

ATTENTION DEFICIT/HYPERACTIVITY DISORDER
AND THE OCCURRENCE OF FREQUENT CHILDHOOD EAR INFECTIONS

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Abstract

This study examined the relationship between children diagnosed with Attention Deficit/Hyperactivity Disorder (AD/HD) and the occurrence of frequent childhood ear infections. Other topics examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD. Utilizing historical and case study methodology, this study showed a relationship between frequent childhood ear infections and AD/HD. Additionally, parents did not intentionally use preventative measures to reduce the risk that their child would develop ear infections. Interventions to control the symptoms of AD/HD were utilized but did not appear to make a significant difference as children with AD/HD continued to present significant challenges for family members and teachers. The findings from this study are important. Parents should utilize early interventions and public schools should revise guidelines regarding hearing screenings as well as provide training on AD/HD for school personnel. Parents should participate in support groups and children who have AD/HD should have access to specialized school services and interventions.

Key Words: AD/HD, ear infections, otitis media, ear infection prevention, AD/HD interventions, school hearing screenings, AD/HD training

Chapter 1

Statement of Problem

Attention Deficit/Hyperactivity Disorder (AD/HD) is the most frequently diagnosed behavioral disorder in children. It affects about 3% to 5% of children globally and is diagnosed in about 2% to 16% of school-aged children. It is a chronic disorder with 30% to 50% of those individuals diagnosed in childhood continuing to have symptoms into adulthood (Millichap, 2008). In comparison, middle ear infections, also known as otitis media, are among the most common illnesses of early childhood. About 50% of all children will experience at least one ear infection during their first year of life. Sixty percent will suffer from at least three by the time they are 3 years-old (Adesman, Altshuler, Lipkin, & Walco, 1990). For many children, otitis media is a long-lasting condition requiring continuous treatment and intervention.

The presence of either of these conditions may negatively impact a child's educational experience. Frequent middle ear infections have been linked to language and learning deficits (Lindsay, Tomazic, Whitman, & Accardo, 1999). In this study, I explored the possible relationship between frequent middle ear infections and AD/HD in school-age children. Other areas examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD.

Purpose of the Study

The purpose of this study was to examine the relationship between children diagnosed with Attention Deficit/Hyperactivity Disorder and the occurrence of frequent childhood ear infections using historical and case study methodology. Other topics examined were whether parents

infections using historical and case study methodology. Other topics examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD.

Significance

As a School Psychologist, I have observed that children diagnosed with AD/HD present significant challenges for their teachers and parents and are at a high risk for developing academic difficulties as well as oppositional and defiant behaviors. In addition, I have observed that multiple childhood ear infections can result in difficulty with language and auditory processing. These children often have trouble distinguishing letter sounds which eventually impacts their achievement in all core academic areas.

On the surface, AD/HD and frequent childhood ear infections seem to be unrelated. However, could it be possible that the use of early interventions could reduce or eliminate early childhood ear infections thus reducing the number of children diagnosed with AD/HD? Or, could it be possible that early identification of risk factors, for example frequent ear infections, could result in early interventions for children, thus preventing the development of AD/HD when they are older? As a School Psychologist, my mission is to make each student's educational experience as positive and germane as possible. Any insights gained through this study may help a child be more successful in school, and eventually in life, which is my primary objective as an educational professional.

Early intervention for children is beneficial for a number of reasons. Fewell and Deutscher (2002) suggest that the earlier the recognition of the predictors for an AD/HD diagnosis, the

sooner appropriate interventions, treatments, and counseling can begin to counter the negative effects of family stress, lowered self-esteem, and ensuing learning and social difficulties.

The educational and psychological costs of AD/HD and frequent childhood ear infections are such that further efforts are needed to clarify whether a relationship exists between the two. If an association is present, then changes may need to be made, both in the school system and in the treatment of otitis media, accompanied by early intervention for learning problems and attention issues.

Setting

Mar Vista Elementary School is part of the Ocean View School District which serves the southeastern portion of Oxnard and unincorporated Ventura County from the Los Angeles County line to Port Hueneme. The district serves children from an area covering 80 square miles and includes three elementary schools, one junior high school, and two early education schools. The district employs 126 teachers and educates approximately 2,492 students (<http://www.oceanviewsd.org>).

Mar Vista Elementary School currently serves approximately 650 students in kindergarten through the fifth grade with a student demographic of 96% Hispanic, 2% Caucasian, 1% African American, .5% American Indian, and .5% Filipino (Verdugo, 2009). The school is located in the city of Oxnard which has a population of 170,358 and an average household income is \$43, 500 per year (profiles.nationalrelocation.com).

Definitions of Terms

- *Attention Deficit/Hyperactivity Disorder*- a neurobehavioral disorder primarily characterized by the existence of attention problems and/or hyperactivity with symptoms present before the age of seven.
- *Individualized Education Plan (IEP)* - the Individuals with Disabilities Education Act (IDEA) requires that all public schools develop an IEP for every student with a disability who is found to meet the federal and state requirements for special education.
- *Middle ear effusion*- the fluid build-up that occurs in the middle ear space.
- *Otitis media*- a generic term which includes acute and chronic middle ear disease. Also includes otitis media with effusion.
- *Psycho-educational assessment*- provides an estimate of a student's intellectual abilities and educational achievement levels. It is typically used to generate recommendations relevant for educational planning.
- *Standardized assessment*- the same assessment is given in the same manner to all test takers; questions, conditions for administration, scoring procedures, and interpretations are consistent.

Working Definitions

- *Frequent ear infections*- current research indicates a range of between 4-10 infections between the ages of 6 months and 6 years of age (Minter, Roberts, Hooper, Burchinal, & Zeisel, 2001). For the purposes of this study, frequent ear infections are defined as any number greater than 5 infections between the ages of 6 months and 6 years of age.

- *Early childhood* – for the purposes of this study, early childhood is defined as the period between 6 months and 6 years of age.

Research Questions

The purpose of this study was to examine the relationship between children diagnosed with AD/HD and the occurrence of frequent childhood ear infections. Specifically, the study aimed to answer the following research question and related sub-questions:

1. What is the relationship between frequent childhood ear infections and the diagnosis of AD/HD?

Sub-questions

The following sub-questions were directed at parents of children who had frequent childhood ear infections and were diagnosed with AD/HD:

1. Did parents engage in preventative measures to reduce the risk that their child would develop childhood ear infections?
2. How has AD/HD impacted your child's life?
3. Have interventions help control and/or reduce the symptoms of AD/HD?
4. How has AD/HD impacted your family life?

Methodology

The design for this study encompassed historical and case study methodology to examine the relationship between children diagnosed with AD/HD and the occurrence of frequent childhood ear infections. Quantitative data were obtained from the review of 100 historical case studies.

Additionally, an AD/HD rating scale was distributed to five parents and five teachers to explore whether interventions helped control and/or reduce the symptoms of AD/HD. Qualitative data was obtained from five case studies to examine whether interventions helped control and/or reduce the symptoms of AD/HD. Likewise, qualitative data was utilized to explore how AD/HD impacted both the child and the family. Specifically, quantitative data was obtained through file review (see Appendix A for the Health and Developmental Report) and the distribution of the Attention Deficit Disorder Evaluation Scale (ADDES) Home & School Versions (McCarney 2004). Qualitative data was gathered through parental interviews (see Appendix A for the Parent/Guardian Questionnaire).

