ADHD Medication: To Medicate or Not to Medicate?

by

Alyssa Henderson

A CAPSTONE PROJECT

submitted in partial fulfillment of the requirements for the acknowledgement

Honors Distinction

Pre-Med Biology
School of Mathematics and Science

TYLER JUNIOR COLLEGE
Tyler, Texas

2019

Approved by:
Capstone Coordinator
Professor Ryan Button

I. Abstract
Attention Deficit Hyperactivity Disorder, or ADHD, is a chronic condition that has become overwhelmingly prevalent in American society—a ratio of 1 to 3 out of every thirty children in the classroom setting (ADHD, 2018). This translates to eleven percent of American children are diagnosed with at least one type of ADHD. That is 6.4 million children that are clinically diagnosed with the inability to focus attentively, restlessness, imbalanced mood swings and under-developed social skills (Sheffer, 2013). All of these lead to any learning environment being a daily battleground for diagnosed children both internally as well as externally. This is caused due to an under-activity in the frontal lobe of the child’s brain, which is responsible for their planning, motivation, social behavior and speech production (Brown, KJ, Bill, & Brian).

The symptoms associated with ADHD are currently being combated with the utilization of stimulants known as methylphenidates and amphetamines (Ehmke, 2018). This sector of the pharmaceutical industry costs a family seeking treatment around $2,000 annually, while society at large spends approximately 42.5 billion for the various treatment options available to the public coupled with those currently being researched (Briody, 2013), (Holland, Riley, & Krucik, 2017). But an even larger concern remains, what are these stimulants truly doing to these children both short and long term? This study will provide a solid knowledge base for the general population as well as parents of children effected with ADHD by examining whether medicating the child provides more benefit than the risks of possible adverse effects associated with stimulant use (Moldavsky, Pass, & Sayal, 2014).

II. Background of the Problem

Data retrieved from the Centers for Disease and Control and Prevention pertaining to the statistics of the varied amounts of children cases of ADHD over the course of the 20th century. The data consists of how many children have been diagnosed, how many of those have ADHD along with another disorder, and how many of those cases are actively being treated with medications. This study concluded that there are around 2.4 million children between the ages of six to eleven diagnosed with ADHD in America. Two of the three children that are diagnosed with ADHD were found to also have another disorder of some sort. There are an estimated 62% of children who are currently being medicated, coupled with 47% receiving behavioral treatment. This database provided a graphic displaying the distribution of medication and behavioral treatment across America and how it varies within each state.

https://courses.lumenlearning.com/boundless-psychology/chapter/psychodynamic-perspectives-on-personality/

This article in Lumen Learning explains the fundamentals behind Freud’s Psychoanalytic Theory of Personality, or how a person’s personality is developed through psychological conflict. Freud states that a personality is the composed between interactions of an individual’s id, ego, and superego. This is consistent with the ideal that Freud believes biological drives and social expectations navigate internal conflicts through differing developmental stages of life, thus constituting for cognitive collisions when attempting to form a person’s behavioral responses to their environment or their personality.
This summary was conducted attempting to navigate the efficacy and safety of methylphenidate use for ADHD treatment. Clinical trials for the endorsement of various ADHD drugs lacked clear measurements on the efficacy as well as the safety of these medications for FDA approval. In this research, 20 medications for ADHD treatment were tested within 32 clinical trials, averaging about 75 participants per trial, overall approving eleven of the proposed treatments. This trial also acknowledges that there are gaps within ADHD treatment understanding that assess long-term effects of the stimulant as well as the different possibilities of rare adverse symptoms.

The Harvard Health Publishing letter contracted new information from their database about methylphenidate, the reasons that parents should and should not be concerned, as well as the precautionary measures needed to safeguard the use of methylphenidate for their children in particular. This study described methylphenidate as the most commonly prescribed ADHD treatment, and their analysis derived that classroom performance improved, general behavior included fewer symptoms of ADHD-like symptoms, as well as better quality of life for the
family improved overall. It was also included that short-lived problems, such as sleep issues and decreased appetite are usually prevalent in stimulant users, while no life-threatening issues have surfaced. However, significant psychological and developmental complications, as shown by other studies, in up to one-half of children are often left untreated.


