A Comprehensive Study of the Effects of Allergic Rhinitis on the Performance and Conduct Behavior of School-Aged Children

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ABSTRACT

Current research suggests that up to 40% of the population under the age of 18 suffers from allergic rhinitis (Blaiss, 2004a). There are many ways to treat symptoms, but there is concern regarding the affects on academic performance in children and adolescents. For example, consistent absenteeism, lack of sleep, and reduced ability to concentrate due to allergic rhinitis symptoms are all shown to affect a child's ability to learn effectively (McCabe, 2008). Information regarding the prevalence, symptoms, possible causes and prevention of allergic rhinitis are reviewed in this paper. Previous research on the effects of allergic rhinitis on academic performance is also evaluated. Recommendations are offered based on what educators, parents and school psychologists can do in order to provide adequate support for children and adolescents suffering from allergic rhinitis.

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Chapter I: Introduction

Benjamin is a fourth grade boy who has recently been struggling in class. His teacher has been noticing that he appears drowsy and has a difficult time concentrating on class activities. Benjamin has frequently been asking to go to the nurse because his head hurts and he feels very tired. With no improvement over two weeks, Benjamin's mom brings him to the doctor. They diagnose him with severe allergies to dust mites and mold. The doctor strongly suggests to Benjamin's mom that action be taken to diminish Benjamin's contact with the allergens. When Benjamin's mom brings the issue to his teacher, she is unsure how to handle the situation while he is in school.

Benjamin's symptoms were classified as allergic rhinitis (AR), and are extremely common throughout the United States and the world. Allergic rhinitis is commonly known as hay fever. Symptoms are very similar to that of a cold, but are actually caused by the body's reaction to a foreign substance (Gershwin & Klingelhofer, 1998). These symptoms can include itchy, watery eyes, nasal congestion, sneezing, and postnasal drip. Such symptoms can lead to a variety of consequences in children that include decreased learning ability, lower school performance, sleep impairment, daytime fatigue, and missed school days. The National Medical Expenditure estimated that approximately 824,000 days of school are missed each year due to allergic rhinitis symptoms in the 1987 survey (Blaiss, 2004b). Since then, the number has risen to an estimated 2 million days of missed school annually by those under age 18 (Blaiss, 2004a).

Allergic rhinitis is considered the sixth most prevalent chronic disease in the United States. Approximately 35 million people are affected each year, and up to 40% of children. The prevalence is so great that still a large number of cases go undiagnosed. Although the disease is not life-threatening, the consequences are still very alarming.

The quality of life for a child can decrease dramatically, performance in school can suffer, and the likelihood of developing other diseases such as asthma, chronic sinusitis, and other respiratory complications increases as well (Blaiss, 2004a).

Common causes of allergic rhinitis include mold, pollen, animal dander, dust mites, pollutants, and other airborne particles. These substances can be found almost anywhere on earth and do not always depend on the time of year. Some of these allergens are considered seasonal, while others are common year-round (Blaiss, 2004b).

Whether a student is allergic to a substance seasonally or year-round, attention should be given during the time the allergen is present. Certain supports should be lined up to provide the best learning and home environment possible for students. The supports and adjustments will depend on the allergy, but are very imperative to the success of the student.

The onset of allergic rhinitis can occur at any age and does not always lessen over time (Monroe, 2001). Oftentimes allergies can show up unexpectedly and can be quite severe (Cutler, 1998). Data has shown that symptoms resolve in only 10 to 20% of children within 10 years of the onset. That leaves a large majority of allergic rhinitis sufferers to deal with the symptoms over a long period of time (Blaiss, 2004a). As symptoms arise, the likelihood of a child presenting a learning disability is more likely. Borres et al. (2002) reported that children with allergies are more likely to have difficulty concentrating, staying alert, and attending school. Blaiss (2004a) also stated that children with allergic rhinitis can be more short-tempered and so fatigued that they disrupt classroom activity and adversely influence their relationship with peers.

The main issue with allergic rhinitis that affects students is that it can cause many health issues that make it very difficult for a child to cope with everyday life activities. Addition to the illness, students are also responsible for keeping up with school and performing to the best of their ability. Oftentimes children with allergies appear as though they are performing inferior to their classmates without allergies (McLoughlin et al., 1983). If that is the case, then efforts need to be made to ensure that students with allergies do not fall so far behind that they are unable to catch up.

Along with trying to promote an ideal environment for children with allergies, there are many medications that can help control the symptoms of allergies and prevent allergic rhinitis. Popular methods include pills and nose sprays. Antihistamines are pills that work at counteracting the histamines that are released from the nose and eyes when an allergen comes in contact with an individual. It is these histamines that essentially cause the allergic rhinitis symptoms and can make it unbearable for the individual (Gershwin & Klingelhofer, 1998). Nose sprays also work well to prevent the symptoms of allergic rhinitis. Nose sprays stop the reaction before it even occurs, and are safer than pills because they do not cause drowsiness and are not completely absorbed by the body (Gershwin & Klingelhofer, 1998).

Prior research has been done on the effects of allergic rhinitis on academic performance in students under the age of 18. The conclusions are not consistent and the numbers of studies are also very sparse. Professionals do not seem to have actively made a decision on the level of effect allergic rhinitis has on the performance of adolescents in education.

Purpose of the Study

The purpose of this study is to explore and understand the literature relevant to the academic performance of children and adolescents diagnosed with allergies. A comprehensive review of the literature will be conducted during the summer and fall of 2008.

Research Questions

This study focuses on the following research questions:

1. What are the physical effects of allergic rhinitis?
2. What effects can allergic rhinitis have on academic performance?
3. What has previous research concluded about the effects of allergic rhinitis on academic performance?
4. What are possible prevention strategies for individuals with allergies who are prone to allergic rhinitis?

Assumptions of the Study

It is assumed that all of the research conducted on the topic is valid and reliable. The previous research is also assumed to accurately demonstrate the effects of allergic rhinitis on academic performance.

Definition of Terms

To aid in the understanding of this review, the following terms are defined:

Allergic Rhinitis: Common allergy characterized by an array of symptoms involving the nose, eyes, throat, ears, and skin. These symptoms include nasal congestion, sneezing, and production of clear, watery discharge; runny, itchy

eyes; sore throat and irritation from postnasal drip; ear pain and pressure; and generalized fatigue, irritability and headaches (Schultz et al., 1994).

Eustachian tube: tube that originates in the back of the nose and runs up into the middle ear to drain mucus away form the middle ear and ensure optimal hearing (Massoud, 2007).

HEPA filter: HEPA is an acronym for "high efficiency particulate air". A HEPA filter would trap a large amount of small particles that typically are circulated into the air after vacuuming or opening windows and doors. Popular small particles a HEPA filter may catch are dust mites, animal dander, and pollen (Mayo Clinic, 2008).

Limitations of the Study

Limitations exist in the amount of research information compiled. It is unlikely that every study that has been conducted on the subject was reviewed for this study.