Chapter 2

Literature Review

The purpose of this literature review is to examine research on the frequency of ear infections occurring in early childhood, the prevalence of AD/HD in school-aged children, and the relationship between frequent childhood ear infections and the diagnosis of AD/HD. In addition, research will be examined regarding the ways in which AD/HD impacts the life of the individual and their family. Thus, the framework for this comprehensive study encompasses the following sections: (1) the frequency and scope of ear infections occurring in early childhood; (2) the prevalence of AD/HD in school-aged children; (3) the relationship between frequent ear infections and the diagnosis of AD/HD; and (4) the impact of AD/HD on an individual and their family.

Frequency and Scope of Early Childhood Ear Infections

Otitis media, or middle ear disease in early childhood, is experienced by almost all young children and has been linked to a number of negative developmental outcomes. Almost all children experience at least one episode in the first few years of life, and up to one-third of children have chronic problems with this disease (Vernon-Feagans, Manlove, & Volling, 1996). In a Boston collaborative study completed by Hagerman and Falkenstein (1987), out of 2,565 children, more than two-thirds of the participants had at least one infection by age three and one-third had five or more episodes before age six. Additionally, large population studies have shown that 5% to 6% of children have more than 10 infections by the age of 6 to 8 years old. Interestingly, the greatest incidence of acute otitis media occurs between 6 and 24 months of age.

Recurrent episodes are associated with the onset of the first episode within the first year of life (Mahone, Pillion, & Hiemenz, 2001).

Otitis media usually results when fluid builds up in the middle ear space. This fluid, or effusion, may become infected and this is the condition often responsible for fluctuating hearing loss. Antibiotics and other forms of treatment are effective in eliminating bacterial infections, but have not shown to reduce the fluid in the middle ear (Vernon-Feagans, et al., 1996). It is the presence of the fluid, not the infection, which causes the hearing loss. By the time children enter kindergarten, approximately 10% to 15% of children who receive hearing screenings at school will fail them (Lindsay et al., 1999).

Contributing to this predicament is that even when effectively treated, children with chronic ear infections may go on to have a higher rate of language processing disorders (Mahone et al., 2001). Likewise, recurrent otitis media and fluctuating hearing loss in early childhood have been associated with cognitive and learning deficits in the school-age child. According to Vernon-Feagans, et al. (1996), researchers in child development have only recently become interested in otitis media because this condition might explain currently unexplained individual differences in the behavior of young children, for example, in the areas of learning and attention deficits. If a relationship is found between frequent childhood ear infections and the diagnosis of AD/HD, then early hearing screenings and additional interventions would become necessary as children diagnosed with AD/HD are often at-risk for school failure.

AD/HD in School-Aged Children

AD/HD is one of the most commonly diagnosed behavioral disorders in children, affecting 3% to 5% of the kindergarten and school-age population (McGoey, Eckert, & DuPaul, 2002). According to the U.S. Census Bureau, it is estimated that 568,260 to 947,100 children of

kindergarten age could show signs of AD/HD upon entering the school system (Fewell, Deutscher, 2002).

According to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 1994)*, individuals diagnosed with AD/HD may be primarily hyperactive/impulsive, inattentive, or a combination of both. Hyperactive/impulsive type includes fidgeting or talking excessively, difficulty waiting turns, and frequently interrupting others. Inattentive symptoms include making careless mistakes in school, forgetfulness, and being easily distracted. These diagnostic criteria in the DSM-IV are widely used and are supported by clinical studies (Alloway, Elliott, & Holmes, 2010).

Relative to typical peers of the same age and sex, children with AD/HD have specific needs that must be met in order for them to be successful in the school environment. Research indicates that when children are repeatedly unsuccessful in school, especially when this lack of success is evident across most aspects of their school experience, they frequently become aggressive and often develop other inappropriate behaviors (Francis, 2010).

Students with attention disorders present unique challenges to school staff, even those that have been trained in behavioral techniques and other strategies designed for use with behaviorally disordered children. The student's difficulties with sustained attention, impulse control, and over-activity often result in academic problems, social skills deficits, and peer and adult conflicts (Ohan, Cormier, Hepp, Visser, & Strain, 2008). Unfortunately, many teachers may be unprepared to effectively manage the exceptional needs of these children and this lack of ability impacts the entire classroom (Arcia, Frank, Sanchez-LaCay, & Fernandez, 2000). Thus, the educational costs of this disorder, especially academic failure and peer problems, are such

that further efforts are needed to clarify the relationship between frequent childhood ear infections and AD/HD.

The Relationship between AD/HD and Frequent Ear Infections

Frequent ear infections are experienced by almost all young children and have been linked to negative outcomes in school, especially in the areas of language and verbal skills (Vernon-Feagans et al., 1996). There have been many hypotheses about the nature of the relationship between early occurrences of otitis media and developmental problems. More recently, researchers in child development have become interested in whether otitis media may be linked to behavioral challenges in children.

Hagerman and Falkenstein (1987) evaluated the relationship between frequent middle ear infections beginning in the first two years of life and the presence of hyperactive behavior in middle childhood. The study, involving 67 children, demonstrated a positive correlation between hyperactivity and recurrent otitis media beyond what would generally be expected in large populations. To illustrate, they found that 94 % of the individuals that were diagnosed and medicated for AD/HD had three or more otitis infections, and 69 % had more than 10 infections. Seventy-nine percent of the children known to have more than 10 infections experienced recurrent otitis media before one year of age.

Another study conducted in 1999 found that a history of major ear problems was “positively associated with the presence of articulation disorders for children in a low social class” (Lindsay et al., p. 123). Interestingly, in this same study, the authors found that within the middle class social group, the children who had frequent middle ear disease also demonstrated a greater likelihood for hyperactivity.

A study completed at Schneider Children's Hospital in New York reported similar findings (Adesman, 1990). Based upon parental report, children who were diagnosed with AD/HD had significantly more complaints of earaches during the preceding three months and significantly more ear infections during the preceding year. The study concluded that middle ear disease in school-age children may also be associated with hyperactivity and/or inattention, independently of learning disability.

Hersher (1998) found similar results. The frequency of otitis media among 22 hyperactive children with learning disabilities was compared with the frequency of otitis media in a sample of 772 typical children, using the same criteria for the diagnosis of otitis media in both groups. A significantly higher percentage of hyperactive children (54%) had more than six episodes of otitis media than was found in the typical group (15%). Thirty-six percent of hyperactive children had more than 10 episodes compared to 5% in the typical group.

Other investigators have reported comparable results. McGee, Silva, and Stewart (1992) linked a history of otitis media to behavioral problems. Likewise, Eisenberg and Schneider (2007) reported a relationship between frequent childhood ear infections and attention deficits.

