ADHD AND ITS IMPACTS:

A COMPREHENSIVE REVIEW AND PROPOSAL FOR FUTURE RESEARCH

By

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Abstract

This project seeks to propose directions for the future of research on the impacts, outcomes, and mitigations of Attention Deficit Hyperactivity Disorder (ADHD). This paper focuses mainly on Childhood ADHD and its impacts on the lives and futures of those diagnosed. After sourcing 85 articles and closely reviewing each one, the major findings and contentions of the articles were compiled to provide insight to the wealth of knowledge about the impacts, history, demographics, and diagnoses of ADHD. These impacts were organized by the topics of the Home and Family, School and Education, Social Relationships, and the Self. The impacts of ADHD range from impacts that are directly caused by the disorder (such as emotional dysregulation and hyperactivity/impulsivity) to the more social issues such as stigma. The literature sourced for this paper conveys themes of stigma, poor emotion regulation, environment, hyperactivity/impulsivity and inattention. Finally, a proposal for future research revolving around the gaps in the literature on impacts and the future of mitigation research are made. The proposals focus on the future implementation of research in the educational, social, and familial spheres.

ADHD and its Impacts:

A Comprehensive Review and Proposal for the Future of ADHD Research

Attention Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder which, according to the American Psychological Association's (APA) Diagnostic Statistical Manual of Mental Disorders fifth edition (DSM 5), is characterized by impulsivity, hyperactivity and inattention, while having high comorbidity for Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), and Depression (MDD) (APA, 2013; Armstrong et.al., 2015; Baum & Olenchak, 2002). ADHD has the highest rates of childhood diagnosis of a neurodevelopmental disorder with onset in childhood (Perou et.al., 2013). Those who are diagnosed with ADHD can find themselves struggling with a myriad of difficult settings and relationships. For instance, children diagnosed with ADHD may find that education and academic achievement within the school setting can be greatly impaired (Daley & Birchwood, 2009; Langberg et.al., 2011; Owens & Jackson, 2017; Rider, 2003), as can the child's relationships with their peers and their teachers (Anderson et.al., 2012; Bell et.al., 2011; Simonil, 2018; Snider, Busch, & Arrowood, 2003).

Other relationships that may be strained include the child's relationships with their family members (including parents and siblings) and their relationship to health (Nigg et.al., 2015; Sinha et.al., 2016). These detriments combined with impairments of social relationships such as friendships in childhood and romantic relationships in adolescence and adulthood can cause serious impacts on a person's life (Blachman & Hinshaw, 2002; Bukowski, Motzoi, & Meyer, 2009; Normand et.al., 2011; Normand et.al., 2013; Normand et.al., 2019). Such impacts relate to negative outcomes for those living with this disorder, such as a higher likelihood of incarceration and divorce (De Sanctis et.al., 2012; Soltis et.al., 2017; Wymbs et.al., 2008; Young & Thome, 2011). The diagnosis of ADHD alone can have detrimental effects on a child in the form of

stigmatization from peers, parents, teachers and themselves (Bell et.al., 2011; Bellanca & Pote, 2013; McKeague et.al., 2015; Slomkowski & Klein, 1995). ADHD is a wide reaching and costly disorder for individuals who have it and their families; that being said, ADHD is worth understanding on an intimate level so that further research may be explored to ease the lives of those under its thumb. This paper serves as a literature review of the impacts of ADHD on School, Home, Social Relationships, and the lives of those diagnosed with ADHD. Throughout the course of the paper the author will discuss the history of ADHD, demographics of the disorder, diagnostic methods, treatment methods, and costs. Finally, this paper will conclude by suggesting directions for the future of ADHD research for each of the areas of impact.

History, Demographics, and Diagnosis

The status of ADHD has rapidly evolved to be the most predominant neurodevelopmental disorders currently diagnosed in childhood. The first instance of ADHD symptoms being officially discussed was by George Still in 1902 during his lectures discussing children with an abnormal inability to sustain attention (Lancet 1902; Still 2006). In the following century ADHD would go from relative insignificance to being seen as a major disorder in the lives of children. Beginning in 1937 stimulant medication was the primary method of treatment for the disorder, and subsequently this would escalate to an unprecedented level of school aged children taking stimulant medication by the 1970s (Bradley, 1937; Laufer, Denhoff, and Solomon, 1957; Kugel, 1975). The first official diagnostic schematic for disorders resembling ADHD symptomology was presented in the DSM-II (under the title Hyperkinetic Reaction to Childhood or Adolescence). The DSM-III incorporated the disorder into a subset of Attention Deficit Disorder (ADD) as ADD with hyperactivity. And finally, ADHD was identified first in DSM-IV and

DSM 5 by name with three subsequent subtypes: Primarily Hyperactive, Primarily Inattentive, and Combined (American Psychological Association (APA) 1968; 1980; 1994; 2013).