Chapter II: Literature Review

This chapter will include information on the prevalence of child and adolescent allergic rhinitis, symptoms, possible causes, and prevention inside and outside of school. In addition, information on what constitutes academic achievement will also be addressed. This chapter will conclude with information on research that has been conducted regarding allergic rhinitis and the effect on academic achievement.

Prevalence

As previously stated, allergic rhinitis affects up to 40% of the United States population under the age of 18. However, a large number of adolescent cases go undiagnosed and untreated each year (Blaiss, 2004a). Many children start off with seasonal allergy symptoms that develop into year-round allergies that can be an even larger burden (Brody, 1997). Allergy symptoms are so common that Seargeant (1997) stated that "one out of every five pediatric visits is allergy related" (p. 15). So many physician visits can add up when expenses are considered. It is estimated that 2.3 billion dollars are spent each year on allergic rhinitis-related doctor visits concerning children under the age of 12 (Blaiss, 2004b).

The prevalence of allergic rhinitis has risen dramatically over the past 20 years. The number of children affected compared to 20 years ago has doubled (Blaiss, 2004b). It is now estimated that one-third of individuals diagnosed with allergic rhinitis are under that age of 18 (McCabe, 2008). The increase is so overwhelming that many are wondering why the frequency has risen so dramatically. The incidence of allergic rhinitis in early childhood is less than two percent, however, the prevalence increases dramatically after age two once a child is repeatedly exposed to consecutive seasons of

allergens in the air (McCabe, 2008). Allergies can influence people of all ages and races, but heredity has a lot to do with whether an individual will become an allergic rhinitis sufferer or not. If one or both parents of a child have allergies, the chances of the child inheriting those allergies go up considerably. If one parent has an allergy, the likelihood of a child inheriting the allergy is about 30%. However, if both parents have an allergy the likelihood climbs to 60%. Those numbers are much greater than the probability of a 10% chance of developing an allergy if neither parent has an allergy (Brody, 1997).

Prevalence of allergic rhinitis can also be affected by location within the United States. Those who live in rural areas have a higher probability of coming into contact with allergic rhinitis triggers and sparking allergic rhinitis symptoms compared to those who live in the cities with a lower chance of coming into contact with allergen caused symptoms (Gershwin & Klingelhofer, 1998). It should be noted that no matter what the circumstance, allergic rhinitis is not contagious and cannot be passed from one person to another. The illness is caused by the predisposition of one individual and is unique to each individual (Monroe, 2001).

Symptoms

Allergic rhinitis is characterized by a number of symptoms caused by substances that are generally breathed in through the air. The majority of the substances in the air are considered harmless. However, the body's immune system attacks substances that could be harmful such as viruses and other illness-causing agents. Sometimes the immune system mistakenly attacks a non-threatening substance such as pollen or mold. The immune system releases antibodies to fight off the substances. One antibody emits chemicals called histamines in the lining of the nose and eyes. Histamines can cause the

eyes to water, turn red and itch, and the nose to run. Aside from the nose and eyes, many other symptoms may occur (Monroe, 2001). Allergies can cause sore throats, nasal congestion, fatigue, stomachache, headache, and tenderness in the cheeks and forehead (Brody, 1997). It is important to note that not all of the symptoms listed are going to be present in every individual with allergic rhinitis. Symptoms can vary from person to person (Blaiss, 2004b).

In actuality, symptoms of allergic rhinitis are very similar to a common cold. The major difference is the duration of symptoms. A common cold can last for about a week and then the symptoms diminish. Allergic rhinitis on the other hand, can last for weeks or even months. Some people have year-round symptoms because the triggers they are allergic to are in the air year-round (Brody, 1997).

It has been reported that approximately 30-40% of allergic rhinitis sufferers show symptoms for up to five hours after the original exposure to the allergen that caused the reaction. This occurs mainly because the body continues to emit chemicals to continually fight the allergen that has entered the body (McCabe, 2008).

It is important to note that once an individual becomes sensitized to certain allergens, more frequent exposure can cause immune responses in anticipation of the exposure. Repeated exposure causes the threshold of an allergic reaction to lower substantially. This is commonly referred to as priming. Priming effects the response to certain allergens, but can also cause reactions to other allergens when encountered as well (McCabe, 2008). This effect can lead many seasonal allergy sufferers to not only react to their usual seasonal allergens, but exacerbate reactions to year-round allergens as well (McCabe, 2008).

Aside from physical symptoms, allergic rhinitis can have a debilitating effect on the lifestyle of an allergic rhinitis sufferer. As stated earlier, allergic rhinitis symptoms can impair a child enough that he or she may have difficulties learning, sustaining attention, and sleeping. Children are also more likely to become fatigued and perform poorer in school (Blaiss, 2004b). Studies have looked at overall health-related quality of life of children and adolescents affected by allergic rhinitis. The studies indicate that "allergic rhinitis is associated with fatigue, poorer health perception, and disturbed social function in adults, and learning impairment, difficulty integrating with peers, anxiety, and family dysfunction in children" (McCabe, 2008). These symptoms can be severe enough to prevent a child from attending school on certain days. Especially children who live in environments that continually expose them to mold, dust, pollutants and vermin are more likely to continually miss school days. Increased school absences contribute largely to the probability of a child falling behind in school and struggling with grades (McCabe, 2008).

If a child with allergic rhinitis symptoms does come to school, the chances are great that the symptoms will contribute to greater difficulty concentrating, physical discomfort and general unhappiness. Symptoms have been shown to at times effect shot-term memory and recall, fatigue and intermittent hearing loss that can effect attention. Sleep patterns also can be effected by allergic rhinitis symptoms and lead to diminished attention and academic performance (McCabe, 2008).

In very extreme cases allergies that go untreated can lead to developmental and functional problems. The disruptive behavior that can result from inability to concentrate can lead to a false identification of attention deficit disorder (ADD). It has also been

reported that children with allergic rhinitis are two times more likely to have a depressive episode due to their lack of overall life satisfaction (Blaiss, 2004b). It is important to note the effect symptoms of allergic rhinitis can have on an individual's mental health. Many students with allergic rhinitis symptoms carry tissues, blow their nose frequently, rub their eyes and nose and take medications. These behaviors can be distracting to peers and possibly lead to teasing. Certain difficulties students with allergic rhinitis experience while in school have been connected to low self-esteem and embarrassment in childhood (McCabe, 2008).

At the current time, there is no evidence to support allergic rhinitis causing a learning disability or any long lasting delay in achievement. On the other hand, the repetitive absenteeism, lack of sleep, and reduced ability to concentrate are shown to influence a child's ability to learn effectively in the classroom (McCabe, 2008). Some medical professionals suggest that allergic rhinitis symptoms can even have an effect on an individual's physical growth. Recent research has found that children with disorders such as asthma, dermatitis, and allergic rhinitis are two to five times more likely to display a shorter stature and a slowing of bone maturation. The main cause of the retardation in bone maturation is due to a chemical released during the presence of an allergen. The chemical released effects the growth factor prostaglandin E2 from being synthesized in osteoblasts and negatively effects bone growth (McCabe, 2008).

