The Causes and Effects of Attention Deficit Hyperactive Disorder

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Attention Deficit Hyperactive Disorder (ADHD) is one of the most common child and adolescent psychiatric disorders. This disorder is categorized into three subtypes, including inattentive type, hyperactive-impulsive type, and combined type, according to the predominant clinical manifestations of inattention, hyperactivity, and impulsivity (Wang et al., 2011). In children it is has been shown to have a significantly negative influence on global aspects of academic performance, family function, and interpersonal relationships (Wang et al., 2011). Many studies have been conducted to test and find evidence for the causes and effects of this disorder. Some of the themes among these studies include family genetic tendencies as a cause of ADHD symptoms, gender differences and similarities in the presentation of ADHD, environmental exposure to lead and tobacco as a cause of ADHD, and sleep problems as effects of ADHD.

Family genetic tendencies have been shown to be a strong predictor for the development of Attention Deficit Hyperactive Disorder in children. In order to acquire more consistent findings about the strong genetic heritability of ADHD, a current study decided to refine the ADHD phenotype dichotomous diagnosis and test its associations with continuous information from the underlying symptom dimensions (Bidwell et al., 2011). The researchers of this study used a well-characterized sample with rich phenotypic data to test VNTR polymorphisms in three candidate genes (DRD4; dopamine receptor gene associated with attention and inhibition, DAT1; dopamine transporter gene known to be the principal site of action for a common stimulant treatment for ADHD, and 5HTT; serotonin transporter gene associated with hyperactivity when disrupted) for association with novel phenotypes developed from continuous measures of ADHD symptom dimensions (Bidwell et al., 2011). They used FBAT-GEE analyses, which allow for multivariate continuous phenotypes, to test association with three continuous phenotypes, including total ADHD, inattentive, and hyperactive-impulsive symptoms (Bidwell et al., 2011). Results suggest an association between continuous ADHD symptoms ratings and two theoretically plausible candidate genes. Using FBAT-GEE analyses, two polymorphic regions of DRD4 and DAT1 were found to be significantly associated with a continuous phenotype by combining information from each of the 18 ADHD symptoms (Bidwell et al., 2011). The DRD4 exon 3 VNTR polymorphism was significantly associated with ADHD and this association was driven by both hyperactive-impulsive symptoms and inattentive symptoms (Bidwell et al., 2011). The association with ADHD and the VNTR polymorphism at the 30 untranslated region of the DAT1 gene was also significant and was primarily explained by the inattentive symptom dimension. A significant association was not found in the current study when examining the 44-bp deletion polymorphism region of the 5HTT gene (Bidwell et al., 2011). In conclusion, this data shows the strong influence of certain gene variants on the development of continuous Attention Deficit Hyperactive Disorder symptoms.

Many studies suggest gender differences and similarities in the prevalence and presentation of Attention Deficit Hyperactive Disorder. Attention Deficit Hyperactive Disorder has been traditionally described as a disease of hyperactive and impulsive young boys. This clinical stereotype ignores the fact that millions of young girls suffer from this disease and are frequently misdiagnosed, undertreated, and underrepresented in research studies (Sassi, 2010). Even though several studies have described a much larger prevalence of ADHD in boys than girls, Sassi (2010) notes that most recent analyses have been changing this perception and confirming that ADHD in girls is quite prevalent and disabling. Sassi (2010) speculates that underrepresentation of girls in prevalence studies could be due to the fact that boys typically have more overt behavioral symptoms (including more rule-breaking and externalizing behaviors) and are more likely to be referred to specialty clinics and treated for the disorder, where as girls tend to present with more inattentive than hyperactive symptoms, as well as less dramatic behavioral symptoms. Studies have shown that both genders have a similar age of onset, length of illness, psycho-educational impairments, and severity of psychiatric comorbidity (Sassi, 2010). Both genders have a similar long-term prognosis if not treated. They both tend to continue to express some symptoms of Attention Deficit Hyperactive Disorder as they become adults, with significantly lower educational levels, higher rates of unemployment or underemployment, and higher rates of divorce and social maladjustment (Sassi, 2010). Sassi (2010) addresses that although the negative impact on both genders is equivalent, there are clinically relevant differences between males and females with Attention Deficit Hyperactive Disorder in regards to comorbid diagnoses. Girls’ typically tend to show more internalizing disorders such as depression and anxiety, as well as covert aggression, while boys typically are more likely to have oppositional-defiant disorder, conduct disorder, disruptive behaviors, impulsivity and aggression as comorbid diagnoses (Sassi, 2010). Studies show that females with ADHD have a higher risk of developing a substance use disorder than males, while males are more at risk or more vulnerable to the potential psychosocial risk factors of ADHD such as maternal psychopathology and family conflict (Sassi, 2010). There is also a higher risk for eating disorders in girls with Attention Deficit Hyperactive Disorder (Sassi, 2010). Sassi (2010) argues that even though certain aspects of Attention Deficit Hyperactive Disorder are similar between genders, there are still significant gender differences between the presentation and comorbidity profiles. These differences have led to an underrepresentation of the severity, prevalence, and long-term effects of Attention Deficit Hyperactive Disorder in young girls.