In contrast to these studies, Minter et al., (2001) failed to find a significant association between a history of otitis media in early childhood and later problems with attention and/or hyperactivity. Their study examined whether otitis media with effusion and associated hearing loss during the first four years of life were related to the children's inattentiveness in the first six years of life. Measures of attention and behavior were collected from parents, teachers, and clinicians when the children were infants, preschoolers, and first grade students. Findings revealed that on average, children experienced otitis media with effusion 30% of the time between six months and four years of age. However, analyses revealed no relationship between

the amount of early childhood otitis media with effusion and attention deficits or behavior problems in the first six years of life.

The Impact of AD/HD on an Individual and Their Family

AD/HD is a disorder that may impact many areas of an individual's life, contributing to academic difficulties, social problems, and strained parent-child relationships. According to Hoza, et al. (2005), AD/HD often occurs with other issues such as oppositional behavior and conduct problems. Likewise, children who have been diagnosed with AD/HD are less socially preferred, have fewer friends, and are more often socially rejected. They are often at an increased risk for accidental injuries, with one study stating that children with AD/HD are five times more likely to die by the age of 12 than non-AD/HD children (Hinshaw, Peele, & Danielson, 1999).

Children who have been diagnosed with AD/HD also have impaired academic functioning. For example, these children often do worse on objective measures of achievement (e.g., group tests), have a higher rate of special education placements and retention, and are more likely than their non-AD/HD peers to be suspended (Harpin, 2005). Additionally, 15% of children diagnosed with AD/HD have math and/or reading disabilities and 80% to 90% are significantly behind in school by fourth, fifth, and sixth grade (Hinshaw et al., 1999).

A study completed by the National Bureau of Economic Research (1990) examined the effect of AD/HD on educational outcomes by comparing gender and socio-economic status. Interestingly, the research found that boys with severe symptoms of AD/HD were much more likely to be enrolled in special education and to have lower test scores than comparable girls. Furthermore, children who were diagnosed with AD/HD and came from high-income families

were less likely to be retained in school but no more likely to receive medical interventions for the disorder.

AD/HD impacts not only the child, but the entire family including parents and siblings. Since these families have to contend with a greater number of behavioral, developmental, and educational difficulties, it is not surprising that they tend to be chronically stressed with both adults and children at a greater risk of physical and mental health problems (Kendal, 1999).

Interestingly, one study found that the adverse effects of AD/HD upon children and their families changes from the preschool years to elementary school and adolescence with varying degrees of the disorder becoming more prominent at different stages. Children in their primary school years frequently experience academic failure, rejection by peers, low self-esteem, and learning difficulties. Adolescents tend to be inattentive, excessively aggressive, and antisocial. Likewise, they are at increased risk of academic failure, dropping out of school, teenage pregnancy, and criminal behaviors (Mash & Barkley, 1998).

According to Hinshaw et al., (1999), the effects of AD/HD on family functioning include a greater risk for marital problems, including higher divorce rates. Indirect costs include higher medical bills and lost work productivity. Other researchers suggest that children with AD/HD require more monitoring and supervision by their parents and require additional assistance with homework, organization, and behavioral issues. For these reasons, parents need to work together to provide consistency to reduce potential conflict in the household (Smith, 2002).

AD/HD also has a significant impact on the siblings of children with AD/HD. Kendal (1999) found that 10 of the 13 siblings (brothers and sisters) thought that they were “severely and negatively” affected by living with a sibling who had AD/HD. This study found the most significant problem identified by siblings was the disruption caused by the child with AD/HD.

Examples of disruptive behavior included physical and verbal aggression and out-of-control behavior. Siblings described their family life as chaotic, exhausting, and focused on their sibling who had AD/HD. Another study confirmed seven types of disruptive behavior identified by non-AD/HD siblings. Specifically, physical and verbal aggression, out-of-control hyperactivity, family conflicts, and poor peer relationships impacted non-AD/HD siblings the most (Rabiner, 2010). Another important finding from this research was that children who were expected to care for their sibling with AD/HD felt frustrated and were often the target for aggression, leading to feelings of resentment and the yearning for a “normal life.” Lastly, Smith (2002) showed that the severity of negative behavior by the AD/HD child not only impacted the parent and the child’s relationship, it also had a negative effect on parental relationships with other children in the household.

Conclusion

Attention Deficit/Hyperactivity Disorder (AD/HD) is the most frequently diagnosed behavioral disorder in children, affecting about 2% to 16% of school-aged children (Millichap, 2008). In comparison, middle ear infections, also known as otitis media, are among the most common illnesses of early childhood. About 60% of children will suffer from at least three by the time they are three years-old (Adesman et al., 1990). The presence of either of these conditions may negatively impact a child’s educational experience. Recently, researchers in child development have become interested in studying whether frequent occurrences of otitis media may be linked to behavioral challenges in children.

A number of studies have reported a positive correlation between frequent childhood ear infections and the presence of AD/HD, particularly AD/HD, Hyperactive-type. For example, in

their study, Hagerman and Falkenstein (1987) found that 69% of the children diagnosed and medicated for AD/HD in middle childhood had experienced more than 10 ear infections during their first two years of life. Likewise, Hersher (1998) found that 36% of hyperactive children had more than 10 episodes of ear infections compared to 5% in the typical group.

However, not all studies found a significant association between a history of otitis media in early childhood and later problems with attention and/or hyperactivity. Minter et al., (2001) found that on average, children experienced otitis media with effusion 30% of the time between six months and four years of age. However, analyses revealed no relationship between the amount of otitis media and attention deficits or behavior problems in the first six years of life.

More definitive is the concept that AD/HD impacts many areas of a child's life, contributing to academic difficulties, social problems, and strained parent-child relationships. Research indicates that AD/HD impacts not only the child, but the entire family including parents and siblings. These adverse effects change from the preschool years to elementary school and adolescence and range from academic difficulties to antisocial behaviors and dropping out of school (Harpin, 2005).

The educational, psychological, and social costs of AD/HD and otitis media are such that further efforts are needed to clarify whether a relationship exists between the two conditions. If an association is present, then revised guidelines for the treatment of otitis media may be necessary. Additionally, changes in the scope and frequency of hearing screenings conducted in the public school system accompanied by focused early intervention for learning problems and AD/HD will ultimately enable a student to have a more successful school experience. It appears that because of the severity of problems associated with AD/HD, efforts to find ways for early

diagnosis and treatment could have a large payoff in terms of improving the academic outcomes for these children (National Bureau of Economic research, 1990).

Chapter 3

Methodology

Research Design

The design for this study encompassed historical research methods and case study methodology to examine the relationship between children diagnosed with Attention Deficit/Hyperactivity Disorder (AD/HD) and the occurrence of frequent childhood ear infections. Other areas examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD.

Quantitative data using historical research methods were obtained from review of 100 files completed by the School Psychologist at Mar Vista Elementary School. Each file contained information obtained from the interviews of parents or guardians of students referred for either a psycho-educational evaluation or an AD/HD screening. After selecting five students who demonstrated a correlation between frequent ear infections and the diagnosis of AD/HD, additional quantitative data were gathered through the distribution of an AD/HD rating scale given to teachers and parents. The scores from these rating scales were used to examine to what extent the student continued to demonstrate the characteristics of AD/HD in both the school and home environment.