Possible Causes

There are numerous different airborne allergens that are found in the air. A few of the most common are plant pollens, dust, dust mites, molds, animal dander, pollutants, and other airborne particles (household cleaners, perfumes, soaps, and detergents). One

or more of these allergens can cause allergic rhinitis symptoms in an individual (Gershwin & Klingelhofer, 1998). The main issue that individuals with allergic rhinitis struggle with is eliminating contact with as many allergy triggers they may come into contact.

Pollen is given off many plants as part of their reproduction. A pollen particle is so small that thousands of them could fit on the head of a pin. Pollen allergies are most common in the spring and come mainly from trees (Gershwin & Klingelhofer, 1998).

Dust and dust mites can be found inside and outside. Dust is made up of many different components, but the most influential in causing allergic rhinitis symptoms is the dust mite. They are mainly responsible for the allergic reactions to dust. Dust mites are most comfortable in humid and warm conditions. When their bodies or feces are inhaled, an allergic reaction is caused. Dust mites live in fabrics such as carpet, drapes, mattresses, blankets, pillows, stuffed animals, etc. (Gershwin & Klingelhofer, 1998).

A mold allergic reaction is caused by inhaling spores from mold. Mold is found both indoors and outdoors. Mold also grows in moist and warm conditions (Gershwin & Klingelhofer, 1998). In a home, mold is often found in basements, bathrooms, and kitchens were there tends to be a moister environment.

Animal dander is essentially the flakes of skin off of an animal. An individual can be allergic to one or more types of animals. Most common are cats and dogs, but rabbits, hamsters, mice, birds, and horses are also included. Between 5 to 10% of the population has an animal allergy and the number continues to rise as the number of in-home pets rise as well (Monroe, 2001).

Pollutants are found in the air due to industrial and vehicular emissions. Pollutants are more likely to be a factor in urban settings where the emissions are much more common and tend to have permanent and temporary severe air pollution (Gershwin & Klingelhofer, 1998).

Other airborne allergens tend to come from household chemicals, detergents, perfumes and soaps. Most airborne allergens emit an overpowering odor and usually are irritating to individuals with the allergy. Not too much is known about other airborne allergens and dealing with symptoms is dealt with through trial and error (Gershwin & Klingelhofer, 1998).

Prevention

When planning on implementing preventative measures for school-aged children, it is wise to consider where a child will be spending his or her time each and every day and what allergens may be hidden within that environment. During the school year, a student spends the majority of his or her time in school and at home. Those are the primary places of concern. When a child begins to fall behind in school, it is necessary to provide supports at home and school in order to limit the contact with allergens that may be causing the illness. There are many different types of supports to consider when trying to provide a healthy environment for a child with allergies and prevent allergic rhinitis from occurring.

If a child is allergic to dust and/or dust mites, there are several preventative measures that can be taken. At home, mattresses, pillows, and box springs should be covered in an allergen-proof encasement. Bedding should also be washed in hot water once a week to rid them of dust mite remnants. Carpet and stuffed animals should be

kept to a minimum in the house and should not be in the child's bedroom. Indoor humidity should also be kept to a minimum of less than 50% in the home. At school the environment should be quite similar in order to accommodate to individuals with dust and/or dust mite allergies. Humidity should be kept to a minimum, and can be done so with an air conditioner. Schools should replace carpeting with tile floors in order to reduce dust mite occurrences (Blaiss, 2004a).

Pollen is another common allergen that causes allergic rhinitis in children. Schools should keep windows and doors closed to prevent pollen-filled air from entering the learning environment. Children with strong pollen allergies should refrain from going outside when there is a high pollen count (Blaiss, 2004a). Indoor recess and gym class should be encouraged during that time of the year for those students. At home students should also be in an environment with the windows closed and refrain from being outside during times when pollen counts are high. Children should refrain from camping, hiking, and raking leaves when the pollen count is high as well. If possible, a HEPA filter could be installed to clean the air that is circulated throughout the house. It is also encouraged that children take showers or baths before going to bed to ensure that their body and hair is free of pollen particles (Blaiss, 2004a).

Mold and fungi can be a large allergic rhinitis contributor. In order to accommodate those students with mold and fungi allergies, additional steps can be taken. Meticulous cleaning is very important at both home and school. Like dust mite prevention, carpet should be avoided to prevent mold growing underneath. Humidity should be kept to a minimum, and air conditioning can help with that. Special filters can

be added to air conditioners to trap mold spores and clear them from the air. A dehumidifier can be helpful as well, but should be properly maintained (Cutler, 1998).

Mold-growing inhibitors can also be added to many areas of home and school. Shower curtains, tile walls, tubs, and toilet tanks can all be treated with mold-inhibiting solutions to prevent mold growth on the damp surfaces. Mold can also grow in basements, so it is imperative that those who are allergic to mold do not have a room in the basement or near a damp area (Cutler, 1998). The classroom the student sits in while in school should also be in an area away from damp places where there could be possible mold growth.

Schools should also impose a rule that no working animals be allowed on school premises (Borres et al., 2002). The remnants of the animals could spark an allergic reaction to any child who comes in contact with it. Homes should also be free of animals that could trigger an allergic reaction. Rules should also be imposed to control the airborne particles that are being let into the air within the school. Perfumes and strong smelling skin or hair-care products should not be worn excessively by teachers and/or students, and cleaning products should lack a strong scent as well (Borres et al., 2002).

It is very important to be a keen observer of a child's allergy symptoms so identification of triggers can be determined. It is possible that allergy symptoms may be worse in the morning because a pillow may be full of dust mites, or the bedroom may have mold. Avoiding the allergens is considered the best therapy for allergies, but it takes some effort (Schultz et al., 1994).

One important aspect of allergies to consider is the lack of training and knowledge professionals within schools will have with allergies. Oftentimes the

environment within the school will be lacking in qualities that will minimize the risk for allergens in the air. Parents and nurses need to be the advocates for changes within the schools because they know the supports that would be most beneficial for students (Sander, 2003).

Academic Achievement

Academic achievement can have many meanings to many people. Some would define achievement as the proficiency in the core subjects of math and reading. Others would say that academic achievement is characterized by the ability to learn information that makes an individual able to contribute to society (Center for American Progress, 2006). When people are concerned with allergies affecting the academic performance of a child with allergic rhinitis, they are usually concerned with how well he or she is performing in school. The easiest way to determine how a student is doing in school is to look at their grades and determine if he or she is different depending on when allergies are affecting his or her health. For instance, a child with pollen allergies may develop allergic rhinitis in the spring when the pollen count is the highest in the air. If that is the case, it is possible that a drop in grades from winter to spring could be a fault of the symptoms of allergic rhinitis.

Previous Research

Research regarding allergic rhinitis and academic performance is not very vast. Currently, a very small number of researchers have dedicated the time to empirically study the effects that allergic rhinitis can have on a student's academic performance. However, many researchers have conducted reviews of literature regarding the effects of

allergic rhinitis. Recent research suggests that allergic rhinitis can have a much larger effect on a student's learning than many originally presumed (McCabe, 2008).