This article is an overview of newly surfaced data from the Centers for Disease Control and Prevention. Approximately two-thirds of Americans diagnosed receive prescriptions for ADHD treatment that constitute for academic enhancement and behavioral improvement, while also showing rising levels in anxiety and addiction. The estimated yearly cost for an average family’s treatment is around $2,000, with prescriptions ranging from fifteen to two-hundred dollars a month. Briody also suggests that parents are simply falling complacent to a “quick fix” in order to help their child succeed at the hands of aggressive pharmaceutical advertisements as well as poor learning environments.

The Neuropsychology Associates enacted the first comprehensive study that utilized MRI scans with children 4 and up that have been diagnosed with ADHD. The study concluded that the brain could overall be smaller, due to reduction in size of differing regions, and the severity of the child’s ADHD symptoms are predicted through the said reduction magnitudes. One of the regions, namely the frontal lobe, exhibits underactivity when diagnosed with ADHD, thus constituting for malfunctions occurring in the child’s planning, motivation, and behavior and speech production.


The Psychiatric Times Newsletter from the ModernMedicine Network proposed a compilation of theories that intertwined to better understand medication adherence, as well as deferral. Within these theoretical proposals, one in particular, the Health Beliefs Model, furthered insight into what options parents with ADHD diagnosed children have to weigh when deciding to put their child on medication or not. This theory incorporates the entire overlying purpose of my research, to fully understand the medication, weigh every cost, then decide if the medication is or is not for their child.

This summary is the combination of two experiments enacted in 1999 from the Archives of General Psychiatry that conducted a clinical trial with placebos along with ADHD stimulants and recorded the effects on the participants over a 14-month period and the use of moderators and mediators in treatment responses. This study tested almost 600 children between the ages of 7 to 9 utilizing various doses given to each child at the same times throughout the day, some coupling with behavioral treatment, and others simply receiving placebos to determine the overall effect of the medication through parent and teacher evaluations. At the end of the trial, those students on the medication showed significant improvement, especially with careful consideration taken into account for each child’s optimal dose/medication.


Meghan Cooney, the writer, pulled information from the American Psychiatric Association and the U.S. Department of Education to overall evaluate the true effects that ADHD medication has on diagnosed students. She evaluates the impact on academic performance, attention and concentration, behavior and impulsivity, activity level, and socialization and relationships, while also raising awareness to the side effects that the medication will have on the child as well. Cooney found that almost every area evaluated overall improved for the child while receiving treatment. However, she also warns about the headaches, inconsistent sleeping habits, irritability, irregular eating patterns, and dizziness that could potentially arise from the stimulant use as well as the desired effects.
This review evaluates each medicine that is commonly prescribed to individuals diagnosed with ADHD and the pros and cons relating to each of them. The Child Mind Institute conducts their own research regarding these medicinal treatments, so Doctor Roy Boorady compiled their findings on the differing Methylphenidate medications, so they can be compared easily with one another. One highlighted finding is that dopamine and epinephrine are two of the most commonly associated medications in understanding ADHD medication, which stimulate the prefrontal cortex for attention and focus (i.e. decreasing external stimuli signals and focusing on desired signals). Over 80% of those on ADHD stimulants respond well to their treatment, and with the large variety available to those diagnosed, there is one best fit for almost every individual.


This account focuses on the different behaviors children diagnosed with ADHD enact in the classroom setting by teacher and principal, Flewelling, along with her colleagues' experiences. This focuses on how the children's ADHD symptoms directly impact their academic performance. The general conclusions from the educator's opinions were that children
with ADHD have extreme difficulty controlling their own person, reduction in environmental
stimuli optimizes focus, and suggests that the child is not behind in intelligence, but simply
cannot translate their input of information and understanding to what they can express.

Statistics, and You. Retrieved November 12, 2018, from https://www.addrc.org/adhd-
numbers-facts-statistics-and-you/

This source contains a compilation of graphics regarding statistics over ADHD from the
ADD Resource Center. It describes ADHD as a mental disorder associated with occurring in
children. Some important information includes an average diagnosis age of 7, around 6.1% of
children being medically treated, an approximate 42.5 billion dollars cost annually to Americans,
as well as a 42% increase in ADHD diagnosis over the past decade. This data was essential in
forming the basis background knowledge needed for an introductory explanation of this
prevalent disorder.

from https://ideas.ted.com/the-neuroscience-of-adhd/

Laura McClure is writing about Neurobiologist David Anderson expressing his alarm with
“drugging children” to simply treat the symptoms of ADHD. Here, he argues the facts and
statistics of the disorder and the treatment pros and cons for the individual and the country as a
whole. McClure’s data is derived from Anderson’s findings and writing. Anderson expresses his
concern with the extensive treatment options available to America’s children, without scientists fully understanding the disorder. One in ten children in America are diagnosed, and Anderson believes, medication should be the last resort. Anderson claims that there are alternative variables that can be manipulated in order to appeal to a child with ADHD’s needs through behavioral treatment first, however, society has pointed more commonly to the riskier, more evasive solution, medication.