Since 1997, according to the annual National Survey for Children's Health, there has been roughly a 4% overall increase in the number of children diagnosed with ADHD (NSCH, 2016). According to the Centers for Disease Control (CDC) from data accrued by the Child and Adolescent Health Initiative, approximately 9.4 percent of children ages 2-17 (6.1 million children) in the United States have been diagnosed ADHD (2016). Of these children, 2 in 3 had comorbidity with another disorder, and approximately 62% were taking medication for ADHD. A vast majority of these children were white male (in proportion to females the ratio is 6-9:1) and there was an even distribution of socioeconomic status of those diagnosed (CDC 2016). While 62% are taking some type of medication only about 47% were receiving behavioral therapy, of which only about15% were utilizing behavioral therapy alone (CDC 2016). The cost of treating ADHD is very high, in 2013 alone the total U.S. health expenditure on ADHD treatment was roughly 23 billion dollars (Dieleman et.al., 2016). However, adding the cost that families pay each year in productivity, time away from work, lost or made up education and schooling, doctor visits, medication and other health care, may raise the total cost to 50 billion dollars or more each year (Dieleman et.al., 2016). All of these interactions spawn from the very beginnings of ADHD identification; children that have been diagnosed, medicated, and stigmatized have had their lives changed significantly. Research into the impact of this disorder is relatively young considering the age of psychological research, however the detriments of diagnosis and mishandling of the disorder are rampant and long lasting.

The diagnosis of ADHD is a complex matter that relies on a myriad of matters. The DSM guides the diagnosis of new patients through its narrative structure, which implies a description

of the disorder symptomology and common features, time frame of diagnosis (age of onset) that makes identifying the disorder easier (American Association of Pediatrics, 2011; APA, 1994; 2013). However, the fifth edition of the DSM (DSM 5) removed some of the restrictions on the diagnosis of ADHD making the process much simpler. These alterations reduced the number of symptoms necessary for diagnosis over the age of 17, and increased the age limit for presentation of symptoms from 7 to 12 years of age (Sibley et.al., 2013). Making the diagnosis easier for an already extremely prevalent disorder has been a major point of contention, due to its proclivity for overdiagnosis, as discussed by Bruchmüller and colleagues (2012). Additionally, according to Visser et.al. children with ADHD most commonly received their diagnosis from a pediatrician or primary care physician (53%), where only 14% received their diagnosis from a psychologist (2015). According to Bruchmüller, overdiagnosis is more likely to happen due to the prototypical nature of the disorder, and not relying strictly on the DSM criteria to diagnose. Rather, their study suggests that those who are diagnosing children with ADHD are more likely to do so based on their previous conceptions of the disorder, and the prototypes they have come across before. In this regard, prototypical nature refers to a sense of overlying homogeneity in the reported cases of ADHD, for instance: disruptions in class, combative and impulsive behavior, unable to sit still, etc. (Bruchmüller et.al., 2012). However, these traits are also shared with a host of other plausible reasons that are not associated with ADHD.

For example, as Ford-Jones (2015), and Baum and Olenchak (2002) discuss in their respective studies there is a connection between ADHD-like behavior and subsequent diagnosis of children who are more relatively mature for their ages or more intelligent than their comparative peers. Ford-Jones's study investigated children rated as more mature in comparison to their peers, discovering that they were more likely to be combative or dissatisfied with their

situations (2015). This was described as leading to conflict in class and at home which fit into, as Bruchmüller et.al. described, the prototype of the ADHD child. The children from Ford-Jones's study were more likely to be diagnosed with ADHD without the other symptomology such as hyperactivity, thus being misdiagnosed and earning the impacts of ADHD stigmatization that will be described later in the paper. Baum and Olenchak found a similar interaction occurring with more intelligent children bored with their classroom settings and saw similar levels of diagnosis and medication (2002). These finding suggest that there are many children who are absorbed into the ADHD diagnosis without need, who are then medicated. However, as there are groups of children who are over- and misdiagnosed, there are also children who need diagnosis and treatment who do not receive it.

ADHD varies greatly by geographic location, with those living in urban areas having the lowest rates of the disorder (McDonald, 2013; Silverstein et.al., 2016). According to a recent study, those in urban communities have some of the lowest rates of ADHD across the country (McDonald, 2013). This implies that there are substantial groups of children not being diagnosed (if the demographics elsewhere are consistent). Additionally, there is research to suggest that there an interaction between race and lowered ADHD diagnoses. According to the CDC a large majority of ADHD diagnosed children are white males, but the disorder occurs in females and communities of color as well (2013). Despite the rates of ADHD diagnosis in female subjects increasing over previous years and although there is a presence of the disorder in communities of color, the amounts are not nearly as robust as they are within the white male populous (Coker et.al., 2016; Morgan et.al., 2013; Robinson et.al., 2002). Several studies have found that children of color have much lower chances of ever being diagnosed with ADHD even if they are more likely to exhibit symptoms (Coker et.al., 2016; Morgan et.al., 2013; Livingston, 1999).

According to Coker et.al., white children were roughly 7-9% more likely to have received a diagnosis of ADHD in comparison to their African American peers (2016). Research performed by Bussing and colleagues suggests that this may be due to a distrust of doctors among populations of color, so there may be a lower likelihood that parents will seek out clinical help even if they think a diagnosis is warranted (1998). This leads to children of color not receiving diagnosis or treatment when they need it (Brown University, 2012). Both overdiagnosis and underdiagnosis are extremely problematic. Nevertheless, those who receive diagnosis, warranted or not, are subjected to impacts that exists in all realms of their lives.

