidence, development, and overall health. The principal recommendation for practice is to screen for comorbid anxiety in the pediatric asthmatic population in the primary care setting. Future research should be focused on examining the ANS response in pediatric asthmatics with and without anxiety. Additionally, future research should begin to evaluate the current treatment protocols in place for the management of anxiety disorders in regards to their effectiveness in the patient with comorbid asthma. Finally, future research aimed at exploring the family dynamic in the management of chronic pediatric asthma and anxiety is necessary.

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