The Child Psychology and Psychiatry Journal decided to conduct an experiment with teacher questionnaires regarding whether or not children should be referred to a specialist in order to be diagnosed with ADHD. The majority of the findings suggested that teachers were cautious to refer children to undergo the testing, as well as conveyed unenthusiastic and hesitant views towards any and all ADHD medications for the children. Only five of the 496 teachers expressed positive views towards the effects of the ADHD treatments. The overall conclusion pointed towards educating instructors on how to effectively identify the need for referral to a specialist as well as ways to manage ADHD behavioral concerns in school.

The American Pharmacists Association compared data from their census regarding ADHD statistics in America between 2003 and 2011. Their findings showed that eleven percent of American children, or 6.4 million kids, are currently diagnosed with ADHD between the ages of 4 to 17. From the 2011 National Survey of Children’s Health, among those diagnosed with ADHD previously, 83% were proven to actually have ADHD and 69% of those are currently being medicated, or 3.5 million. The statistics also displayed a 42% increase in parent-reported ADHD diagnoses cases from 2003 to 2011.

III. Statement of the Problem

One obvious gap in knowledge that I continuously encountered within my research was observing that the desired results while the child is on medication (i.e. improved behavior in the classroom, better grades), often jaded the parents and teachers to where they overlooked underlying adverse symptoms, realizing that the child could be affected much more heavily than recognizable at first glance (Flewelling, 2016), (Bourgeois, Kim, and Mandl, 2014). Effectively measuring the positive effects of the medication with equal consideration upheld for the negative symptoms that surface would be an ideal bridge to close the gap between weighing the benefits versus the potential harms associated with ADHD treatments (McClure, 2016).

IV. Purpose of the Study

The conduction of my research will be performed both qualitatively and quantitatively. Quantitatively, I will measure all of the children in one local elementary school, kindergarten through fifth grade, that have been diagnosed with ADHD, measuring their academic
performance as well as their body mass index with and without stimulants (Cooney, 2016).
Qualitatively, I will utilize an evaluation tool given to both the student’s parents and teacher to measure their overall behavior, personality, mental stability, as well as any physical changes (i.e. changes in eating and sleeping habits) (Braaten, 2016). The children will also be interviewed using simple questions regarding their overall happiness with school and homework before and after their medication. This study will be performed over the course two weeks with a pre-medicated survey for one week, followed by a one-month post-medicated survey lasting one week (Connaghan, 2006).

V. Significance of the Study

Whether the benefits outweigh the adverse side effects associated with ADHD medications is a controversial topic prevalent within the ADHD treatment community. Children that are receiving clinically prescribed stimulants are often prone to experience a loss of appetite, inconsistent sleeping habits, and lower energy levels in order to balance overall mood (Cooney, 2016). The right course of action for parents can be a difficult line to discern, especially with the unknown adverse effects that could potentially influence their child’s psyche, mental and physical development, as well as hormonal production as a result of dependence on their treatment.

This study is an attempt towards providing experimental validation as to how effective the stimulants are truly improving academic performance as well as lowering children’s tendencies to disrupt classroom operations (Ehmke, 2018). The significance of these findings would constitute for a deeper understanding for parent’s acceptance or denial of these medications as
well as to determine whether this costly pharmaceutical industry is genuinely producing useful, beneficial, yet safe products for school children.

VI. Primary Research Focus

Exploration into Associations of ADHD Medications to Academic and Behavioral Performance in Comparison to the Adverse Side Effects.

VII. Methodology

When a child is being evaluated, I propose that if the before and after survey displays the child's behavioral and academic patterns to yield overall improvement following treatment, that parents will still choose to continue treatment, despite the adverse side effects that may arise (Braaten, 2016). The conduction of my research was originally intended to survey local third-grade student’s parents as well as interview teachers regarding their opinion’s and deductions towards ADHD medications, with respect to their personal experiences.