Research Based on Literature

Michael S. Blaiss wrote an article on behalf of The Allergic Rhinitis in Schoolchildren Consensus Group in 2004. The article was published in the *Current Medical Research and Opinion* journal. The consensus group consisted of academic, school and healthcare providers who possessed a great deal of experience and knowledge concerning allergic rhinitis. The goal of the article was to gather a variety of information in order to accurately assess how severely allergic rhinitis can affect school-aged children. Based on the compiled information, the group aimed to determine how to improve screening, prevention, diagnosis and treatment to ensure the highest quality of life and school performance for this school-aged population. The group was able to make conclusions about the effects of allergic rhinitis symptoms on school-aged children, as well as the effects of allergic rhinitis medications on school-aged children (Blaiss, 2004a).

Based on the collected information by the group, it was determined that allergic rhinitis symptoms can have a considerable harmful effects on absenteeism, cognitive impairment, poor school performance and behavioral and psychosocial problems in schoolchildren. The researchers suggested that the affects the symptoms allergic rhinitis can have on academic performance is much "underappreciated" (Blaiss, 2004a). Uncontrolled symptoms of allergic rhinitis were concluded by the group to impair cognitive functioning and risk optimum learning ability within the classroom. For example, a student may be present in the classroom, but they are not able to cognitively

concentrate on what is being presented in class. The group conducted a survey of adolescents in order to determine what affects allergic rhinitis has on their school performance. The majority of adolescents reported that they experience difficulty doing homework, difficulty focusing on problems, and was less able to get school activities accomplished when their allergic rhinitis symptoms were present (Blaiss, 2004a).

In addition, researchers found that children with allergic rhinitis can become more irritable and tired and result in inattention and difficulty concentrating on class material. More alarming behavioral patterns were acknowledged as well within the youth population as well. The symptoms of allergic rhinitis can become so severe that they begin to distract students and noticeably influence their in-class behaviors. Students will often not only be distracted, but become unresponsive and disinterested in tasks as well. It is also possible that the symptoms may drive the student to elicit disruptive behaviors as well. Such behaviors can negatively affect the relationships between the student and their peers/teachers (Blaiss, 2004a).

Unfortunately, allergic rhinitis symptoms can occur all year long. Those with seasonal allergies are afflicted in fall and spring with allergies, which both occur during the traditional school year. Allergic rhinitis can lead to the development of other serious comorbidities such as sinusitis and asthma as well. Early diagnosis of allergic sinusitis is crucial in reducing the impairment caused by allergic rhinitis, but can only be established through increased education and awareness in schools and in the home (Blaiss, 2004a).

In order to obtain a reliable representation of the effects of allergic rhinitis on school performance, the researchers also collected information regarding medications for allergic rhinitis symptoms. Treatment for allergic rhinitis in children is very similar to

allergic rhinitis in adults, but more close attention needs to be paid to side effects and how susceptible children may be. Some of the current forms of treatment identified by the research group were antihistamines, decongestants, corticosteroids, mast cell stabilizers, anticholinergics, and allergen-specific immunotherapy (Blaiss, 2004).

Antihistamines remain the most common form of treatment for allergic rhinitis symptoms and are mainly available for oral use. Antihistamines work by blocking the histamine effects on cell surfaces and nerve endings. First and second-generation antihistamines are available. First-generation antihistamines are usually found over the counter and are traditionally found to be "sedating" (Blaiss, 2004a). Second-generation usually require a prescription and are found to be less or non-sedating. Sedation can have a negative effect on a child's school performance; therefore, it is recommended by the researchers that non-sedating antihistamines are tested before sedating antihistamines on younger children (Blaiss, 2004a).

Decongestants are commonly used to treat nasal congestion caused by allergic rhinitis; however, decongestants really have no influence on other symptoms such as itching, sneezing or runny nose. Psuedophedrine is commonly one of the main drugs found in decongestants and can cause nervousness, irritability, and insomnia because the drug has a tendency to effect the Central Nervous System (Blaiss, 2004a).

Intranasal corticosteroids act against allergic rhinitis symptoms by being administered nasally. Most symptoms of allergic rhinitis are found to be treated with intranasal corticosteroids. Not many side effects have been reported, but the researchers were able to identify one large effect intranasal corticosteroids causes within children. It has been reported by several studies that intranasal corticosteroids may have an effect on

the growth of young children. It was recommended by the researchers that use of intranasal corticosteroids be used in severe cases of allergies in order to control the severe symptoms that may occur (Blaiss, 2004a).

Mast cell stabilizers relieve allergic rhinitis symptoms such as itching, sneezing, and runny nose, but have little effect on nasal congestion. Possible side effects include sneezing and burning. A positive of this type of drug is that it is approved for the use in children under the age of 6 years (Blaiss, 2004a).

Anticholinergics prevent nasal secretion and ultimately runny nose. Unfortunately, anitcholinergics have no effect on other allergic rhinitis symptoms. Side effects of this drug include nosebleeds, blood-colored mucus and nasal dryness. Not much data has been collected regarding this drug, and is not recommended for use in children under the age of 12 (Blaiss, 2004a).

Immunotherapy is recommended when antihistamines and other treatments do not diminish side effects of allergic rhinitis. Immunotherapy also aids in preventing the development of asthma is school-aged children. Because of the risk of anaphylaxis, immunotherapy should only be used in sever cases of allergic rhinitis and should be discontinued if benefits are not noticeable (Blaiss, 2004a).

Based on the research The Allergic Rhinitis in Schoolchildren Consensus Group conducted, they made several conclusions to guide further research and strategies that can be used to ensure children with allergic rhinitis are being properly taken care of. The group stated that allergic rhinitis can be a debilitating disease if not treated properly and create large negative effects on a child's school performance. One recommendation that was made by the group was to increase education and awareness encompassing allergic

rhinitis in order to properly diagnose and treat it. The group maintained that early detection and prevention are very important in minimizing the impact on education in children (Blaiss, 2004a).

Prevention strategies such as removing carpet in school classroom to eliminate risk of mold growth may not always be possible; however, schools should take special efforts to make the learning environment as allergen free to the students who suffer from allergic rhinitis. Often time's preventative strategies may not be enough. If that is the case, the group recommends involving a medical doctor to determine the need for medications in order to control symptoms (Blaiss, 2004a).

As stated earlier, the group was able to evaluate what drugs are most beneficial to children based on side effects and the effectiveness of relieving allergic rhinitis symptoms. The group concluded that antihistamines are the medication of choice for school-aged children, but should be evaluated for side effects before having a child take it. Antihistamines such as fexofenadine have been shown to increase school attendance and classroom performance due to the non-sedating side effects (Blaiss, 2004a).

Moreover, the group also stresses the need for communication between parents, educators and medical professionals in the management of allergic rhinitis and school performance (Blaiss, 2004a). The research conducted by The Allergic Rhinitis in Schoolchildren Consensus Group, serves as a framework for any professional or parent dealing with allergic rhinitis in a child they know and serve.