ADHD Impacts in the Home

The Home is where children spend a large portion of their most formative years, and there are many interactions within the home that are greatly impactful for the overall development of a child (Baumrind 1966). Specifically, there are important interactions between ADHD children and their parents (or primary care takers) and the children's health within the home. Many aspects of the parent-child dynamic are severely skewed due to ADHD. Much of the research assessing the intricacies of parent-child relationships focus solely on the mother-child relationship and neglect father-child interactions (Honkasilta 2015, Lifford, Harold, & Thapar 2008). Noting this, many of the familial interactions discussed in the literature have been shown to identify strained relationships between child and mother due to ADHD. Honkasilta and colleagues noticed a distinct power struggle between children with ADHD and their parents (2015). In their study they revealed that due to the children's hyperactivity there was more stringent restrictions on their agency which led to high levels of conflict between the parents and children (Honkasilta et.al. 2015). This is a common theme presented in the literature, the loss of agency and individuality without supervision and medication instills hostility and resentment in

the child, which in addition due to the prototypical nature of ADHD, leads parents to be more hypervigilant of their children and assume worsened ADHD status and related behavior (Baumrind 1966; Lifford, Harold, & Thapar 2008; Bruchmüller et.al. 2012; Honkasilta et.al. 2015). This hypervigilance and suppression of agency is consistent with a shift from a more warm and supportive parenting styles to more authoritative and controlling styles, which leads to further conflict within the home (Baumrind 1966; Bruchmüller 2012; Honkasilta et.al. 2015).

In addition to the heightened level of control exhibited by parents of ADHD children there is also the possibility of higher rates of rejection from the parents as well (Lifford, Harold, & Thapar 2008). This rejection refers to the emotional unavailability from the parents, especially the mothers, in relation to the needs of the child (Lifford, Harold, & Thapar 2008). However, Lifford and colleagues also found that this interaction is not consistent for the father child relationship; this finding may suggest that there is a relationship between emotion, work, stress, and closeness directly interacting with the child that leads to rejection (2008). The findings that ADHD brings more stringent regulation and less warm parenting environments are consistent with a common trend among ADHD research: a stunted relationship between developing child and emotion and emotion regulation (Bruchmüller, 2012; Gordon & Hinshaw, 2018; Honkasilta et.al., 2015; Lifford, Harold, & Thapar, 2008). In addition to the negative relationship between parents and children, tension often arises between parents. This contention between parents usually comes about regarding treatment, medication, and discipline of their diagnosed child (Wymbs et.al., 2008). This conflict may often lead to marital problems which may then lead to divorce. Divorce alone can have traumatic impacts on a child's development, but coupled with additional family strain from ADHD, emotion dysregulation and the effects can be crippling (Wymbs et.al., 2008).

Emotion regulation is a major point of discussion in research on ADHD and its relation to the family context. This is due to its integral role in emotional development and the forming and maintaining of healthy relationships (Bodalski, Knouse, & Kovalev, 2019; Fogelman et.al., 2018; Shyu, Tu, & Yeh, 2017). Being able to functionally regulate one's emotions and utilize emotion in relationships is a major part of healthy dyadic relationships particularly between mother and child (Gordon & Hinshaw, 2018; Shyu, Tu, & Yeh, 2017). Gordon and Hinshaw explored the dyadic relationship between mothers and their ADHD daughters and found compelling evidence that when parental stress is high there is significant adverse effects for the children in those environments (2018). Specifically, the study found higher rates of suicidality and internalizations of depression in households with higher parent stress, they also alluded to the possibility that this parental stress can be onset by the ADHD itself (2018). This evidence supports a cyclical nature of ADHD stress and adverse outcomes for both parent and child. Similarly, Shyu and colleagues' study on family emotion regulation in China yielded interesting results that are consistent with a disruption in emotionality onset by ADHD that may be a proponent of stressors within the home (2017). The study reports inconsistencies in the children's understanding of their emotionality and ability to regulate their emotions which, they contend, may lead to conflict within the home (Shyu, Tu, & Yeh, 2017). Although this study was performed in a vastly different cultural setting than the United States, a similar study has yet to be performed in the US. However, due to the dynamics of the families depicted in the article being similar to those modeled in the US, it seems likely that the findings will be consistent.

In addition to dysregulation of emotion and dysfunction of family, there may also be an impediment to the physical health of ADHD children as well. This is not referring to a physical danger such as suicidality or self-harm as shown by Gordon and Hinshaw (2018). Rather, threats

to physical health can come in the form of obesity and heart disease that can extend from unhealthy eating habits originating from childhood ADHD (Nigg et.al. 2015). A study by Nigg and colleagues correlated ADHD and obesity, claiming that the increased impulsivity associated with the disorder fosters poor eating habits that lead to excessive weight gain (2015). This claim substantiates that the dysfunction within the home (both emotional and familial) leads to poorer health outcomes for children with ADHD (Nigg et.al. 2015). Through understanding this interaction, one can also extrapolate how the interactions between ADHD and what occurs within the home can severely impact a child's life. From the more stringent and controlling familial environment, to the injured emotionality and destabilized eating habits, there are many ways for the home environment to deeply impact a child with ADHD in ways that have long lasting repercussions. However, the home is only one institution that children spend their time in. The educational institution provides one of the most daunting environments for children with ADHD, and the impacts of what occurs in the school setting can be devastating to their development.

ADHD Impact in the School

The modern classroom typically favors more sedentary and compliant children who can manage to sit still and focus for around six hours a day. Therefore, the very concept of ADHD is not conducive to the modern classroom environment since ADHD is characterized by hyperactivity and inattention. This trend of ADHD children being disadvantaged in the classroom and educational contexts has been thoroughly analyzed by researchers over the past several decades. ADHD leads to adverse consequences within the school setting that can be highly devastating to the children who are diagnosed. The interactions with their teachers, classrooms, and peers lead to educational outcomes that are correlated with lowered educational

achievement. The way that each of these relationships impact the ADHD child and their subsequent long-lasting effects will be discussed in the following section.

