CAUSES OF ATTENTION DEFICIT HYPERACTIVITY DISORDER

by

Daniel A. Mertig

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The Graduate College
University of Wisconsin-Stout
Menomonie, WI 54751

ABSTRACT

(Writer)	Mertig (Last Name)	Daniel (First Name)	A. (Initial)

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As a society we often look at how we can fix current problems. This study takes another approach that has not been as well researched in the area of Attention Deficit Hyperactivity Disorder, and that is the potential causes of this highly diagnosed disorder. By knowing the causes of the disorder we can assist in reducing the likelihood of the onset of ADHD. Studies have indicated prenatal smoking (Milberger et al., 1996), serum free fatty acids and zinc deficiencies (Bekaroglu et al., 1996), and genetics (NAMI, n.d.) as potential causes of ADHD.

In this study a questionnaire was mailed out to parents of children that have been diagnosed with AD/HD in the Chippewa Falls, Eau Claire area including members of the Children and Adults with Attention Deficit Disorder, Ch.A.D.D., organization on July 17, 2000. The questionnaire listed several of the causes that the literature has provided, as well as an open-ended question on what the parent believes may have been a contributing

factor. The questionnaire also asked questions regarding personal demeanor, past family behaviors, and environmental information.

The data from the questionnaire was statistically analyzed. The results of the questionnaire indicate that there was no one significant cause of AD/HD, according to the results from parents of children with AD/HD who have completed the questionnaire.

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CHAPTER ONE

Introduction

Attention deficit hyperactivity disorder, AD/HD, has been a growing diagnosis in recent years. Researchers continue to discover new potential causes for the disorder every year. Many educators are finding it frustrating to teach a child that has difficulty staying on task and distracts other students. Finding a cause would assist in prevention of AD/HD, which would result in less frustration felt by the teachers and a child that would not have to fight distractions throughout the day to learn.

The American Psychological Association, in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, first recognized attention deficit hyperactivity disorder in 1994. The DSM-IV divides AD/HD into three areas (American Psychological Association, 1994). The first is AD/HD predominantly inattentive type, where the child appears to be mostly inattentive. This is often referred to as attention deficit disorder. Predominantly hyperactive-impulsive is the second type, where the child is mostly impulsive and hyperactive. The third is predominantly combined type, which is where the child has both characteristics, they are hyperactive-impulsive, and inattentive (NICHCY, 1999). The last type is what is often referred to as attention deficit hyperactivity disorder. Most of the diagnoses are made in first to third grades due to the outwardly expressed behaviors such as inattention, impulsivity, constantly moving, and off task behaviors which were not a concern earlier in the child's life because of the child's developmental stage (Milberger et al., 1996).

It was discovered that the brain in a child with AD/HD is actually under stimulated causing not inattention, but hyper attention where the child pays attention to

everything, causing him/her to be distracted by every movement or sound that is not part of the child's main task. As a result of this discovery, research has shown that stimulant medications actually produce a calming effect in these children. Stimulants help because they stimulate the part of the brain that is often distracted. Some forms of stimulant medication used to address the symptoms of AD/HD include Ritalin (Methylphenidate), Cylert (Pemoline), and Dexedrine. Ritalin is the most commonly prescribed stimulant medication used for treating children with AD/HD (Kwasman et al., 1995).

Medications work for some children, however other children still find it difficult to sit still and stay on task. The proper amount of medication is often difficult for doctors to prescribe. Research by Baren in 1989 stated that different people take different dosages and that every milligram makes a difference. Over dosages can cause side effects that change the child's affect greatly. Under dosages will show little to no improvement in behavior. This is where many of the misconceptions about stimulant medications are formed.

There are many misconceptions that people have in regards to AD/HD. Many of the misconceptions deal with medication. Some people believe that the medication will cure the disorder separately (Bower, 1998), while others believe that medications have severe side effects, such as making children zombie-like (Fowler, 1994; Kwasman et al., 1995). The common misconceptions will be covered in further detail in the literature review.