Bruce G. Bender published an article in the School Psychology Review in 1999 concerning asthma and allergies and the likelihood that they are causal for learning disorders. Bender (1999) collected a variety of data on pertaining to asthma and allergy

effects on development. He also reported information on how medications and side effects of allergic rhinitis and asthma can contribute to poor school performance (Bender, 1999). This report focuses on allergic rhinitis, so the Bender's findings regarding asthma are not reported.

It has been reported that allergic rhinitis is one of the most frequent causes of school absences in the United States. Prevalence has risen dramatically in recent years in every region of the country. It has been suggested that children with allergic rhinitis may have trouble adapting to school, attending school and experience obstacles within learning. New reports suggest that allergic rhinitis may be a cause, or associated, with changes within a child's brain. If this were true, it would explain the academic difficulties children with allergic rhinitis face and the frequent diagnosis of specific learning disabilities (Bender, 1999). Bender (1999) reported on several studies that addressed this issue and was able to come up with what he considered to be an accurate conclusion.

Several researchers have conducted studies on the assumption that allergic rhinitis causes brain changes severe enough to indicate learning disabilities. A few studies have concluded that it is a large possibility that learning disabilities can be mediated by autoimmune diseases such as allergic rhinitis (Bender, 1999). Bender (1999) found one study by Pennington, Smith, Kimberling, Green and Haith (1987) that concluded allergic rhinitis is found to be increased in populations with dyslexic. This research supports the assumptions that allergic rhinitis could have an effect on normal brain development and manifest in a learning disability or behavioral problems (Bender, 1999).

Havard (1975) also conducted a study that concluded that individuals with allergic rhinitis may experience difficulties with auditory and visual processing as a result of allergic rhinitis symptoms. Within this study Havard (1975) reported that many children who are considered to be hyperactive, language disabled, lazy, minimally brain damaged, or emotionally disturbed may have allergic rhinitis problems underlying their disability. Bender (1999) also reported on several other studies that indicated attention deficit disorders as a causal effect of allergic rhinitis.

Succeeding research has not supported the results reported in the previous studies. Samples of hyperactive children were assessed in studies done by McGee, Stanton, & Sears (1993) and Mitchell, Aman, Turbott, & Manku (1987). The results of the studies concluded that there was no connection between allergic rhinitis and an increased incidence of hyperactive children. McLoughlin et al. (1983) also conducted a study and concluded that achievement levels of children with allergic rhinitis were no different than children not diagnosed (Bender, 1999).

Based on the inconsistent information Bender (1999) collected from a variety of resources, he concluded that there was no clear evidence to support that allergic rhinitis interferes with normal brain development and has the potential to cause learning disabilities and behavioral problems. It is possible that some children may experience allergic rhinitis as well as learning disabilities, but it does not mean one causes the other (Bender, 1999).

Despite the conclusions of the previous studies, Bender (1999) did state that many children with allergic rhinitis may have difficulty in school due to school absence, illness symptoms interfering with concentration, hearing loss, sleep loss and medication side

effects. School absence is common in children with allergic rhinitis, and interrupts the learning process as well as social interactions and extracurricular activities. Special education intervention is not often needed in children with allergic rhinitis who frequently miss school, but does interrupt acquisition of new skills (Bender, 1999).

Fatigue was identified by Bender (1999) as another common side effect of allergic rhinitis. Children who experience this fatigue generally feel ill and may interfere with their concentration and learning within the classroom. The fatigue could be described as low energy, unable to function or just feeling poor. Vuurman, van Veggel, Ulterwijk, Leutner, & O'Hanlon (1993) found that children with allergic rhinitis symptoms displayed larger impairment of short-term memory than their non-allergic peers even when they did not have symptoms of allergic rhinitis (Bender, 1999).

Allergic rhinitis can often be a cause of hearing loss, which can impede speech development and aspects of learning in young children. It has been shown that children with chronic ear infections during the first year of life demonstrate long-term delays in auditory processing (Bender, 1999). Bender (1999) noted that hearing deficits early on in life can be corrected and academic deficits are usually regained after correction. It should be noted that there is not enough substantial research at the current time to determine whether hearing loss due to allergic rhinitis symptoms is a cause of language impairment and more research is necessary to make an accurate assumption (Bender, 1999).

As also stated by Blaiss (2004a), sleep loss is a common symptom of allergic rhinitis sufferers. Sleep loss can occur due to the nuisance of other symptoms such as runny nose, drippy throat, headache and general ill feelings. Lack of sleep can cause

fatigue, irritability, poor attention and inability to learn while a child is in school. It has been shown that children require a certain amount of REM sleep a night, and if that amount is not met then significant changes in daily behavior can be noted (Bender, 1999).

Contrary to the reports from Blaiss (2004a), Bender (1999) reports that medications have not been shown to be significant in affecting a child's learning. The side effects of medications used for children with allergic rhinitis are so small that no changes in children are noticeable. For example, it is reported that intranasal corticosteroids cause no difficulties for children and no cognitive or negative effects have been found (Bender, 1999). Antihistamine side effects in children have been reported to be minimal in affecting school performance. Bender (1999) reported that very little research has been done in this area, and currently it is reported that first generation antihistamines cause more sedating side effects than second generation antihistamines. One study conducted by Guill, Buckley, Rocha, Kemp, Segal, Shirley, Tinkelman, Shaath-Schwen, Dietrich, Willie, & Tsai (1986) looked at the effects of a non-sedating antihistamine and a placebo on school-aged children. It was concluded that there were no differences within attention, visual memory, motor speed and coordination between subgroups (Bender, 1999). Despite the current widespread use of second-generation antihistamines, little research has been conducted on the side effects of the medications. Before any concrete assumptions are made about the drugs, more research is crucial (Bender, 1999).

Based on the information Bender (1999) collected, he concluded that conditions such as allergic rhinitis can severely impair a child's ability to learn and adapt within school. Contrary to some research, Bender (1999) did not find any reason to assume that

allergic rhinitis would interfere with appropriate brain development and functioning. Medications on the other hand, were found to have side effects that have the potential to interfere with the learning process in children. Sleep loss, fatigue, ill feelings, and ear infections can result in diminishing a child's ability to concentrate in school and perform to their ability. In order to provide for such students, catch-up support should be offered to student who may miss school because of their symptoms and in most cases should be sufficient enough to maintain pace within the classroom (Bender, 1999).

Empirically Based Research

As stated earlier, very few researchers have dedicated the time to empirically researching the effects of allergic rhinitis on children and adolescents and more specifically on academic performance. McLoughlin, Nall, Isaacs, Petrosko, Karibo and Lindsey (1983) studied the relationship between allergies and allergy treatments to student's school performance and behavior. The researchers focused on school attendance, academic performance and social behavior. Additionally, relationships between allergy medications and allergies to the behavior and learning within the student's school and home were also explored (McLoughlin et al, 1983).