Teachers serve as important figures in the lives of children, however as they alternate every year for a majority of the child's educational career some teachers may find it difficult to form meaningful connections with their students (Honkasilta et.al., 2016; Wolfraich et.al., 1998). This lack of connection may lead to the teachers regarding their students (specifically their more difficult students) with less respect, and they may react to difficult children in an adverse manner (Honkasilta et.al., 2016; Wolfraich et.al., 1998). Honkasilta and colleagues performed a study of ADHD students in the Netherlands and their narratives regarding in-class experiences. Through analyzing the narratives, they found that while in class, teachers reacted with hostility and aggression in response to typical ADHD behaviors (Honkasilta et.al., 2016). This case is not universally applicable due to the different national laws regarding teacher boundaries in the classroom. For instance, the study uncovered that there were scenarios in which the teacher berated and insulted the ADHD students almost making one student cry. In other cases, the teacher went so far as to throw objects at the students when they misbehaved. However, in other countries where the laws and regulations are more stringent, teacher interactions with students are impactful without the use of physical violence or beratement (Bell et.al., 2011; Hale, Fiorello, & Brown, 2005; Honkasilta et.al., 2016). One of these ways is aggressive stigmatization of ADHD children and subsequent excessive scrutiny that may stem from a lack of teacher's knowledge about ADHD and its role in childhood education.

Research indicates that many teachers are not sufficiently prepared or knowledgeable enough to handle the ADHD students in their classrooms, often resulting in the students being removed (Bell et.al., 2011; Hale, Fiorello, & Brown, 2005; Honkasilta et.al., 2016; Snider,

Busch, & Arrowood, 2003; Wolfraich et.al., 1998). Teachers have been (at the time of the research) shown to be lacking knowledge of ADHD medications and overall treatment options (Hale, Fiorello, & Brown, 2005; Snider, Busch, & Arrowood, 2003). This lack of knowledge of the ADHD experience leads the teachers to not only see ADHD behavior as disrespectful to their authority, but they also tend to become more eager to stigmatize those children that do act out (Bell et.al., 2011; Snider, Busch, Arrowood, 2003; Simoni, 2018). This interaction may account for the actions taken by the teachers in the study performed by Honkasilta and colleagues. However, according to Bell et al. the relationship between stigmatization and reactivity are negatively correlated with teacher's experience and level of credential (2011). This means that the more experienced a teacher is and the higher the level of education and preparedness for the role of teacher they possess, the less likely they are to stigmatize ADHD children or react negatively to their behavior.

Through having teachers react to vignettes of ADHD behavior, Hale, Fiorello, and Brown also found a relationship between reaction and knowledge of whether the child was on medication or not (2005). This is consistent with the notion that there is a myriad of circumstances that may alter the teacher's understanding and orientation toward the disorder. However variable the circumstances may be, one aspect is always constant: the impact on the child. The interaction between teacher's over-stigmatization of ADHD children and a general misunderstanding of the disorder may be an accessory to the lowered academic achievement of ADHD students (Daley & Birchwood, 2009; Bell et.al., 2011; Lanberg et. al., 2011). As teachers serve as a major component of the foundations of a child's orientation toward education, negligence and misconduct can severely impair a child's drive to succeed academically (Bell et.al., 2011; Daley & Birchwood, 2009; Lanberg et. al., 2011). Diminished drive for academic

achievement is highly consistent with ADHD, but the external factors exacerbate the detriments. This decrease of achievement is additionally correlated with the conception of the classroom itself and the nature of the modern learning space.

The general orientation of the idealized modern classroom consists of rows of children sitting obediently still at desks in (preferred) studious silence for roughly 6.5 hours a day, approximately 180 days a year, for about 12 years of a child's life (Antrop, Roeyers, & De Baecke, 2005; Daley & Birchwood, 2009). This configuration is rigged against the success of ADHD children who are by disposition hyperactive and inattentive. In the classroom setting it is much more likely for an ADHD student to be identified by teachers as problematic, and thus their behaviors are scrutinized much closer (Daley & Birchwood, 2009; Honkasilta et.al., 2016). While under this proverbial microscope all of the more minor transgressions are viewed as much worse and disruptive to the classroom setting (Antrop, Roeyers, & De Baecke, 2005; Daley & Birchwood, 2009; Rogers & Tannock, 2018). Thus, ADHD children are more susceptible to be subject to disciplinary action in comparison to their non-ADHD peers, of these disciplinary actions being removed from the classroom is of the most common (Antrop, Roeyers, & De Baecke, 2005; Daley & Birchwood, 2009; Rogers & Tannock, 2018). After being exiled from the learning environment, children with ADHD fall farther behind their peers in terms of education. Removal from the classroom not only implicates less time engaged with the material but also a distinct schism between them and the other students (Daley & Birchwood, 2009; Rogers & Tannock, 2018). Being identified as abnormal by the teachers, staff, and one's peers can be highly distressing to a young child, this distress can be exacerbated by being punished for their differences and additional bullying due to their ADHD diagnosis (Antrop, Roeyers, & De Baecke, 2005; Costill, 2016; Daley & Birchwood, 2009). This research presents a connection to

an overall impact of the feelings of otherness and incompetence in the school setting. Disengagement presents detriments that are resounding across many aspects of the child's life. Difficulty in school propagated by teacher stigma and poor classroom environment could reasonably lead to further issues in an already strained home setting, and finally to a general impairment to self-esteem, self-view, emotion regulation, and social relationships for the developing ADHD child.