The cause of the disorder is biochemical (Fowler, 1994). What causes this chemical imbalance is the question that needs to be answered. A review of literature indicates a multitude of possibilities. Some include deficiencies in fatty acids and zinc

that are needed to regulate the chemicals that regulate behavior (Bekaroglu et al., 1996). Another potential cause is prenatal smoking (Milberger et al., 1996). Prenatal smoking harms the fetus brain development at critical times. The family environment can effect the onset of AD/HD as well (NAMI, n.d.). Examples of the family environment that may effect the onset include abuse of the child, along with environmental coping mechanisms that the child has formed to make it through everyday life. It has been thought that genetics may play a role as a cause of AD/HD as well according to the National Alliance on Mental Illness. These will be covered in more detail throughout the research paper.

AD/HD can often cause children to feel rejected by their peers, suffer academically due to the distractibility associated with the disorder, and have family problems due to the lack of understanding of the disorder (Bower, 1998). Children with AD/HD get in more trouble due to their impulsivity. They often decide to take part in at risk behaviors because of their impulsivity. They are vulnerable to low self-esteem feeling that they are a "bad" kid because of the disorder and because they have to take a pill.

When taking all of these factors into consideration, AD/HD is a very difficult disorder to diagnose and treat. Many children state that they are trying to be attentive, but so many thoughts are running through their minds. This shows that they want to improve and that they are trying, however due to the disorder, they are having difficulties that are reflected in their academic work. If more were know about the initial causes of this disorder, then we could share that information to prevent the rapid growth of the misdiagnosis of this disorder.

Research Hypothesis

A review of literature shows that there are several causes of attention deficit hyperactivity disorder. The research is still in the early stages of discovering the main causes of this disorder. Therefore, the hypothesis of this study is that there is one main cause of the disorder that occurs significantly more than others as indicated by the parents sampled.

Statement of the Problem

The purpose of this study is to identify the most common causes of attention deficit hyperactivity disorder in children, according to their parents with children that have AD/HD as measured by a scale developed through the research. Parents of children that have been diagnosed with AD/HD will be mailed a questionnaire on July 17, 2000.

Objectives

1. To identify the multiple sources that may cause AD/HD from the literature.

2. To determine the most common cause for AD/HD in the Chippewa Falls, Eau Claire area including members of the Ch.A.D.D. organization.

3. To determine if there is one cause that is significantly more predominant than others.

Limitations

This study has three known limitations. One limitation is the small sample size that received the questionnaire and returned it. Another limitation is that the questionnaire was not previously used. The third limitation is that some questions were unclear. Many of the respondents were not sure if their child received enough zinc.

CHAPTER TWO

Literature Review

Introduction

This chapter will discuss each of the diagnosis, treatment, and misconceptions of AD/HD; however the primary focus will be on potential causes of AD/HD that have been discovered through current research. The last topic that will be covered in this chapter is the potential outcomes of being diagnosed with AD/HD. Literature indicates chemical imbalance or deficiencies of neurotransmitters in the brain are causes AD/HD. What causes this imbalance or deficiency? There are many speculated causes such as prenatal smoking, serum free fatty acids and zinc, genetic, metabolism, parental attributes, and many others.

Diagnosis

Diagnosis of AD/HD is very difficult because a physician cannot tell by getting a blood sample, by looking at a certain region of the body, or by scanning the body. A diagnosis is based on 1) personal and family history; 2) interviews with the child, parents, and teachers; 3) a physical exam; 4) an evaluation of the child's development; and 5) a psychological evaluation (Buncher, 1996). Pediatricians rely heavily on parent and teacher reports about the possible symptoms (Kwasman et al., 1995). Some of the symptoms may include patterns of difficulty with attention, motor activity, and impulsivity (Milberger et al., 1996). The report is sometimes given through an assessment called the Hawthorne. The Hawthorne lists behaviors, then the parent using the home form and the teacher using the school form rates how often the child engages in

certain behavior. Parents and teachers check one to several times per a month, week, day, or hour when rating the child (McCarney, 1995).