Qualitative data were obtained from case studies completed on the five students who demonstrated a correlation between frequent ear infections and the diagnosis of AD/HD. Each case study was comprised of a parent interview as well as a review of the student's cumulative file. This information was used to help understand how AD/HD impacted both the student and

his/her family. Additionally, each student's school file was examined to determine how AD/HD impacted the child in the school setting.

Setting of the Study

Participants in the study were students who attended Mar Vista Elementary School and were evaluated by the School Psychologist. Typically, these children were referred to the School Psychologist by staff at Mar Vista School, the child's parents, or other individuals such as physicians or county agencies. One hundred case studies were chosen randomly and reviewed primarily to: (1) document the number of early childhood ear infections per student, and (2) document if the child was diagnosed with AD/HD either by the School Psychologist or another medical or mental health professional.

Other participants in the study included teachers and parents of five students who met both of the criteria (frequent ear aches and the diagnosis of AD/HD). Parents were asked to provide feedback via an interview as well as an AD/HD rating scale. Current teachers were asked to complete an AD/HD rating scale.

Mar Vista Elementary School is located in a rural setting in Southern California. It is a Title I School as well as a California Distinguished School. Mar Vista currently serves approximately 650 students in kindergarten through the fifth grade with a student demographic of 96% Hispanic, 2% Caucasian, 1% African American, .5% American Indian, and .5% Filipino (Verdugo, 2009). The school has 34 full-time teachers with an approximate student-teacher ratio of 23:1. The number of students who receive free lunch is 459 while 102 students receive reduced lunch (profiles.nationalrelocation.com). Mar Vista School is characterized by caring teachers who often devote extra time to support students. As the school principal stated,

“Teachers at Mar Vista are good at listening and accepting ideas and suggestions. They are enthusiastic and seem to take pleasure in the experiences of teaching” (Verdugo, 2009).

The School Psychologist (researcher of this study) at Mar Vista School completes psycho-educational assessments and AD/HD screenings on children between the ages of 5 to 12 years old. On average, each assessment takes up to 60 days to complete and may include the following information: student cumulative file review, parent input, teacher input, classroom and playground observations, and standardized testing. At the completion of the assessment, a report is generated which details all results, including parental feedback on childhood ear infections and the results of any AD/HD evaluation. These reports are kept in student files which are located in the School Psychologist’s office at Mar Vista School. It is from these files that initial data was gathered for this study.

Data Collection

Quantitative Data Sources

Quantitative data were gathered using two methods. First, 100 student files were reviewed in order to gather information regarding frequent ear infections and the diagnosis of AD/HD. In order to ensure that file selection was random, every third file from the School Psychologist’s records was chosen. This historical data was used to determine if a relationship existed between frequent childhood ear infections and the diagnosis of AD/HD. Secondly, a standardized AD/HD protocol called the Attention Deficit Disorder Evaluation Scale (ADDES) was disseminated to the parents and teachers of five students who met both of the selection criteria (frequent childhood ear infections and a diagnosis of AD/HD). In order to ensure this file selection was random, every third file that met the selection criteria was chosen. This

information was studied to determine to what extent the students continued to demonstrate the characteristics of AD/HD in both the home and school environment. Each student was assigned a unique identification number to ensure anonymity.

Qualitative Data Sources

Qualitative data were gathered to create case studies on five students who were identified as meeting the selection criteria (frequent ear infections and a diagnosis of AD/HD). The candidates for the case studies were chosen from the initial file review (every third file that met the selection criteria). Data were gathered via parent interviews and cumulative file review. Information was collected on whether preventative measures were taken to reduce the onset of early childhood ear infections. Additionally, parents were asked if interventions such as counseling or a medication trial had helped to control and/or reduce the symptoms of AD/HD. Parents were also asked how AD/HD had impacted their child's life as well as the overall functioning of the family. Finally, information from the cumulative file review was collected to help understand how the child was currently functioning in the school environment. The cumulative file review comprised the following components: a) the most current California achievement test scores; b) the most current report card grades (including teacher comments); and c) information from the student's IEP if applicable. Each student received a unique identification number to ensure anonymity.

Analysis

Quantitative Data Sources

After the file review was completed, the following information was entered into a Microsoft Excel spreadsheet (per student): Gender, age at the time of the initial evaluation, the number of

childhood ear infections (reported as a range 0-2, 3-4, 5-6, >6), and current diagnosis of AD/HD (yes/no). This information was studied to determine if a relationship exists between children diagnosed with AD/HD and the occurrence of frequent childhood ear infections.

Data were also gathered using the ADDES. The ADDES is available in home and school versions and scores are based upon the student's age. Four scaled scores per student were entered into a Microsoft Excel spreadsheet: Home Version: (1) Inattentive (2) Hyperactive/Impulsive. School Version: (1) Inattentive (2) Hyperactive/Impulsive. A scaled score has a mean of 10 and a standard deviation of 3. Thus, an average score is between 7 and 13. This information was studied to determine how the student was currently functioning in the home and school environment as well as to see if interventions helped control and/or reduce the symptoms of AD/HD. Each student received a unique identification number to ensure anonymity.

Qualitative Data Sources

After the interviews, the following information was entered into a Microsoft word document that was organized into the following sections per student: a) preventative measures taken to reduce the risk of developing ear infections; b) impact of AD/HD on the child's life; c) impact of AD/HD on the family; d) interventions to control and/or reduce symptoms of AD/HD; e) other information if applicable. This information was studied to determine if early preventative measures and later interventions impacted the child's experiences at home and school. Likewise, data was studied to determine how AD/HD impacted the child and the family.

After the cumulative file review was completed, the following information was entered into a Microsoft word document that was organized into the following sections per student: (1) current report card grades; b) current report card comments; c) current CST/CMA scores in English Language Arts and Math; d) information from the student's IEP if applicable. This information

was studied to determine how AD/HD impacted the child's overall success at school. Each student received a unique identification number to ensure anonymity.

Chapter 4

Findings and Discussion

The design for this study encompassed historical research methods as well as case study methodology to examine the relationship between children diagnosed with AD/HD and the occurrence of frequent childhood ear infections. Other areas examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD. In order to synthesize this information, the results of this study were organized according to research question and sub-questions.

Research Question

Quantitative data were obtained from review of 100 files to determine if a relationship existed between frequent childhood ear infections and the diagnosis of AD/HD. Data were gathered on each student in four areas: gender, age at the time of the evaluation, number of ear infections reported by the parent, and whether a diagnosis of AD/HD was present. The database included 52 males and 48 females between the ages of five and eleven years of age. The average age of the participants was 7 years, 7 months.

Is there a relationship between frequent ear infections and AD/HD?

The primary purpose of this study was to answer the following research question: What is the relationship between frequent childhood ear infections and the diagnosis of AD/HD? The results of the file review shown in Table 4.1 show the number of students who met both criteria (frequent ear infections and the diagnosis of AD/HD) and the number of students who did not satisfy both requirements.

Table 4.1

Results of the File Review

Gender	Students who Met Criteria:	Students who did not Criteria
Male	27	25
Female	14	34
Both	41	59

Note. Both criteria is defined as frequent ear infections and the diagnosis AD/HD

Findings

The results of the file review indicated that 41 out of 100 children met both criteria. These children had at least five ear infections between the ages of six months and six years of age. In addition, they were also diagnosed with AD/HD, either by the School Psychologist or another mental health professional. Of the 41 children who met both criteria, 27 were male and 14 were female.