Between January and August of 1982, data was collected concerning children and adolescents attending nursery school through grade twelve in the Louisville, Kentucky area. Parents of children diagnosed with an allergy and visiting an allergist's office completed surveys and returned them to the researchers. Other surveys were sent out to random allergy patients who were receiving treatment at the time but did not make visits to the allergist's office. Furthermore, parents of nonallergic children were also surveyed within pediatrician's offices in the same area. An individual was available at each site to

verify and answer any questions parents may have about the survey. Additionally, physicians verified the information provided by low socioeconomic respondents. Independent, blind ratings conducted by a physician in 30 of the remaining cases indicated that the judgments made by the parents were reliable and above what would have been expected out of chance (McLoughlin et al., 1983).

The first portion of the survey addressed school performance and behavior issue. Topics included absenteeism, academic and language performance, school retentions, diagnosis as handicapped and behavior issues. The second portion of the survey focused on symptoms, current allergy treatments and diagnosis, possible side effects of medication on behavior and perceived effectiveness of the treatment. Overall, 400 parents were surveyed. 79% had children who were allergic and 21% had children who were nonallergic. 85% of the children were in grades nursery to 7 and 15% were in grades 8 to 12. Problems with allergic rhinitis (86%), Eustachian tube dysfunction or chronic ear infections (57%), asthma (58%), gastrointestinal symptoms (36%) and hives (29%) were reported (McLoughlin et al., 1983).

The results of the study indicated that parents with allergic children reported a greater amount of school absences than nonallergic children. The absences mainly occurred in the winter (49%). However, there was no significant difference between school performance in children diagnosed with allergies and those nonallergic. Reports of diagnosed handicaps were reported within both allergic and nonallergic populations. Speech/language difficulties as well as learning disabilities were reported in both cases (4%) and matched the national average (McLoughlin et al., 1983).

In regards to school and home behaviors issues, there was little to no difference between groups overall. However, it should be noted that parents with allergic children reported more problems regarding sleep and drowsiness in the behavior of their children. The majority of the parents who reported that their children had allergies also reported the presence of upper respiratory problems (chronic rhinitis and eustachian tube dusfunction) and asthma. Those with eustachian tube dysfunctions were rated lower on reading, spelling, math, writing, listening, and speaking than their peers. Eustachian tube dysfunction was also linked to inattentiveness and overtalkativeness in the behavior of the child. Additionally, gastrointestinal-related allergy problems were linked to inattentiveness, hyperactivity, impulsivity and withdrawn behaviors with children and adolescents (McLoughlin et al., 1983).

Researchers analyzed the effects of allergy medications on student behavior in the home and in school based on parent reports as well. About 25% of parents reported a change in behavior at home due to medication. The use of antihistamines seemed linked to complaints of side effects in the home. On the other hand, over 65% of parents indicated that they considered the allergy treatments to be very effective and could see a difference in their child's behavior (McLoughlin et al., 1983).

McLoughlin et al. (1983) concluded several findings based on their research. Contrary to belief, this study found that allergic children do not really have any more problems in school or behavioral areas compared to their nonallergic peers. This supports the assumption that expectations should not be lowered for allergic children due to their allergic side effects. If side effects do occur from the allergies or medications, teachers, parents and physicians should all be contacted in order to serve the student as

positively as possible. The teacher should especially be notified on how the allergies may affect a student's performance and what they can do to accommodate. For example, the data showed that upper respiratory problems can be associated with inattentiveness and inability to express thoughts and feelings (McLoughlin et al., 1983).

McLoughlin et al. (1983) wanted to use this research to answer a variety of questions related to allergies in children and adolescents. Although they collected a large amount of data, they did suggest that only parts of the questions are answered due to the objectivity of parental knowledge and perceptions. Information collected from teachers would also be imperative in order to gain a full view of child and adolescent behavior that a parent may lack knowledge about. Lastly, the researchers wanted to note that the current research is reliable enough to pay a closer look at what implications are being made about the school performance and behaviors of allergic children in order to decide if the right inferences are being made (McLoughlin et al., 1983).

Marshall, O'Hara and Steinberg (2002) explored the effects of seasonal allergic rhinitis on mood and levels of fatigue in adults. Although the population sample was between the ages of 23 and 50, the focus and results of the study could still be applied to any individual suffering from allergic rhinitis including children and adolescents. Marshall et al. (2002) recognized that many individuals complain of moodiness and fatigue during their allergy seasons. The focus of the research was to gather information on the effects allergies can have on negative and positive mood and fatigue levels. The researchers hypothesized that patients with allergic rhinitis do indeed experience changes in fatigue and mood during the seasons their allergies are present (Marshall et al., 2002).

To gain information on the fatigue and mood changes within allergic rhinitis sufferers, Marshall et al. (2002) tested both allergic and nonallergic patients. The nonallergic patients acted as control subjects within this study. Subjects were tested in the fall of 1996, winter 1997 and fall 1997. Ragweed, a common allergen, is found to be most high in the fall, and should elicit allergic rhinitis symptoms. It was noted that in fall 1997 the ragweed level was unusually low, so the fall of 1998 was used in place of fall 1997 in the study after an extension in the research. Each subject was questioned and interviewed to ensure that they had no history of drug abuse or major physical or mental illness that could interfere with the reported mood or fatigue levels. Additionally, no subject was taking an medication that could have affected the central nervous system and consequently affected mood and/or fatigue (Marshall et al., 2002).

Each allergic subject was asked to complete the Positive Affect Negative Affect Scales (PANAS) each morning and before dinner in the fall of 1996 and 1997 when their allergy symptoms were most severe. Both allergic and nonallergic subjects were asked to complete the PANAS each evening for 7 consecutive days in the winter of 1997 when allergens would likely not be in the air. In addition to the PANAS, the subjects were given the Multidimensional Fatigue Inventory (MFI-20) in order to assess levels of fatigue. The subjects were all given the MFI-20 at the same time of the day across all three seasons in order to account for daily variables that may have an influence on fatigue (Marshall et al., 2002).

Results indicated that allergic rhinitis sufferers reported more motivational fatigue, activity-related fatigue, general fatigue and mental fatigue in ragweed season 1996 than in winter 1997. Physical fatigue was not noted to increase between ragweed

season 1996 and winter 1997. Allergic subjects also reported more motivational fatigue, general fatigue and mental fatigue in the fall of 1998 than in winter 1997. Physical and activity-related fatigue was not shown to increase during this time. Control subjects did not report any change in motivational fatigue, activity-related fatigue, general fatigue, mental fatigue or physical fatigue in ragweed seasons 1996 and 1998 and winter 1997 (Marshall et al., 2002). Marshall et al. (2002) concluded that allergic rhinitis symptoms can cause fatigue within the central nervous system and the data collected supports that original assumption.