AD/HD is difficult to diagnose because many healthy children may exhibit some of the behaviors as coping mechanisms to their home and community environment (Bower, 1998). Another difficulty with diagnosing AD/HD is that often underlying conditions such as conduct disorder, learning disability, depression, anxiety, post traumatic stress disorder, epilepsy, mental retardation, and schizophrenia have similar expressions of outward behaviors (NAMI, n.d.). When children are diagnosed with AD/HD, but they have the above-mentioned disorders, it only masks the problem and deals with the symptoms. This can be very detrimental to the long-term care of the child. Children who are naturally more boisterous are more often given an AD/HD label (Bekaroglu et al., 1996). This would be another case of potential misdiagnosis. Because it is so difficult to diagnose, 60% of pediatricians in 1995 reported that they set aside a special amount of time to attempt to diagnose AD/HD (Kwasman et al., 1995).

Most of the diagnoses of AD/HD are made in elementary school (NAMI, n.d.). Signs of the disorder begin to show, generally, around the age of four. Most diagnoses, however, occur from age three all the way to seventeen (Kwasman et al., 1995). The average age that children are diagnosed with AD/HD falls around age eight. In one year the diagnoses almost doubled. In 1995 three to five percent of school aged children had the disorder (Stevens et al.). In 1996 that statistic rose to six to nine percent (Milberger et al.). Currently two million children between the ages of five to fourteen have been diagnosed with AD/HD (Bower, 1998). Of these children, boys make up a vast majority of the diagnosed (Stevens et al., 1995). In an identical twin study, both twins were

diagnosed with having AD/HD, including those separated at birth, fifty-one percent of the time (Milberger et al., 1996).

Treatment

Treatment of AD/HD can be divided into four categories. They are pharmacological methods, behavioral/psychological therapy, environmental manipulation, and family support (Buncher, 1996).

The pharmacological methods refer to different types of medication. The most frequent medication used in treatment of AD/HD is methylphenidate hydrochloride, which is commonly known as Ritalin (Kwasman et al., 1995). Ritalin is used ninety-eight percent of the time. Other medications that are used include Cylert and Dexedrine (Stevens et al., 1995). Medications are seventy-five percent effective in helping treat the symptoms of AD/HD. Some of the side effects of the medications include headaches, stomach aches, loss of appetite, irritability, and trouble sleeping (Silverman, 1996). These side effects should subside two weeks after the initial start of the medication. Higher dosages of the medications can delay the natural growth cycle. Some of the complaints about the medications include insomnia, mood and affect change, headaches, that it wears off too fast, it doesn't work, feeling of being singled out, and that the person didn't want to take it at school (Kwasman et al., 1995). Pediatricians state that if a child is feeling lethargic, depressed, has glassy eyes, or has any other adverse symptoms AD/HD could be the wrong diagnosis or the dosage of medication in too high (Baren, 1989). Other signs that there has been an overdose of medication include whiny, withdrawn, tearful, suspicious, vomiting, agitation, tremors, convulsions, or hallucinations (Silverman, 1996). Many of the above mentioned drawbacks can be

eliminated or decreased by starting with a lower dosage of medication (Baren, 1989). Many children with AD/HD only need a small amount of medication to alleviate the symptoms. The dosage should start at 5mg. This should continue for a week before increasing the dosage. If the dosage goes above 25mg, AD/HD is most likely the wrong dosage (Baren, 1989).

Behavioral and psychological therapy is a critical component to management of AD/HD (Buncher, 1996). The child with AD/HD should have the benefit of counseling to help assist with the different situations that may occur in their home, school, and community. Counseling will help eliminate the possibility of other issues that result in AD/HD behaviors.