ADHD Impact on Social Relationships

As previously mentioned, many relationships in the lives of children with ADHD can be injured due to the disorder. However, making and maintaining social relationships may be severely impaired as well. This issue can be pervasive throughout the life span as shown by research that explores social relationships (Ben-Naim et.al., 2017; Normand et.al., 2011). The literature contends that one reason for the interaction between ADHD and social relationships is due to emotion dysregulation that is common in those diagnosed with ADHD (Bodalski, Knouse, & Kovalev, 2019; Fogelman et.al., 2018). The dysregulation of emotion as discussed previously can impair the forming and sustaining of social relationships due to being unable to moderate one's emotions or relate to the emotional expression of those around (Shyu, Tu, & Yeh, 2017). Thus, the maintaining of relationships can be highly challenging for children with ADHD throughout their lives from early childhood friendships to romantic relationships later in life (Ben-Naim et.al., 2017; Bodalski, Knouse, & Kovalev, 2019; Fogelman et.al., 2018).

Friendships in childhood can be difficult to maintain in childhood as observed in research performed by Normand and colleagues (2011; 2013; 2019). Normand et.al. explored the interactions of how ADHD children mismanage their dyadic relationships, the continuity of friendships, and how ADHD children manage play. In studying how ADHD children manage

their friendships, Normand and colleagues recognized that ADHD children were typically more aggressive and selfish during activities, and reported that they were less satisfied with their friendships overall (2013). Additionally, supporting evidence of this interaction was provided through research describing friendships being both shorter due to the childrens' lack of emotion moderation and their emotions being less meaningful or satisfying (Normand et.al. 2011). This finding is consistent with results found in a study performed by Blachman and Hinshaw (2002). Blachman and Hinshaw, through their research on the social relationships of girls with ADHD, discovered that the subjects expressed much more aggression and less effective conflict resolution skills (2002). Thus, across genders and relationships there are convincing levels of evidence suggesting lowered ability to make friends, maintain friendships, and emotionally connect with others.

The interaction between ADHD and impaired social relationships are compounded by the application of stigma. Stigma, as mentioned earlier involving teacher reactions to ADHD children, has been shown to function in a similar way for the children's peers (Costill, 2016; Fogelman et.al., 2018; Law, Sinclair, & Fraser, 2007; Walker et.al, 2008). In one instance, researchers found that children who have been recently diagnosed with ADHD experience sharp spikes in feelings of being bullied and victimization by peers (Costill, 2016). This interaction is described as occurring due to a general negative social mindset that children have about their peers with ADHD. Walker and colleagues discovered that there are higher levels of childhood stigmatization of children with ADHD and Depression than other neurodevelopmental disorders (2008). The researchers equate this to a degree of social ineptitude and emotional incongruence with one's peers that comes with these disorders (Walker et.al., 2008). Additionally, researchers have found a distinct relationship between the label of ADHD and the presence of victimization

and stigma (Law, Sinclair, & Fraser, 2007). In their study, Law, Sinclair, and Fraser uncovered an interaction between the way that children view narratives of ADHD behavior can be dependent on if the ADHD label is attached to the behavior (2007). Their results provided evidence that children reacted more negatively toward vignettes of ADHD peer behavior when the diagnosed label was attached; thus, it is not only the disorder but just the concept of the disorder that impact opinion and inspire stigma (Costill, 2016; Law, Sinclair, & Fraser, 2007; Walker et.al, 2008). Social relationship impairment is a major counterpart of ADHD and can lead to further impacts later in life.

ADHD Impact on the Self

ADHD has many effects on the self. Considering the culmination of the previous impacts on the lives of children, impacts on the self are not unexpected. Research has shown that in addition to the external stigma that children receive from their peers, teachers, and parents, when children receive the diagnosis of ADHD, they may stigmatize themselves (McKeague et.al., 2015). McKeague and colleagues found that before and after diagnosis children alter their self-perception (2015). In general terms they discovered that after diagnosis, the children were much more likely to identify with common associations of ADHD and the subsequent stigma associated with it (McKeague et.al., 2015). This additionally showed that the children were more likely to associate themselves with the behaviors and attitudes associated with “bad kids” (McKeague et.al., 2015). Such self-identification with the negative aspects of ADHD and concurrent self-stigmatization can be very harmful for the proper development of self-image. Additionally, it is correlated with lower self-esteem in adolescence and into adulthood, in some cases even after the subject was no longer diagnosable (Slomkowski & Klein, 1995). Both the internalization of stigma and the lowered self-esteem can have radical impacts on the functioning

and behavior of those affected, and may also be linked to the higher rates of criminality amongst ADHD populations (De Sanctis et.al., 2012; Mckeague et.al., 2015; Slomkowski & Klein, 1995; Soltis et.al., 2017; Young & Thome, 2011).