In regards to mood, results indicated that positive affect (PA) increased within allergic subjects between ragweed season 1996 and winter 1997. PA scores also decreased within allergic subjects between winter 1997 to ragweed season 1997. These results indicate that allergic subjects experienced a more positive mood during the winter rather than ragweed seasons. On the other hand, control groups (nonallergic) were found to have no significant change in affect between winter and ragweed seasons. Results suggested that allergic reaction symptoms are related to positive affect in allergic rhinitis sufferers. Data concerning negative affect indicated that no change was significant between winter and ragweed seasons in the allergic group or control group. The researchers concluded that allergic reactions are unrelated to negative affect changes (Marshall et al., 2002).

In conclusion, the researchers stated that allergic rhinitis symptoms can create fatigue and depressive feelings. Marshall et al. (2002) suggest that allergic reactions may induce biochemical changes that create symptoms that are similar to depression. The changes in mood and fatigue documented in this study support the researcher's claims.

The authors suggest that more research be conducted in order to determine the relationship between depression and allergic rhinitis for future medical use (Marshall et al., 2002).

Sundberg, Torén, Höglund, Åberg and Brisman (2007) conducted a study in Sweden involving the association between nasal symptoms and school performance in adolescents. The researchers hypothesized that the side effects (specifically nasal symptoms) of allergic rhinitis symptoms could negatively impact learning, cognitive functioning, classroom performance and the quality of life in children and adolescents. In fall 2000, 10,837 responses were assessed in order to determine the relationship between allergic rhinitis symptoms and overall school performance. Questionnaires were used to determine what symptoms the adolescent's experienced related nasal congestion and allergic rhinitis. Grades were also compiled and compared to the symptoms of individuals (Sundberg et al., 2007).

Results of the research suggested a significant relationship between allergic rhinitis symptoms (severe nasal symptoms) and low grades. The researchers stated that their research supported their original hypothesis that severe nasal symptoms associated with under controlled allergic rhinitis can negatively impact an children and adolescent's school performance. Moreover, the researchers suggested that allergic rhinitis can also impact children and adolescent's physical, social and psychological well-being (Sundberg et al., 2007).

Chapter III: Discussion

Supported by the exploration of literature on allergic rhinitis, it is obvious that allergic rhinitis is much more common than many may recognize and has many debilitating effects. There are many ways of dealing with allergic rhinitis and preventing the symptoms, but it is clear that children under the age of 18 are still being affected despite those measures. A summary of the literature, including key points and noteworthy findings, is included in this chapter. Lastly, recommendations regarding the literature are discussed.

Critical Analysis

It is apparent that allergic rhinitis is not rare and influences the lives of those who suffer from it. It is reported that 35 million people are affected by allergies each year in the United States. 40% of those who suffer are children. A large number of cases are still undiagnosed and indicates that a large number of allergy sufferers are experiencing debilitating symptoms without any medical help (Blaiss, 2004a). Prevalence, symptoms, possible causes, prevention and previous research regarding allergic rhinitis have been examined.

Over the past 20 years, the prevalence of allergic rhinitis has risen greatly. In fact, the number of children diagnosed with allergic rhinitis has doubled in the past twenty years. Many are wondering why the increase has been so great in the past twenty years (Blaiss, 2004b). Many factors have been contributing to the rise in allergic rhinitis diagnoses. Heredity has been shown to influence whether an individual will suffer from allergic rhinitis. If one parent has an allergy, then a child has a 30% chance of inheriting that allergy. If both parents have an allergy, then a child has a 60% chance of inheriting

that allergy. Even if both parents do not have an allergy, the chance of a child having an allergy is 10% (Brody, 1997). With percentages such as these, it is understandable why the number of people suffering from allergic rhinitis is increasing all the time.

Symptoms can be obvious or concealed by the sufferer. Allergic rhinitis is caused by the body's release of antibodies called histamines. The histamines are meant to fight off harmful substances such as viruses and illness-causing agents, but are not needed for non-threatening substances. Unfortunately, many non-threatening substances such as dust, mold, pollen, animal dander, and dust mites are often mistaken for harmful substances and the body releases histamines. Histamines cause eyes to water, turn red and itch and the nose to run. Allergic reactions can also cause sore throats, nasal congestion, fatigue, stomachache, headache, and tenderness of the cheeks and forehead (Brody, 1997). Depending on what an individual is allergic to, symptoms can last year around or occur depending on the season. Symptoms can become severe enough to affect the daily lives of those who suffer. Children who suffer from allergic rhinitis are more likely to miss school days. If a student with allergic rhinitis symptoms does go to school they will likely experience intermittent hearing loss and the inability to concentrate (McCabe, 2008).

Allergic rhinitis is caused by allergens that are found in the air. The most common allergens that elicit allergic responses are plant pollens, dust, dust mites, molds, animal dander, pollutants, and other airborne particles (household cleaners, perfumes, soaps, and detergents) (Gershwin & Klingelhofer, 1998). An individual can be allergic to one or more allergens found in the air. The main trouble for allergic rhinitis suffers is eliminating contact with allergens that cause reactions. Many allergens are found both

indoors and outdoors. Other allergens are mainly found outside, but are found during most of the seasons of the year (Gershwin & Klingelhofer, 1998).

Prevention strategies are highly recommended and can be very successful in avoiding the symptoms of allergies and allergic rhinitis. In order to prevent children and adolescents from having a large amount of contact with allergens is to consider where they spend most of their day. Home and school are generally the two places a child spends the most time, so it is imperative to ensure that both environments are preventing allergic rhinitis symptoms. Many accommodations such as eliminating carpet, keeping windows closed and utilizing air conditioning can be used in the schools. At home mattresses can be covered with an allergy-proof encasement, bedding should be washed in hot water, humidity should be kept to a minimum and carpet and stuffed animals should be kept to a minimum (Blaiss, 2004a).

At this time little research has been completed concerning allergic rhinitis and the effect on school performance in children and adolescents. The findings are rather inconsistent as well. Several research and empirically based studies have been analyzed and it is unclear whether or not allergic rhinitis does affect school performance. Michael S. Blaiss wrote an article in 2004 that concluded allergic rhinitis to have substantial effect on absenteeism, cognitive impairment, poor school performance and behavioral and psychosocial problems in school-aged children. Alternatively, Bender (1999) concluded that there is not any clear evidence that suggests that allergic rhinitis cause behavioral problems and learning disabilities. Bender (1999) did state in his article that despite his findings, many children may have difficulty in school due to absenteeism, inability to

concentrate, hearing loss, and medication side effects all resulting from allergic rhinitis symptoms.

McLoughlin et al. (1983) conducted empirically based research in 1982 and concluded that allergic rhinitis does not affect school performance contrary to the beliefs of many. Although, McLoughlin et al. (1983) did note that their research could be expanded to account for more information they did not cover. Marshall et al. (2002) also gathered empirically based information on the effects of allergic rhinitis on mood and fatigue in adults. The research indicated that allergic rhinitis symptoms decrease positive affect and also increases certain types of fatigue in allergic rhinitis sufferers (Marshall, et al., (2002). Sundberg at al. (2007) determined based on their research that allergic rhinitis is related to low grades in children and adolescents. It was also suggested that the physical, social and psychological well-being of children and adolescents can also be affected by allergic rhinitis symptoms (Sundberg et al., 2007).