The environment can be manipulated through giving the child structure, predictability, clear rules, expectations, and consistent consequences (Fowler, 1994). These consequences should be stated ahead of time and delivered immediately for children with AD/HD. Behavior modification programs have been very successful in assisting children with AD/HD (Bower, 1998). These programs need more research and development to find out what works most effectively.

The family often needs to learn new ways of coping with the disorder. Some of the possible topics that could be learned through family support include assistance with setting up a more structured environment and learning about the different types of medication that are available.

Misconceptions

Throughout all of the research, there are many misconceptions that seem to surface frequently. Some of the misconceptions include that medications cure AD/HD

through erasing behavior problems, increasing academic skills, and helping social skills (Bower, 1998). Other misconceptions include medication addiction, poor diet, the child behaves this way on purpose, the child needs more discipline, children will outgrow the disorder, medications make children zombie-like, parents and teachers cause the disorder, along with many others (Fowler, 1994; Kwasman et al., 1995). All of these have evidence that proves otherwise.

Causes

There are many suspected causes of AD/HD. This section will cover potential chemical imbalances, family disturbances, prenatal smoking, and zinc and fatty acid deficiencies. All of the previous are potential causes that the literature covered.

According to Fowler, AD/HD is a neurobiologically based developmental disability (1994). This means that there is a chemical imbalance or deficiency in the neurotransmitters that control a person's behavior. Children with AD/HD have difficulties controlling their behavior. Other chemicals in the body that have been thought to play a role in AD/HD are docosahexaenoic, dihomogammalinolenic, and arachidonic acids (Stevens et al., 1995). These acids are significantly lower in children that are hyperactive. The catecholaminergic pathways may also play an important role in the cause of AD/HD (Milberger et al., 1996). The body's main energy source, glucose, is lower in children with AD/HD (Fowler, 1994). These are all significant because they play a factor in controlling, regulating, and assisting in behaviors that are often expressed by children with the disorder.

Many family factors can play a role in AD/HD. The family environment can influence the onset of AD/HD (NAMI, n.d.). Some family environmental factors that

could increase the chances of onset include family discord, sibling harassment, and physical, sexual, or emotional abuse all can intensify the symptoms of AD/HD. Other family factors that contribute to the likelihood of onset include the family's socioeconomic status, maternal and paternal AD/HD history, and intelligence quotient (Milberger et al., 1996). Bower states that genetics can play a significant role in AD/HD likelihood (1998).

Maternal smoking while pregnant is a risk factor of AD/HD (Milberger et al., 1996). Nicotine freely passes through the placenta to the unborn child. Many children with AD/HD had low birth weight which is associated with smoking (Baren, 1989). During critical prenatal developmental periods, nicotine could cause damage to the brain of the fetus (Milberger et al., 1996). Prenatal smoking leads to cognitive impairment that has been correlated with AD/HD. Nicotine affects the levels of chemicals, listed above, that influence behaviors.

Fatty acids and zinc deficiencies influence hyperactivity through regulation of melatonin production (Bekaroglu et al., 1996). Melatonin has a direct biochemical action on functions that relate to AD/HD. The levels of fatty acids and zinc are significantly lower in children that have AD/HD. Children with AD/HD are often more thirsty which is a sign of essential fatty acid deficiencies (Stevens et al., 1995). Children with hyperactivity are more likely to have eczema, asthma, and other allergies that can be alleviated through essential fatty acid supplementation. The supplementation can level out the biochemical deficiencies in the body, helping to alleviate the symptoms of AD/HD.

Outcomes

Children with AD/HD often are rejected by their peers, have family problems, and suffer academically (Bower, 1998). These children are more likely to take part in at risk behaviors due to their impulsivity. Such behaviors could include alcohol use, illicit drug use, criminal behaviors, and they are more likely to be in an accident. The children often feel that the disorder is their fault and that they are stupid (Kwasman et al., 1995). These feelings can be alleviated through medication, which can help in controlling the child's behavior. This will in turn make the child's behavior more socially acceptable.