Discussion

The data obtained from the file review indicated that there was a relationship between frequent childhood ear infections and the diagnosis of AD/HD. A total of 41 of the files reviewed met both criteria and this figure was statistically significant. Additionally, more males than females met both criteria which would be expected as past research has indicated that AD/HD is diagnosed two to four times more frequently in boys than in girls (Fewell, Deutscher, 2002). These research findings are important for several reasons. First, since this study shows a relationship between frequent childhood ear infections and the diagnosis of AD/HD, and ear infections have been shown to be preventable (Mayo Clinic 2010), more preventative measures should be utilized to help reduce and/or eliminate ear infections in children. This means that health care providers should receive comprehensive training about preventions. Parents also

need to be informed about the benefits of preventative measures as part of prenatal education provided by their health care team. Likewise, the guidelines for health care providers should be revised to include a more aggressive medication trial to reduce the chance of reoccurring ear infections.

There are also other implications from these findings. Since public schools are frequently the first to identify that children may have a hearing problem and the hearing problem may be caused by an ear infection, the guidelines regarding the scope and frequency of hearing screenings should be changed to include more comprehensive and frequent hearing tests conducted at school. School Psychologists should receive training on the relationship between frequent childhood ear infections and the occurrence of AD/HD. In addition, as part of their intake interviews with parents, School Psychologists should include questions regarding the occurrence of early childhood ear infections. This will help School Psychologists to better understand the students that they will be evaluating.

In order to further analyze the data, Table 4.2 shows the number of ear infections experienced by the participants in the study.

Table 4.2

Number of Ear Infections Experienced by Participants

Gender	>6 Ear Infections	5-6 Ear Infections	3-4 Ear Infections	0-2 Ear Infections
Male	7	20	6	19
Female	7	7	11	23
Total	14	27	17	42

Out of the 100 files reviewed, 42 students had zero to two childhood ear infections, representing the largest subgroup. Interestingly, out of the 41 students who had frequent ear infections (defined as 5-6, and >6), the majority of the students fell within the range of five to six ear infections. Within that group of children, 20 were male and 7 were female. Of the 41 students who met the criteria for frequent childhood ear infections and the diagnosis of AD/HD, the majority of children experienced between five to six ear infections. Thus, the findings from this research study presented an interesting question. Are children who experienced more than six ear infections less likely to be diagnosed with AD/HD than children who have between five to six ear infections? This question remains unanswered but would be an interesting topic for a future research project.

Research Sub-Questions

Qualitative data were obtained from case studies completed on five students who demonstrated a correlation between frequent ear infections and the diagnosis of AD/HD. File review resulted in the selection of three males and two females. Details regarding current age and current grade are shown in Table 4.3

Table 4.3

Student Case Studies: Current Age and Grade

	Sex	Current Age	Current Grade
Student 1	Male	10	5 th
Student 2	Male	12	7 th
Student 3	Male	7	2 nd
Student 4	Female	9	4 th
Student 5	Female	11	5 th

In order to explore the four sub-questions which were related to the primary research topic, data were gathered via parent interviews and cumulative file review.

Did Parents Engage in Preventative Measures?

The first interview question that parents were asked was whether they had engaged in preventative measures to reduce the risk that their child would develop childhood ear infections. The responses from this question are shown in Table 4.4.

Table 4.4

Parental Responses to whether they engaged in Preventative Measures

Student 1	“I breast fed him because that’s what we did but he didn’t always take so he had formula too.” “...he was always getting colds from the other kids so he stayed home a lot.”
Student 2	“I didn’t really know about preventions. So nothing, I guess.”
Student 3	“Preventions? Like not getting colds? I tried to keep him away from cousins who were sick but kids seem to have one thing or another. Mostly just a part of growing up.”
Student 4	“My daughter always had ear infections or at least it seemed like that. I never thought about preventing them or if I did, I didn’t know how.”
Student 5	“After going to the doctor many times, I asked what could be done. They said nothing but we might get antibiotics. They just said she would grow up,” “At daycare, the other children always seemed sick so sometimes I kept her home.”

Findings

The results from this study implied that parents did not intentionally engage in preventative measures to reduce the risk that their child would develop childhood ear infections.

Interestingly, two out of the five parents stated that they were not aware that preventative measures existed that could reduce or eliminate the occurrence of ear infections. The remaining

three parents did utilize practices that have been shown to reduce the chances of their child getting ear infections but the connection appeared to be coincidental.

Discussion

The data obtained from the parent interviews indicated that parents did not intentionally engage in preventative measures to reduce the risk that their child would develop childhood ear infections. This is significant because research has shown that parents may be able to prevent the ear infections from occurring. According to Mayo Clinic (2010), there are several ways to prevent or at least lessen the frequency and severity of ear infections. For example, to prevent common colds and other illnesses which often lead to ear infections, the child should be taught to wash his/her hands frequently. Additionally, if the child participates in day care, then a setting with fewer children would be preferable. Other recommendations for parents include breast feeding their baby, or if bottle feeding, holding him/her in an upright position. Likewise, parents should have their child immunized against other illnesses that may lead to ear infections, avoid secondhand cigarette smoke, control allergies, keep the baby's nose clear, and avoid the use of a pacifier (U.S. Department of Health, 1998-1999). Interestingly, the use of antibiotics has been shown to have little impact on treating childhood ear infections while raising the risk of some side effects such as the development of rashes and diarrhea (Tumaini 2010). However, other researchers disagree and have found that the use of antibiotics does effectively treat childhood ear infections (Mayo Clinic 2010).

The results from this study are important for several reasons. First, parents need to be properly educated regarding preventative measures that may reduce the risk of their child developing childhood ear infections. Additionally, parents need to be informed regarding the risks and benefits of specific treatment options, including the use of antibiotics to treat ear

infections. Medical doctors and other health care providers are integral to this process and need to provide parents with information on preventions which may prevent future ear infections. Likewise, health care professionals need to provide parents with current research-based information regarding the use of antibiotics to treat ear infections. This will ensure that they make an informed decision about treatment for their child.

How Has AD/HD Impacted Your Child’s Life?

Data shown in Table 4.5 were gathered from parent interviews. Parents were asked to comment on how AD/HD has impacted their child’s life.