Recommendations

The review of the literature indicates that allergic rhinitis can cause many symptoms that have the potential to interfere with school performance. One recommendation is to further the awareness of educators on the symptoms of allergic rhinitis. Currently there are no services that can be offered to students with allergic rhinitis. The only possible service a student with allergic rhinitis may receive would be under a Section 504 plan, and the symptoms would need to be documented as having a severe effect on academic performance. This would offer a student supports to best accommodate their learning while considering their allergic symptoms. A Section 504 plan does not qualify for an Individualized Education Plan (IEP), thus offering less rights

and protection for students. Therefore, it is important for educators to be familiar with the signs and symptoms of allergic rhinitis in order to better serve affected students. Educators can offer many supports within their classroom to better serve students who may feel fatigued, have trouble hearing, or have trouble concentrating. There also are many ways to make the classroom environment for allergic rhinitis appropriate. Carpet should be taken out, windows should be closed, air conditioning should be used to lower the humidity levels and eliminate certain allergens, animals should be kept out of the classroom and other airborne allergens such as cleaners and perfumes should be kept to a minimum (Gershwin & Klingelhofer, 1998).

A second recommendation would be to further research in order to clarify the relationship between allergic rhinitis and academic performance. The current research offers so many different answers and approaches that there is no consensus. There also are not a large number of research studies regarding this subject at the current time. More research would offer more emphasis on the effects of allergic rhinitis on academic achievement and also highlight the steps that should be taken in order to best accommodate students.

More research could also be gathered on the side effects of medications used to treat allergies. There are some studies that report some side effects of medications, but there could be more research addressing the effect on academic performance. This topic would offer more information for educators to make additional considerations for accommodations. Depending on the results of the research, it could also indicate what choices for medications may be best for students when concerning the effect on school performance.

A final recommendation would be to provide more information to parents on the signs, symptoms, treatment and prevention of allergic rhinitis. Due to the large number of undiagnosed cases, it is apparent that many students may suffer from allergic rhinitis and parents may not be aware of the ramifications (Blaiss, 2004a). On the other hand, parents who are aware of their children's allergic rhinitis may be unaware of the precautions they should be taken at home and the additional support that should be provided in school if necessary. Pamphlets and other forms of information could be distributed in clinics and schools. The more aware parents are of the signs, symptoms, prevention, and treatment of allergic rhinitis, the more they can assist their child if they have allergies and suffer from allergic rhinitis.

References

Bender, B.G. (1999). Learning disorders associated with asthma and allergies. *School Psychology Review, 28*(2), 204-214.

Blaiss, M. (2004a). Allergic rhinitis and impairment issues in schoolchildren: A consenus report. *Current Medical Research and Opinion, 20*(12), 1937-1952.

Blaiss, M. (2004b). Current concepts and therapeutic strategies for allergic rhinitis in school-age children. *Clinical Therapeutics, 20*(11), 1876-1888.

Borres, M.P., Abrahansson, G., Andersson, B., Andersson, B., Brakenheim, G., Fabricius, T., Haag, C., Rinne-Ljungkvist, L., & Foucard, T. (2002). Asthma and allergies at school – A Swedish national position paper. *Allergy, 57*(5), 454-457.

Brody, J. (1997). *Allergy fighter.* New York: W.W. Norton & Company.

Center for American Progress. (2006, July 26). *Measuring academic achievement.* Retrieved June 15, 2008, from: www.americanprogress.org/issues//2006/07/b1982011.html

Cutler, E.W. (1998). *Winning the war against asthma and allergies: A drug-free cure for asthma and allergy sufferers.* Albany, NY: Delmar Publishers.

Gershwin, M.C., & Klingelhofer, E.L. (1998). *Taking charge of your child's allergies: The informed parent's comprehensive guide.* Totowa, NJ: Humana Press, Inc.

Guill, M., Buckley, R., Rocha, W.J., Kemp, J.P., Segal, A.T., Shirley, L.R., Tinkelman, D.G., Shaath-Schwen, M.S., Dietrich, K.K., Willie, L.J., & Tsai, T.H. (1986). Multicenter, double-blind, placebo-controlled trial of terfenadine suspension in the treatment of fall-allergic rhinitis in children. *Journal of Allergy and Clinical Immunology 78,* 4-9.

Havard, J.G. (1975). Relationship between allergic conditions and language and/or learning disabilities. *Dissertation Abstracts International, 35,* 6940.

Marshall, P.S., O'Hara, C., & Steinberg, P. (2002). Effects of seasonal allergic rhinitis on fatigue levels and mood. *Psychosomatic Medicine, 64,* 684-691.

Massoud, E. (2007, April 30). Eustachian tube function. *eMedicine: A Continually Update Clinical Reference.* Retrieved November 23, 2008, from: www. emedicine.com/ent/topic359.htm

Mayo Clinic. (2008, September 27). Mold allergy: *Prevention.* Retrieved November 25, 2008, from: www.mayoclinic.com/health/mold-allergy /DS00773/DSECTION= prevention

McCabe, P. C. (September, 2008). Academic functioning and quality of life of children and adolescents with allergic rhinitis – Part I. *Communiqué, 1, 8-10.*

McGee, R., Stanton, W., & Sears, M.R. (1983). Allergic disorders and attention deficit disorders in children. *Journal of Abnormal Child Psychology, 21,* 79-89.

McLoughlin, J., Nall, M., Isaacs, B., Petrosko, J., Karibo, J., & Lindsey, B. (1983). The relationship of allergies and allergy treatment to school performance and student behavior. *Annals of Allergy, 51*(5), 506-510.

Mitchell, E.A., Aman, M.G., Turbott, S.H., & Manku, M. (1987). Clinical characteristics and serum essential fatty acid levels in hyperactive children. *Clinical Pediatrics, 26,* 406-411.

Monroe, J. (2001). *Allergies.* New York: Lifematters.

Pennington, B.D., Smith, S.D., Kimberling, W.J., Green, P.A., & Haith, M.M. (1987). Left-handedness and immune disorders in familial dyslexic. *Archives of Neurology, 44,* 634-639.

Sander, N. (2003). Making the grade with asthma, allergies, and anaphylaxis. *Pediatric Nursing, 28*(6), 593-598.

Schultz, N.D., Giannini, A.V., Chang, T.T., & Wong, D.C. (1994). *The best guide to allergy.* Totowa, NJ: Humana Press, Inc.

Seargeant, S.E. (1997). *The birds and the bees guide to allergy-free living.* New York: Seargeant Publishers.

Sundberg, R., Torén, K., Höglund, D., ´berg, N., & Brisman, J. (2007). Nasal symptoms are associated with school performance in adolescents. *Journal of Adolescent Health, 40,* 581-583.

Vuurman, E.F., van Veggel, L., Ulterwijk, M.M., Leutner, D., & O'Hanlon, J.F. (1993). Seasonal allergic rhinitis and antihistamine effects on children's learning. *Annals of Allergy, 71,* 121-126.