Conclusion

This chapter discussed how a child can be diagnosed with AD/HD through family, school, and pediatrician assessments, the use of various medications and therapies that assist in treatment, the various misconceptions that people have regarding AD/HD, potential causes such as prenatal smoking, genetics, fatty acids and zinc, and the outcomes of AD/HD. This chapter serves as the framework for the questionnaire that will be used in the research.

CHAPTER THREE

Methodology

Introduction

This chapter will cover the methodology used to for the questionnaire component of this research. The methodology includes how the subjects were chosen, how the questionnaire was developed and the procedures used to distribute and later collect the questionnaire.

Subjects

The sample consisted of twenty parents from the Chippewa Falls, Eau Claire area including members of the Ch.A.D.D. organization whose children have been diagnosed with AD/HD. The parents of the children were mailed the questionnaire on July 17, 2000, to complete and return by the following Friday. Of the twenty parents ten returned the questionnaire in time for the data to be analyzed.

Instrumentation

The questionnaire was developed during the spring of 2000, after reviewing the current literature on AD/HD. It contained eleven questions, ten of which were directly related to the review of literature, leaving the other one as open-ended discussion of the parent's opinion of what was the cause of the child's AD/HD.

The first two questions were in regards to prenatal smoking. The second two questions dealt with the zinc intake of the mother and child. The fifth through seventh questions were based on the intake of serum free fatty acids. The family environment including genetics was covered in questions eight through ten. The last question was an

open-ended question asking the participants to share what they believed to be the cause of their child's AD/HD.

The questionnaire was developed by the researcher and was believed to be valid within its context based on the literature review. It measures the information it was intended to measure. Because this questionnaire was newly developed there are no tests of reliability and validity. A copy of the questionnaire is located at on pages 14-15 at the end of this chapter.

Procedures

The questionnaire was distributed through the research advisor and the president of a group for Children and Parents with Attention Deficit Disorder. The questionnaire was mailed to the parents on July 17, 2000. The parents then returned the questionnaire by July 28, 2000, either by enclosing it in an envelope that was provided or to drop it off in person. Throughout the week the parents received reminders in regards to the importance of the completion of the questionnaire.

Conclusion

This chapter covered the methodology used including how many subjects were chosen, how the questionnaire was developed and the procedures used to distribute and collect the questionnaire.

HUMAN RESEARCH SUBJECT CONSENT FORM

I understand that by returning this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completion of this study. I am aware that information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at anytime during the study will be respected with no coercion or prejudice.

NOTE: Questions or concerns about participation in the research or subsequent complaints should be addressed first to the researcher or the research advisor and second to Dr. Ted Knous, Chair, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 HH, UW-Stout, Menomonie, WI 54751, phone (715) 232-1126.

CAUSES OF ATTENTION DEFICIT/HYPERACTIVITY DISORDER

Please complete the following questions to the best of your knowledge.

Yes = 1
No = 2
Not Sure = 3

Did the child's mother smoke at all while pregnant?	1	2	3
Was the child's mother near people that smoked regularly while pregnant?	1	2	3
Did the child get enough zinc in their diet when an infant?	1	2	3
Did the child's mother get enough zinc while pregnant?	1	2	3
Did the infant eat an irregular diet?	1	2	3
Did the child get enough lean meat in their diet?	1	2	3
Was the mother a vegetarian?	1	2	3
Was there a turning point, or significant event where the behavior became more noticeable? Please explain.	1	2	3

Are there adult family members that display AD/HD characteristics?	1	2	3	

Rate the family atmosphere as indicated below by circling the number

No Rules				Many Rules
1	2	3	4	5
Calm				Stress
1	2	3	4	5

What do you believe could be the cause of the child's AD/HD? Please explain.