As discussed, when a child is continuously disciplined and removed from classrooms, it can exacerbate lowered academic achievement (which can further lead to adverse outcomes), feelings of difference from their peers, and a disconnect from the outside world. These are all circumstances highly associated with ADHD and that have been correlated with higher levels of criminality (De Sanctis et.al., 2012; Soltis et.al., 2017; Young & Thome, 2011). Incarceration is an extremely devastating impact that one carries with one for the rest of one's life. Children diagnosed with ADHD are at a higher risk of juvenile incarceration in comparison to groups of their same age peers (De Sanctis et.al., 2012; Soltis et.al., 2017; Young & Thome, 2011). There is an additional risk to persons of color that are diagnosed with ADHD in comparison to their white counterparts (Soltis et.al., 2017). Where white ADHD children are at a higher risk of incarceration in comparison to their non-ADHD peers, children of color with ADHD are at a proportionally higher risk overall in comparison to both groups (Soltis et.al., 2017). Additionally, research contests that their criminal offenses are typically nonviolent in nature, contending that more petty theft crimes and insubordination were the cause of a majority of the incarcerations (Young & Thome, 2011). The researchers equate this occurrence to the impulsivity inherent in ADHD and the additional conflict with authorities that is common with conduct disorders such as ADHD (Young & Thome, 2011). Being imprisoned can further alter one's self image, leading one to internalize one's deviance from society, which could be responsible for an increase in repeat offenses (De Sanctis et.al., 2012; Soltis et.al., 2017; Young & Thome, 2011).

The negative repercussions associated with merely being diagnosed with ADHD are rather obvious, however, it should be recalled that ADHD is one of the most over diagnosed and misdiagnosed disorders in recent history (Bruchmüller et. al. 2012). As mentioned earlier, Bruchmüller and colleagues suggest that those diagnosing the children are not strictly adhering to the Diagnostic Statistical Manual, and instead diagnose considering the prototypical ADHD case (2012). Considering this fact makes all of the previously discussed impacts more significant because they may be impacting children who in fact do not have ADHD. It has already been shown that stigma and lowered self-esteem due to the diagnosis are persistent after symptomology has subsided (Slomkowski & Klein, 1995). Thus, the other impacts are likely to be similarly continuous across the lifespan after diagnosis.

Outcomes of ADHD

Throughout the course of this paper, ADHD has been shown to have wide-ranging and devastating impacts on the day to day lives of those diagnosed. However, the extent of the impact is not isolated to childhood or even adolescence, but far into adulthood. Such outcomes can be seen in long term health, higher levels of incarceration, and strained romantic relationships (Ben-Naim et.al., 2017; Bodalski, Knouse, & Kovalev, 2019; Soltis et.al., 2017, Sinha et.al., 2016). Considering the health impacts, it has already been noted that there is an increase in obesity in ADHD youth, however there is an additional risk of cardiovascular problems in adults with ADHD (Sinha et.al., 2016). Sinha et.al. contest that ADHD stimulant medication (which according to the CDC 62% of those diagnosed are taking) lead to higher risk of cardiac problems in the future such as high blood pressure and higher heart rate with an additional increased risk of stroke for pediatric patients (2016). Thus, an outcome of ADHD

extends far beyond the social or educational plane of one's life directly impacting one'slongevity and physical health.

As previously discussed, being diagnosed with ADHD can increase one's likelihood of being incarcerated or serving jail time. This is a severe outcome that can lead to a plethora of adverse circumstances throughout the lives of incarcerated individuals. There is an additional racial disparity considering the rates of diagnosis and incarceration rates of Black children. Of the rates of ADHD diagnosis, Black children are less likely to be diagnosed with ADHD, however, compared to the rest of the nation they are the most likely to be imprisoned, this interaction suggests that a large number of this population may be suffering the ill effects of this disorder without knowing it (Bussing, Schoenberg, & Perwien, 1998; Bussing et.al., 2010; Moody, 2016; Soltis et.al., 2017). According to Soltis et.al. many African Americans with ADHD serving time in prisons, received their diagnosis after they were already in prison (2017). This implies that there is a large number of Black incarcerated persons who were never treated for their ADHD before their first conviction. Thus, if the research on ADHD stigma is consistent regardless of racial background, Black children run twice the risks of being punished for their ADHD, both with the diagnosis in the form of stigma and without the diagnosis as according to Soltis et.al. (2017). These outcomes are significant as there is an increase in repeat offenses by those with ADHD that have been incarcerated (Soltis et.al., 2017, Young & Thome, 2011). Thus, children who are diagnosed with ADHD and then incarcerated have a more difficult time navigating through life due to their status as a juvenile delinquent coupled with their ADHD (De Sanctis et.al., 2012). Children who are diagnosed with ADHD run the risk of being caught in a loop of arrests and criminal activity due in part to their ADHD diagnosis, this effect fluctuates by

socioeconomic status, geography, and race (De Sanctis et.al., 2012; Soltis et.al., 2017; Young & Thome, 2011).

The dysregulation of emotion that is inherent in ADHD can disrupt social relationships and stunt emotional growth. This interaction also extends to romantic relationships (Ben-Naim et.al., 2017; Bodalski, Knouse, & Kovalev, 2019; Fogelman et.al., 2018). According to a study performed by Pollock and colleagues, there is a negative relationship between the presence of ADHD and romantic satisfaction (2017). In addition to ADHD, the researchers also tested for lower emotional intelligence being a factor in romantic dissatisfaction. Pollock operationally defines emotional intelligence as an individual's ability to be aware of and control their own emotions as well as monitor and respond empathetically in interpersonal relationships (Pollock et.al., 2017). According to the study, subjects with ADHD scored much lower on this scale than the comparison group, suggesting that in tandem with emotion dysregulation, there is also a disconnect with their ability to comprehend and perceive other people's emotions. Such an interaction implies that without intervention or training, the subjects are left dysregulated in their own emotionality and illiterate to the emotionality of others, this may correlate with their impaired personal relationships in the future. As children with ADHD transition into adults many feel significant levels of loneliness, and many who do find romantic partners often experience divorce (Takahashi et.al., 2017). This can be accounted for by higher rates of parental divorce in the lives of children with ADHD; divorce and subsequent familial conflict in the home have been linked to higher rates of divorce in the future (Gager, Yabiku, & Linver, 2016; Wymbs et.al., 2008).