Some studies have been done on the effects of environment exposure to lead and tobacco smoke on the development of Attention Deficit Hyperactive Disorder symptoms. A study conducted by Cho et al. (2010) assessed the association between blood lead and urinary cotinine levels and inattentive and hyperactive symptoms and neurocognitive performance in children. Cho et al. (2010) recruited 667 children (ages 8-11) from 9 schools in five Korean cities. Teachers and parents completed the Korean version of Attention Deficit Hyperactive Disorder rating scales (K-ARS), while the children performed neurocognitive tests. Blood lead and urinary cotinine levels were then measured. Results of the study concluded that the inattentive, hyperactive, and total scores of the teacher-rated K-ARS were positively associated with blood lead level, while the results of the continuous performance test (CPT), Stroop Color–Word Test, and Children’s Color Trails Test were inversely associated with urinary cotinine levels when controlled for a variety of characteristics including age, gender, father’s educational level, maternal IQ, child’s IQ, etc (Cho et al., 2010). The association between blood lead level and commission errors score on the CPT disappeared when the effect of urinary cotinine level was controlled (Cho et al., 2010). In conclusion, these findings indicate that environmental exposure to tobacco smoke is associated with poor neurocognitive performance, while low levels of led are associated with inattention and hyperactivity symptoms.

Studies have been conducted to try and produce some statistically significant evidence for a connection between sleeping disorders and Attention Deficit Hyperactive Disorder symptoms. A recent study conducted by Chiang et al. (2010) tried to find out if there was an association between Attention Deficit Hyperactive Disorder symptoms and subtypes, and sleep schedules, daytime inadvertent napping, and sleep problems/disorders in children and adolescents with and without Attention Deficit Hyperactive Disorder. The researchers sampled 325 patients, aged 10-17 years old (mostly male, some female) with Attention Deficit Hyperactive Disorder and 257 children and adolescents without the disorder. All of the participants fit into one of four groups; combined type (ADHD-C), predominantly inattentive type (ADHD-I), predominantly hyperactive-impulsive type (ADHD-HI), and non-ADHD type (Chiang et al., 2010). This study was conducted in Taiwan and they used the Chinese version of the Kiddie epidemiologic version of the Schedule for Affective Disorders and Schizophrenia (K-SADS-E) to conduct it. The K-SADS-E is a semi-structured interview scale for the systematic assessment of both past and current episodes of mental disorders in children and adolescents (Chiang et al., 2010). The results of the study were put into three categories. The first category was sleep schedules and ADHD subtypes. Its findings showed that the ADHD-C and ADHD-HI groups significantly went to bed earlier, got up later in the morning, and had longer nocturnal sleep duration than the ADHD-I and non-ADHD groups on schooldays (Chiang et al., 2010). The data didn’t show any significant differences in sleep schedules on weekends among the four groups. There were greater differences in bedtime between weekends and schooldays in the ADHD-C than in the ADHD-I and non-ADHD groups. The ADHD-C and ADHD-I groups, but not the ADHD-HI group, exhibited more daytime inadvertent napping than the non-ADHD group (Chiang et al., 2010). The second category was sleep problems/disorders and Attention Deficit Hyperactive Disorder subtypes. These findings showed that both the ADHD-C and ADHD-I groups were more likely than the non-ADHD group to have different types of insomnia and other sleep problems such as sleep terrors; and to have current and lifetime early insomnia (Chiang et al., 2010). Participants with ADHD-C, rather than those with ADHD-I, were more likely to have problems of circadian rhythm, sleep-talking, and nightmares; current and lifetime nightmare disorders; and lifetime primary circadian rhythm sleep disorder than participants without ADHD. Participants with ADHD-HI were more likely to have nightmares than those without ADHD. Participants with ADHD-I were more likely to have hypersomnia symptoms than those without ADHD (Chiang et al., 2010). No significant difference was found between ADHD-C and ADHD-I groups in these sleep problems. The only difference found between Attention Deficit Hyperactive Disorder groups was that the ADHD-HI group was less likely to have primary insomnia than the ADHD-C group and the ADHD-I group (Chiang et al., 2010). The third category was sleep schedules and problems related to Attention Deficit Hyperactive Disorder symptoms. The data in this category concluded that sleep schedules, inattention, and hyperactivity-impulsivity were all associated with earlier bedtime, later rise time, and longer nocturnal sleep hours on school days (Chiang et al., 2010). In conclusion all of these findings show a significant association between Attention Deficit Hyperactive Disorder and sleep problems. The most prevalent sleep problems for both inattention and hyperactivity-impulsivity were more daytime inadvertent napping, early insomnia, sleep terrors, sleep talking, bruxism, and snoring (Chiang et al., 2010). According to Tininenko, Fisher, Bruce, and Pears (2010) a variety of indicators of sleep disruption have been associated with inattentive/hyperactive problem behavior. For example, increased sleep latency, decreased sleep duration, and decreased sleep efficiency have each been linked with inattentive/hyperactive problem behavior (Tininenko, Fisher, Bruce, & Pears, 2010).

In conclusion, there are a multitude of studies on the causes and effects of attention deficit hyperactive disorder. These studies primarily show that certain gene variants and environment exposure to lead and tobacco smoke are associated with the development of this disorder. Most of these studies also display an underrepresentation of girls, even though the negative impact on boys and girls is equivalent. They also show some gender differences in the presentation of symptoms for the disorder and the other diagnoses that typically accompany it. The extent of the effects of this disorder on girls remains in question due to the lack of studies conducted on females with this disorder. Lastly, these studies suggest that sleep problems/disorders are more likely to occur in children with Attention Deficit Hyperactive Disorder than children without it. Now that studies have proven this time and time again they need to figure out why ADHD children have more sleeping issues. As these studies touch on, Attention Deficit Hyperactive Disorder is a widely debated topic with many causes and effects associated with it. Though many studies have been conducted to understand this disorder, it is still widely misunderstood due to its complexity and over diagnosis.

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