The following questions were to be utilized to conduct my qualitative research:

Parents
- How would you describe your child’s daily experience at school?

Strongly Unsatisfied  Unsatisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied
- Does your child become upset, mad, or frustrated when doing their homework?

Strongly Disagree  Disagree  Somewhat Agree  Agree  Strongly Agree
- How do you feel that your child is doing academically?

Strongly Unsatisfied  Unsatisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied
- Have you ever been contacted by your child’s teacher regarding their grades?
Yes  No

○ If so, why? (Circle all that Apply)
Struggles to Focus on Work  Failing Grades Becomes  Frustrated towards Assignments

- How do you feel that your child is doing behaviorally?

Strongly Unsatisfied  Unsatisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied

- Have you ever been contacted by your child’s teacher regarding their behavior?

Yes  No

- If so, why? (Circle all that Apply)
Disruption  Inattentiveness  Restlessness  Disobedience  Social Strife with Classmates

- How well do you feel your child listen to instructions or follow directions at home?

Strongly Unsatisfied  Unsatisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied

- Do you feel your child has the ability to attentively focus on a single task?

Strongly Unsatisfied  Unsatisfied  Somewhat Satisfied  Satisfied  Strongly Satisfied

- Have you or anyone in your immediate family been diagnosed with Attention-Deficit Hyperactivity Disorder (ADHD)?

Yes  No

○ Have medications for ADHD been prescribed to you or family members?

Yes  No

- If so, how have they impacted daily life?

- How would you describe your child’s personality over the past year?

- Has your child experienced any recent change in eating or sleeping habits? Is there any comparison between these from before your child began taking their ADHD medication to now?
• What is your child’s current height and weight?
• Do you have any concerns regarding your child’s current weight or height? If so, have any of these concerns arisen after the beginning of daily consumption of ADHD medications for your child?

Teachers
• How would you describe a daily school experience for a child with ADHD?
  o Does your answer change if the child is on ADHD medication or not? If so, could you describe this contrast?
• Could you describe what you observe in regard to academic performance for a child with ADHD?
  o Do you notice a variation in grade percentage between medicated and non-mediated diagnosed children?
• How would you describe a child with ADHD’s behavior throughout a normal day? (i.e. focus ability, listening skills, following instructions)
  o In your professional opinion, does this description change with the utilization of medication or not?
• Do you have a personal opinion in regard to ADHD medication utilization? Are there any specific beneficial components or concerns you have observed over the years?

However, after being denied collaboration, a meta-analysis would suffice for continuation of research. My revised research method was performed both qualitatively and quantitatively. Quantitatively, I examined multiple accounts of studies involving children, that both have and have not been diagnosed with ADHD, measuring their academic performance as well as overall
body mass index over several years with and without the use of stimulants. Qualitatively, I will utilize previously conducted interviews with teachers and/or parents evaluating student's overall behavior, personality, mental stability, as well as any physical changes (i.e. changes in eating and sleeping habits) based on their professional and personal experience.

VIII. Theoretical Framework

The Health Beliefs Model is focused towards the decision of whether stimulants should be used or not based on the risks and benefits evaluated from the family's perspective. This correlates with the study, by providing clear findings of the intended effects of the treatment compared side to side with the negative effects of the drug. This will assist all parents that are in this dilemma when trying to determine whether to initiate or continue stimulant treatment (Charach, 2008). Freud's Psychoanalytic Theory can also be incorporated into this study by attempting to rationalize the child's disruptive behavior due to malfunctioning sectors of the frontal lobe. Freud's Theory suggests that conflicts between differing parts of the brain shape a person's personality and behavior. Since there is observable under-activity within one portion of the brain, the other areas are prone to compensate, thus resulting in abnormal behavioral patterns, like those associated with ADHD (Boundless, n.d.).

IX. Implications for Further Research

One prevalent trend that I continuously encountered within my research was observing that the desired results while the child is on medication (i.e. improved behavior in the classroom, better grades), often jaded the parents and teachers to where they overlooked underlying adverse symptoms, realizing that the child could be affected much more heavily than recognizable at first
glance. Effectively evaluating the positive effects of the medication with equal consideration upheld for the negative symptoms that surface would be ideal for weighing the benefits versus the potential harms associated with ADHD treatments; however, this was almost always not the case. When a child’s behavioral and academic patterns yield overall improvement following treatment, most parents will still choose to continue treatment, despite the adverse side effects that may arise.