CHAPTER FOUR

Results

Introduction

This Chapter will cover the results of the data analysis and review the research hypothesis and objectives of the study.

Data Analysis

The data was analyzed by comparing the current research and the responses from the parents of the children with AD/HD and through themes or commonalties using percentages and comparisons.

Prenatal smoking of the mother did not seem to be a significant factor. Forty percent of the mother's smoked while pregnant, while sixty percent of pregnant mother's were around someone that smoked regularly.

None of the respondents knew if their child received enough zinc in their diet or if the mother had enough zinc in her diet while pregnant.

Irregular diet of the infant didn't appear to be significant.

Sixty percent stated that their child received enough of lean meat, or serum free fatty acids. The remaining forty percent didn't know if their child received enough lean meat.

One respondent stated that the mother was a vegetarian, one respondent wasn't sure if the mother was a vegetarian, and the remaining eight stated that the mother was not a vegetarian.

There was no significance in the turning point of the child's behavior. Many stated that the onset occurred from age two to six with one stating that it occurred after age fourteen.

Seven of the respondents stated that there are other family members, mostly the father, that displayed AD/HD characteristics.

Sixty percent stated that the family had many rules and ninety percent said that the family atmosphere had a high degree of stress.

For the open ended question of what do you believe could be the cause of the child's AD/HD, the responses were as follows: two said genetics, two said his father, and one said that it was a result of too much candy, sugar, and pop.

Objectives

1. To identify the multiple sources that may cause AD/HD from the literature. Throughout this paper we have identified multiple sources of AD/HD from the literature. This satisfies the first objective of this research.

2. To determine the most common cause for AD/HD in the Chippewa Falls, Eau Claire area including members of the Ch.A.D.D. organization. The most common cause for AD/HD as identified by the parents of children with AD/HD is genetics. This satisfies the second research objective.

3. To determine if there is one cause that is significantly more predominant than others. There was not one cause of AD/HD that was significantly more predominant resulting from this study.

Research Hypothesis

A review of literature shows that there are several causes of attention deficit hyperactivity disorder. The research is still in the early stages of discovering the main causes of the disorder. Therefore, the hypothesis of this study is that there is one main cause of the disorder that occurs significantly more than others as indicated by the parents sampled.

There are several proposed causes of AD/HD according to the literature review. The research hypothesis is that there is one cause that occurs more significantly than others. As a result of this questionnaire the research hypothesis is rejected.

Conclusion

This chapter reviewed the results of the study including research hypothesis, the objectives of the study, and the analysis of the data that the questionnaire produced.

CHAPTER FIVE

Conclusions and Recommendations

Introduction

This chapter will discuss the conclusions that have been drawn from the research and recommendations that have surfaced from the literature review and the results of the questionnaire.

Conclusions and Recommendations

As a preventative measure the pregnant mother should try to stay away from smoking as well as second hand smoke. They should also give more attention to the zinc and the serum free fatty acids that they eat while pregnant and their child's intake of these as well. The home environment should be carefully examined whether it is healthy for the child or if it is forcing the child to create an unhealthy coping mechanism that is displayed through AD/HD behaviors.

There are several potential causes of AD/HD, however, before we can find what the main cause is we need to clarify the definition of AD/HD. As the literature review pointed out, there are many misdiagnoses as a result of difficulty with diagnosing. This in turn makes it more difficult to find what the actual cause could be. This is why there is a multitude of proposed causes for AD/HD. Many of the proposed causes could be a cause of a different underlying disorder that results in display of AD/HD behaviors.

There are multiple medications used to suppress the active behaviors of children that have AD/HD characteristics. Before these medications are used there should be a thorough investigation of other potential causes of these behaviors.

The diagnosis of AD/HD should be looked further into and a consistent method should be developed to diagnose this disorder. Only after that occurs can a cause of the disorder be fully discovered and properly treated.

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