Further, ADHD extends to the relationship of parenthood and the subject's children. One study found that fathers with ADHD exhibited less supportive behavior and were less

emotionally available in contrast with comparison fathers without ADHD (Joseph et.al., 2018). The study also uncovered that children of the ADHD fathers exhibited more ADHD behavior without being diagnosed. Although ADHD is thought to be a heritable disorder, this interaction suggests that, in this case, through nurture as well as nature, children can develop ADHD-like behaviors through modeling their parent (Joseph et.al., 2018). As noted throughout this paper, exhibiting ADHD-like behaviors can be enough to earn a diagnosis, due to the prototypical nature of the current clinical diagnostic methods (APA, 2015; Bruchmüller et.al. 2012; Baum & Olenchak, 2002). This concept proports a cyclical nature to ADHD diagnosis and a potential exponential increase in cases as more and more children are diagnosed.

Mitigation of Impacts

As is apparent, the impacts of ADHD are plentiful as are the researchers dedicated to studying how to prevent them. Researchers have studied these impacts and proposed solutions to help alleviate the consequences of ADHD on the children and soften the adverse effects of the disorder. However, a majority of the mitigation research is focused on institutional changes such as home and school. These changes will impact the other aspects of social relationships and the self but are not directly aimed at aiding those areas. First regarding family lives, researchers postulate that reducing family strain may need to begin with reducing the stigma around ADHD itself (Gordon & Hinshaw, 2017; Mikami et.al., 2015). Stress and stigma interact very negatively within the home and lead to high levels of intrafamily conflict. Researchers suggest that attempting to destigmatize the disorder among parents may be a key first step toward improving home relations.

Further, there is a significant relationship emotion regulation and many of the ill effects of ADHD, and in order to promote better emotion regulation strategies, research has suggested

that parental modeling of good emotion regulation behavior has an impact on child knowledge and expression of such behavior (Shyu, Tu, & Yeh, 2017). This conclusion is suggested by the study by Joseph and colleagues, which demonstrated a significant interaction between fatherhood ADHD and modeled child behavior (2018). Applying this interaction to the impacts of emotion dysregulation on childhood and the social relationships of people with ADHD could lead to immeasurable benefits. Finally, Meppelink and colleagues suggest that meditation and breathing exercises are as effective for reducing ADHD behavioral problems as medication, which may reduce family struggles regarding medication and overall strain in the household (2016). This claim is significant because it supports a very common argument of reducing the amount of stimulant medication administered to children. As previously mentioned, stimulant medication is related with cardiac issues, and the reduction of medication may alleviate some of the risk of heart problems.

The education system often does not cater to the individual needs of the students in its care, however children with ADHD are specifically targeted by the system. Researchers have posited that alterations to the classroom environment may be effective to help improve ADHD attention and behavior in school settings (Bulut, 2005; Curtis et.al., 2013; Rider, 2003). Hart et.al. suggest that increasing group size and interaction within the classroom rather than the usual reliance on individual work may be extremely beneficial for improving ADHD behavior (2016). This study functions on the logic that increased interaction and less sedentary educational setting are very beneficial for students with ADHD because they are allowed to exercise their impulsivity in group interaction. Other research has suggested the use of aerobic activity to expend excess energy to reduce hyperactivity (Hoza et.al., 2014). This intervention can

ameliorate the existing health issues common with ADHD youth by encouraging exercise, and it can additionally help with behavior in the classroom and improve educational outcomes.

Differently, Shuck et.al., tested the utility of an iPad app to monitor and child behavior and provide reinforcement through the use of points (2016). This method allows the child to monitor their behavior themselves and seek to do better individually. The app encourages learning about technology, and provides them a semblance out autonomy in environments that are often dictated for them. Researchers also propose specific training for teachers in order to follow the idea postulated by Bell et.al. (2011). In this form interventions would be applied to the teachers rather than the children in hopes to prevent their stigma from arising. As Bell and colleagues showed in their study, the more experienced and the higher credential teachers have, the less likely they are to be highly reactive to or engage stigma against children with ADHD (2011). Finally, one method that may improve the quality of the in-class experience is not making diagnosis known in the classroom setting (Hale, Fiorello, & Brown, 2005). This may prevent stigma from both classmates and teachers, while also alleviating the risk of bullying noted by Costill (2016).

Limitations

As with all research there are limitations. Many of the limitations accounted for in the literature revolve around the variability of the ADHD experience. ADHD exists on a spectrum of mild to severe, and includes three different types, all along that continuum the experiences differ significantly. Additionally, each case of ADHD is also at the mercy of a host of other factors including socioeconomic status, race, geographical location, type of education of parents, presence of ADHD in parents, status of teachers and many more (Bell et.al., 2011; Bussing, Schoenberg, Perwien, 1998; Pillay, Naidoo, Lockhat, 1999; Silverstein et.al., 2016). All of these

factors can be isolated to impact an individual child in different ways, but they are not present in every case. Of the interactions noted in this paper, specifically in the family and school section, most data collected is via parent and/or teacher report which is subject to bias and dishonesty. Additionally, regarding the impact of parents and parent-child interactions, there is a clear underrepresentation of fathers and fatherhood as much research on parenthood focuses on the mother's perspective. Thus, in many cases there are aspects of the home environment that research has not delved into, leaving us with an incomplete understanding.