Table 4.5

Parental Responses on how AD/HD impacted their Child’s Life

Student 1	<p>“The struggle is mostly around homework. I also don’t think he has very many friends but the teachers never say anything about that.”</p> <p>“...I don’t think he is happy. He forgets his books and work, especially homework.”</p> <p>“He struggles with school. He told me that he hates school.”</p> <p>“...He doesn’t want to get up and go to school. He won’t do what I ask.”</p>
Student 2	<p>“My child takes Ritalin and it has side effects. He is a picky eater and lost weight.”</p> <p>“At Mar Vista, it was okay. At the Junior High, he gets bad grades and his teachers complained about his not paying attention. He gets detentions for not turning in homework.”</p>
Student 3	<p>“It takes him a really long time to do his assignments. Homework is a chore that we dread.”</p> <p>“He usually loses his homework or doesn’t know what his assignment is.”</p> <p>“...He doesn’t get much free time to be a kid because he is always doing homework.”</p>
Student 4	<p>“...She fights with her brother and sister. They complain that she is mean and can’t control herself.”</p> <p>“She never sits still and can’t focus. We fight over homework and doing chores.”</p> <p>“I think her only friend is her dog Matty.”</p>
Student 5	<p>“She does okay at school but we try hard with her. She doesn’t seem to care about her grades or homework.”</p> <p>“...She stays in her room and complains about not having friends.”</p> <p>“Punishment doesn’t make a difference. She just doesn’t care. She seems sad and that hurts me.”</p>

Findings

The results from this study demonstrated that children with AD/HD had significant impairments that can have a profound impact on their lives. For example, the children in the

study were often forgetful and defiant. They had a tendency to be demanding, restless, and unpredictable. Sixty percent of the children had difficulty developing peer relationships. Likewise, 60% of the children demonstrated poor school performance either indicated by reference to poor grades or by a poor teacher/student relationship. These experiences resulted in unhappiness and frustration for both the children and parents.

The most common theme that the parents reported was that AD/HD impacted their children's educational experience in some way. To illustrate, 80% of the children in the case studies had problems with homework. Parents reported that their children struggled with remembering to bring assignments home from school or forgot to turn the completed assignments in to their teachers. Additionally, parents struggled to get their children to complete homework assignments. Having AD/HD appeared to intensify homework issues for children and parents.

Discussion

The data obtained from the parent interviews indicated that children with AD/HD had significant impairments that impacted their lives in many ways. First, many these children had difficulty developing healthy peer relationships. Research indicates that children with AD/HD often lack the social skills that are essential to success in life. Their lack of interpersonal skills often makes it hard for them to develop positive relationships with friends, placing them at risk for a number of emotional problems (Mash & Barkley, 1998). In addition, children with AD/HD often do not do well in school. Poor school performance can result in social rejection, depending on how the child responds. For example, children who cannot engage themselves with classroom work often disrupt and irritate their peers.

Children with AD/HD often have a difficult time focusing on schoolwork, an issue that not only impacts classroom performance, but also results in many parental struggles with how to get

their child to do their homework. According to Mash & Barkley (1998), AD/HD in children affects the areas of the brain that regulate concentration, impulsivity, and hyperactivity. As a result, students with this disorder often have trouble staying on task when completing written homework, reading assignments, or studying for tests. However, when AD/HD is identified early and adequate treatment plans are implemented, children with this disorder can have successful school experiences and develop positive relationships with peers and adults (Francis, 2010).

To further explore how AD/HD may have impacted the child in the educational setting, each student’s cumulative file was reviewed. As shown in Table 4.6, data were gathered regarding current report card grades including any teacher comments, the most recent state testing results, and any pertinent information from the student’s IEP.

Table 4.6
Information from the Student Cumulative File Review

	Grades: LA Math	Current Teacher Comments	State Testing: CST/CMA	IEP Information
Student 1	Below Basic Basic	Tries hard; Shows leadership skills but doesn’t always get along with peers. Behavior is improving.	CMA ELA- BB CST Math-Basic	Reading at 4 th grade level
Student 2	Far Below Basic Basic	Trouble with keeping materials Organized. Tends to be tardy often. Other students complain about his Behavior.	CMA ELA- BB CST Math- Basic	Organizational goal
Student 3	Below Basic Below Basic	Tries hard to the best of his ability. Likes hands-on activities including art. Needs constant reminders to stay on task.	N/A	Participates in school-based counseling
Student 4	Far Below Basic Proficient	Struggles to read any grade level material. Focus and attention span is poor. Math is a strength which she enjoys.	CMA ELA-FBB CST Math-Basic	Reading at 2 nd grade level.
Student 5	Below Basic Below Basic	Problems with behavior at lunch and recess. Gets many tickets and detentions. Has a select group of friends but she often is alone.	CMA ELA-FBB CMA Math- FBB	Goals for behavior

Data from the cumulative file review demonstrated that children in the case study experienced academic problems in either language arts and/or mathematics. To illustrate, on their last report card in the area of language arts, 60% of the children received a grade of Below Basic and 40% received a grade of Far Below Basic. Regarding mathematics, on their last report card, 40% of the children received a grade of either Basic or Below Basic and one child (20%) received a grade of Proficient. To put this into perspective, it is expected that a student will achieve a report card grade of Proficient which indicates that they have thorough knowledge of grade level standards and are prepared for the next grade. A grade of Below Basic or Far Below Basic means that they have not mastered the standards and may be at risk of retention.

Besides indicating student grades, teachers also complete a comments section on each report card. Data from the cumulative file review indicated that teaching children with AD/HD can be challenging for educators. To illustrate, on their last report card, 100% of the children in the case studies received some mention of a negative behavior trait. For example, comments such as “Behavior is improving; other students complain about his behavior; needs constant reminders to stay on task; focus and attention is poor; and, problems with behavior at lunch and recess” implied that children with AD/HD experienced some type of behavioral challenge and most likely required more attention than is typical from the teacher.

In addition to report card grades, standardized state testing measures a student’s progress towards achieving California state-adopted academic standards. For the purpose of this research study, scores were obtained from the California Standards Test (CST) and California Modified Assessment Test (CMA) in English Language Arts and Mathematics. At school, the majority of students will take the CST; however, the CMA is available to students who receive special education services and scored Below Basic or Far Below Basic on the CST taken in the previous

year. Data from the cumulative file review demonstrated that 60% of the children from the case studies took the CMA English Language Arts test and the CST Mathematics test. One student took both the CMA English Language Arts test and the CMA Mathematics test and one student was exempt from the testing as he was too young to participate. Further disseminating the test scores showed that on the CMA English Language Arts test, four children obtained scores of either Below Basic or Far Below Basic. On the CST Mathematics test, three students received a score of Basic. One student obtained a score of Far Below Basic on the CMA Mathematics test.

The final portion of the cumulative file review was an analysis of any pertinent information from the student's Individualized Education Plan (IEP). Interestingly, two of the children in the case studies had IEP goals pertaining either to organization of school materials or to maintaining appropriate behavior in the classroom. Two other children were reading well below grade level and one student participated in school counseling for difficulties with peer relations.

The data obtained from the cumulative file review indicated that children diagnosed with AD/HD experienced significant difficulties in language arts and mathematics. Behavioral challenges were also present in the school environment and these children often required more attention from teachers than would typically be expected. Data pertaining to standardized state testing showed that the majority of children in the case studies took the CMA, indicating that they scored poorly on the CST in the previous year. Most of the children took the CMA English Language Arts test but participated in the CST Mathematics test demonstrating that for children in this study, reading and written language were more negatively impacted than mathematics. These results correlate with the grades that the students received on their report cards.

These findings are important for several reasons. First, children with AD/HD should have access to school programs and interventions such as homework club and/or social skills training

offered by the school counselor. In addition, teachers need training on the characteristics of AD/HD and on how to utilize strategies to effectively manage children with this disorder.

Have Interventions Helped Control and/or Reduce Symptoms of AD/HD?