Future Directions

After having learned from the wealth of literature on the subject of ADHD impact, the author will now propose directions for future research on aspects of ADHD, including: impacts and mitigations. First, of the directions that research can take, perhaps the most pressing is the impact of fatherhood on ADHD and the father's role within the family regarding ADHD. Increased understanding of father interaction may be very useful in understanding the nuances of the family strain. Studying fathers may better define the relationship between children with ADHD and single parents, or divorced parents with/without shared custody. By utilizing the myriad of information regarding motherhood, fatherhood data would aid in understanding how various home structures are impacted by the presence or lack of a father figure. Additionally, there is overwhelmingly amount literature that revolves around heterosexual parenting relationships and more normative nuclear family dynamics (Nuclear family refers to two heterosexual parents and one to three children). Future literature could benefit from an expanded scope that incorporates more diverse family structures. This will be very valuable in the future as what is considered a normative family structure is changing toward higher levels of diversity. A

focus on fatherhood and diverse family structures and how they interact with ADHD will be an important future direction in understanding the impacts of ADHD.

In the interests of mitigating further impacts, one important direction the research should take is the understanding of how emotion regulation training can lessen the social impact on social relationships. It has already been shown by Shyu and colleagues that parents modeling good emotion regulation behavior can improve the behavior exhibited by their ADHD children (2018). If there is formal training on how to properly regulate emotions for both parents and children, the negative effects inherent in emotional dysregulation may be counteracted. The research would need to understand if the emotional training would be able to combat the ill effects associated with poor emotion regulation. Research in this area may allow an insight into how to prevent strife in the home, social, and even school spheres by improving the emotional regulation skills and emotional intelligence of ADHD youth. Another direction may be considering utilizing therapeutic techniques may be to engage the parent in therapy as well as their child. Utilizing therapy for the child as well as the parent may alleviate some of the stressors of parenting an ADHD child and some of the marital or relational problems that arise between partners. Additional application of Cognitive Behavior Therapy to parents may prove beneficial as having tasks to perform when issues arise is often a more appealing alternative as it provides structure to a disorder that can be very sporadic. Additionally, in the cases of Shyu and colleagues (2018), Honkasilta et.al. (2015), and Hart et.al. (2016) the research was performed outside of the United States. This is notable as there are clear alterations to what, in America (where the majority of ADHD research takes place), may be considered normative dynamics. This demands further research into how generalizable the current international literature is to ADHD as a whole. ADHD is a global disorder, that being said the interactions between family

members, teachers, and peers certainly do not have universal meaning. These cultural variations make generalizing the literature difficult with no concrete way to ensure the dynamics are applicable to everywhere the disorder is present. Further research will allow for a more direct approach to the disorder while providing more resources for all backgrounds and international variations.

Further, additional research into classroom interactions with ADHD may also provide interesting information about mitigation of impacts in the educational setting. By featuring combined types of interventions, the interventions discussed earlier in the paper could be enhanced. By combining large classroom groups, aerobic exercise, and self-regulation via iPad the outcomes may be significantly more enhanced. If all of them work to mitigate ADHD misbehavior in schools individually, then in combination they may work much better than they might on their own. Another direction for research within the school system would be to include a specialized, enriching curriculum that is meant to engage children in interactive learning rather than the more traditional style of lecture and practice that is commonplace in the modern classroom. Implementation and studying of this type of curriculum on ADHD students may prove to engage them more in classroom learning and increase their academic achievement overall. If the learning is engaging and the children are active rather than sedentary, the disruptions that teachers send children out of the classroom for may decrease. Additional restructuring of teacher training methods to incorporate more inclusive and less reactionary intervention techniques that do not incorporate stigma or sending the child out of the room. This may reduce the tendency to blame or stigmatize ADHD children in their classrooms and rather redirect their energy into the learning, thus keeping the child engaged and importantly in the classroom.

Finally, an institutional alteration that may be beneficial to study is increasing the number of clinicians of color available to members of minority communities. Having a source that they community members can more easily relate to and trust can increase the numbers of children that get seen and receive treatment for their undiagnosed ADHD problems. This may reduce the number of children of color that are considered problematic and troublesome, and they can be seen and treated for this detrimental disorder. Additionally, providing more clinicians of color would be beneficial for families and individuals as well, if seeking available mental healthcare becomes more normative for children perhaps more people in those communities may seek the care they need. Researching this interaction may improve the accuracy of the demographics of the disorder and reduce the stereotypical reactions to ADHD. While ADHD is over-diagnosed there may be a large proportion of the population suffering with a disorder that they are unaware of.

Conclusion

ADHD enters children's lives and brings numerous adverse impacts with it. The literature shows a variety of impacts that occur in the home and school, and within social relationships and the self. Impairments of health both emotional and physical, diminished educational attainment and drive for academic achievement, and strains on family, friends, and teachers, all culminate to leave lasting impressions on the children ADHD impacts. These impacts can drive children to criminality, strained romantic futures, and higher risk of cardiovascular problems which all reduce quality of life. There is significant effort currently into the areas of mitigation of these impacts, but unfortunately the discipline does not have enough information. For the futures of the current children diagnosed and for the children who will be diagnosed tomorrow, it is our responsibility to understand and prepare to aid them in the struggle against ADHD.

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