Parents were asked to address whether or not interventions have helped control and/or reduce the symptoms of AD/HD and their responses are shown in Table 4.7.

Table 4.7

Parental Responses: Interventions to Control and/or Reduce the Symptoms of AD/HD

Student 1	“Interventions like medicine? We don’t believe in that. “ “His teacher suggested daily charts which worked when he was younger. We use rules.”
Student 2	“...At first we didn’t want to use medication when he was in 2 nd grade but the school told us we needed to so we tried it. It works pretty good but he doesn’t always remember to take it.”
Student 3	“I don’t know about controlling AD/HD. I just try to make things acceptable. We set limits and use rules.”
Student 4	“In 2 nd grade, she started taking medicine to help her focus and pay attention.” “...We have a homework hour so I set a timer.” “I use a chore chart to earn points.”
Student 5	“...Her doctor said to try Concerta so we did. There were too many side effects so we stopped.” “We didn’t see any difference with her anyway.” “She was in counseling through church and that helped for a while. Sometimes I think that she is just lazy.”

In an effort to gauge whether interventions have helped control and/or reduce the symptoms of AD/HD in the home and school environments, parents and current teachers were asked to complete a standardized AD/HD protocol called the Attention Deficit Disorder Evaluation Scale (ADDES). Results are shown in Table 4.8.

Table 4.8

Parent and Teacher Responses on the Attention Deficit Disorder Evaluation Scale

	<u>Home Version</u>		<u>School Version</u>	
	Inattentive	Hyper/Impulsive	Inattentive	Hyper/Impulsive
Student 1	11	6	6	5
Student 2	7	8	5	10
Student 3	9	5	8	4
Student 4	6	12	7	9
Student 5	6	9	4	10

Note. Scores on the ADDES are reported as scaled scores and have mean of 10 and a standard deviation of 3. An average scaled score would be in the range of seven to thirteen.

Findings

The results from this study indicated that 100% of the children in the case studies participated in some form of intervention to control and/or reduce symptoms of AD/HD. Two children were currently prescribed medication to treat symptoms of AD/HD and one student had used medication previously but it had been discontinued due to negative side effects. Other interventions consisted of creating rules for the home, setting appropriate limits for behavior, using a homework hour, keeping a daily chart to track chores, and providing counseling through affiliation with the family’s church. However, when reviewing the results of the ADDES, the interventions did not appear to have made a significant impact according to the student’s scores. Eighty percent of the children participating in the case studies still demonstrated significant issues with inattention and/or hyperactivity/impulsivity in either the home or school environment. Specifically, in the home environment, 40% of the children were inattentive and

40% of the children were hyperactive/impulsive. In the school environment, 60% of the students were inattentive and 40% were hyperactive/impulsive.

Discussion

This study has shown that many children with AD/HD present significant challenges for parents and teachers. This means that it is very important for parents to understand that interventions exist and to intervene early in order to address current behavior difficulties as well as prevent or reduce the severity of academic deficits. All the children in the case studies most likely benefited from interventions. However, the interventions did not appear to have made a significant impact according to the scores on the ADDES. This is important because research has shown that effective early interventions can make a major impact on a child's functioning, both in the home and at school. A study conducted at the University of Davis stated that addressing attention problems early in life by utilizing interventions could keep some children from entering "a downward spiral" (2011). Another researcher identified several interventions that were found to be effective when used consistently and appropriately: create rules for the home, use appropriate directives, ignore minor inappropriate behaviors and praise appropriate behaviors, set up contingencies ahead of time, use a point/token system of rewards, keep daily charts, and increase structure and predictability in the daily routine (Grohol 2009).

Another option for treating the symptoms of AD/HD which has been highly debated is the use of medication; some researchers strongly believe it is the best option and others think that medication should not be used on children. According to Mash & Barkley (1998), the most important positive aspect to medication is the reduction or elimination of the behavioral symptoms associated with AD/HD. Thus, by reducing hyperactivity and giving a student the ability to focus, medication gives them the ability to perform better in school, make friends, and

participate in extra-curricular activities. However, not all medical care providers think that medication should be utilized to treat symptoms of AD/HD. Wilens (2004) has stated that there are three primary reasons to avoid medication. First, there are very few studies on the long-term effects of the medication. Secondly, there are mild side effects associated with many of the medications. Lastly, children can become psychologically addicted to the medication.

How Has AD/HD Impacted Your Family?

AD/HD is a disorder that may impact many areas of an individual’s life. Table 4.9 illustrates the parental responses regarding how AD/HD has impacted their family.

Table 4.9

Parental Responses Regarding the Impact of AD/HD on the Family

Student 1	<p>“Everything takes forever, even a simple errand.”</p> <p>“Mornings are a bear. It’s hard to get him up so the other kids suffer too.”</p> <p>“...He is not a morning person. Sometimes the others have to get up extra early to account for him.”</p> <p>“I’m not really sure how I feel about him sometimes. His dad says that it is hard to love him and be proud of his oldest boy.”</p>
Student 2	<p>“I think that my boy gets more attention because of his behavior. Is this fair to the others?”</p> <p>“...Because he is a picky eater, sometimes I make food that others don’t like or want.”</p> <p>“My husband has lost time at work because he had to take his medication to his school. ...He was suspended once and one of us had to stay at home”</p>
Student 3	<p>“Morning time is no fun. Most of the time, he doesn’t want to go to school.” He’s tardy and it makes me look like a bad parent.”</p> <p>“...He gets more attention and help with his homework.”</p> <p>“We try to keep him busy in sports. That takes a lot of my time.”</p> <p>“...Sometimes he has melt-downs in the morning. I have been late to work dealing with that.”</p>
Student 4	<p>“She is moody and hyper. It’s exhausting.”</p> <p>“I asked her teacher to reduce her homework because it took so long every night.”</p> <p>“She fights with her brother and sister and this makes the household tense.”</p> <p>“...My kids don’t like to have friends over because she is mean to them.”</p> <p>“I think my husband is ashamed of her because of her attitude.”</p>
Student 5	<p>“The family seems tense and edgy, mostly at dinner time.”</p> <p>“...I don’t think she cares and the family knows this.”</p> <p>“Sometimes it is like walking on egg shells to be with her.”</p> <p>“Forget going someplace first thing in the morning. That’s a battle for everyone.”</p>

Findings

The responses indicated that having a child with AD/HD negatively affected most members of the immediate family. Four of the parents responded that the other children in the family were negatively affected in some way by the child with AD/HD. For example, in one family, siblings had to wake up earlier in the morning because the child with AD/HD was not a “morning person.” In another instance, one parent stated that the other children in the family did not get as much attention because the child with AD/HD needed additional help completing his homework. Likewise, four people responded that a parent had been negatively impacted by the child with AD/HD. For example, one parent had to miss a day of work to stay home with his son because he had been suspended at school. Another parent had arrived at work late because her son experienced “melt-downs” in the morning, causing the family to be delayed by dealing with the behavior.

Discussion

From this research project, it was apparent that children with AD/HD exacted a significant toll on their families by having a negative impact on family routines, relationships, and job functioning. A recent study found that children with AD/HD placed a significant strain on family relationships. Specifically, the study found that 75% of the parents who had children with AD/HD reported that the disorder had a negative impact on their relationship with their child, and just over 50% reported problems with relationships between the child with AD/HD and his or her siblings or peers (Goghil 2008).

In order to help elevate the stress on the family, parents and siblings of children who have AD/HD should participate in family counseling. Likewise, parents should engage in parenting classes to learn strategies of how to manage difficult children. Support groups and national

organizations are also good resources for families who have children with AD/HD and should be utilized for informational and support purposes.

Conclusion

This study sought to explore the relationship between children diagnosed with AD/HD and the occurrence of frequent childhood ear infections. Other areas examined were whether parents engaged in preventative measures to reduce the risk that their child would develop ear infections, the impact of AD/HD on the child and the family, and if interventions controlled or reduced the symptoms of AD/HD.

Results from the study indicated that there was a relationship between frequent childhood ear infections and the diagnosis of AD/HD. Forty-one percent of the children met the criteria and had at least five ear infections between the ages of six months and six years of age and were also diagnosed with AD/HD. When data from the case studies were analyzed, the findings indicated that parents did not intentionally engage in preventative measures to reduce the risk that their child would develop childhood ear infections. In fact, 40% of the parents were not aware that preventions existed that could impact the occurrence of ear infections. Additional data from the case studies indicated that children with AD/HD had significant impairments that impacted their lives in many ways. They were often forgetful and defiant and had a tendency to be demanding, restless, and unpredictable. These children had difficulty developing healthy peer relationships. They also demonstrated academic problems in either language arts or mathematics. Despite the fact that all of the children who participated in the study had received some form of intervention to control and/or reduce the symptoms of AD/HD, the interventions did not appear to have made a significant impact as all children who participated in the case studies experienced some type of

behavioral challenge at home and/or school, presenting significant challenges for their parents and teachers. Likewise, having a child with AD/HD negatively affected most members of the immediate family by having a negative impact on family routines, relationships, and job functioning. Furthermore, parent-child and sibling relationships were also negatively affected.

The findings from this study are important for many reasons. More intensive early interventions should be utilized to help reduce and/or eliminate ear infections in children. Parents and medical professionals need to be educated regarding the use of interventions. Public schools should revise guidelines regarding the scope and frequency of hearing screenings to include more comprehensive and frequent hearing tests conducted at school. In addition, School Psychologists should receive training on the relationship between frequent childhood ear infections and the occurrence of AD/HD so that they will gain a better understanding of the students that they will be evaluating.

Children with AD/HD present significant challenges for both parents and teachers. At home, the family should participate in family counseling. Likewise, parents should have access to parenting classes as well as support groups for families who have a child with AD/HD. At school, teachers need training on how to effectively manage children with AD/HD. The children who have AD/HD should have access to school programs and interventions such as homework club and/or social skills training offered by the school counselor.

The results from this study demonstrated the breadth of problems experienced by children with AD/HD. Consequently, the use of preventative measures to reduce and/or eliminate ear infections, coupled with the appropriate home and school supports for children diagnosed with AD/HD, should help to lessen the educational and psychological costs and enable each child to be more successful in school, and eventually in life.

Chapter 5

Implication and Limitations

Implications

This study has implications for future practice and/or policy. Since this study shows a relationship between frequent childhood ear infections and the diagnosis of AD/HD, and ear infections have been shown to be preventable, more preventative measures should be utilized to help reduce and/or eliminate ear infections in children. This means that health care providers should receive comprehensive training about preventions including current research-based information on the use of antibiotics to treat ear infections. Parents also need to be informed about the risks and benefits of preventative measures as part of prenatal and infant care provided by their health care team. Likewise, the guidelines for health care providers should be revised to include a more aggressive medication trial to reduce the chance of reoccurring ear infections. Since public schools are often the first to identify hearing problems that may be caused by ear infections, the guidelines regarding the scope and frequency of hearing screenings should be changed to include more comprehensive and frequent hearing tests conducted at school. School Psychologists should receive training on the relationship between frequent childhood ear infections and the occurrence of AD/HD. In addition, as part of their intake interviews with parents, School Psychologists should include questions regarding the occurrence of early childhood ear infections. This will help School Psychologists to better understand the students that they will be evaluating.

These findings from this study are important for several other reasons. Children with AD/HD should have access to school programs and interventions such as homework club and/or social skills training offered by the school counselor. In addition, teachers need training on the

characteristics of AD/HD and on how to utilize strategies to effectively manage children with this disorder. In order to help elevate the stress on the family, parents and siblings of children who have AD/HD should participate in family counseling. Likewise, parents should engage in parenting classes to learn strategies of how to manage difficult children. Support groups and national organizations are also good resources for families who have children with AD/HD and should be utilized for informational and support purposes.

Despite the results of the study, important questions remained unanswered: Are children who have experienced more than six ear infections less likely to be diagnosed with AD/HD than children who have between five to six ear infections? Would the results of the file review be different if the children used in the study were not already considered at risk for learning disabilities which has a high co-morbidity with AD/HD? In other words, if the file review was conducted in a pediatrician's office, the children used in the study would most likely represent a more typical population than the one used for this study which primarily consisted of children with suspected learning disabilities and/or behavioral problems. Lastly, how do ear infections impact the results of hearing screenings conducted at school? These questions present opportunities for future research.

Limitations

This study has a number of limitations. First, it relies on parental reporting on several topics, including the number of ear infections that a child has experienced. Unfortunately, parental recall is not always accurate, especially in families that consist of several children. Additionally, what constitutes an ear infection is somewhat subjective and a parent may inadvertently overestimate or underestimate the frequency of occurrence based upon their understanding of

what an ear infection is. In my experience interviewing parents, I have often needed to clarify what symptoms comprise a common cold and what symptoms most likely indicate an ear infection. Likewise, some explanation may be needed to clarify what constitutes preventions to reduce and/or eliminate ear infections as well as interventions that might help control and/or reduce the symptoms of AD/HD.

Secondly, social class may have affected the results. Mar Vista School consists primarily of children from families in the lower socioeconomic range and it is possible that these children may not have had adequate access to medical care, resulting in a higher likelihood of frequent ear infections. This limitation could relate to access and insurance coverage.

Another limitation to this study is that it relies on a valid diagnosis of AD/HD by a School Psychologist or other medical or mental health professional. While the diagnostic criteria for AD/HD has been clearly defined in the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition* (DSM-IV), it has been my experience that some professionals make the diagnosis based upon different criteria that is not always valid. Additionally, the diagnosis is often made by pediatricians who have not had adequate feedback from the school regarding the child's behavior and academic performance. Thus, children may be over-diagnosed or under-diagnosed with AD/HD.

Finally, because other disabilities exist that may overlap or mimic the symptoms of AD/HD, it is often difficult to distinguish one condition from another. To illustrate, learning disabilities, in particular those involving some realm of auditory processing, often have symptoms that mimic those of AD/HD. It is not uncommon for children with learning disabilities or language problems to react to the consequent frustrations with aggression, acting out behaviors, and/or

inattention in the school environment. Thus, AD/HD may be misdiagnosed without adequate information regarding the child's cognitive, academic, and language functioning.

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Appendices

- A. Health and Developmental Report
- B. Parent/Guardian Questionnaire