

Attention-deficit hyperactivity disorder, medication and substance abuse

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Härmed intygas att allt material i denna rapport, vilket inte är mitt eget, har blivit tydligt identifierat och att inget material är inkluderat som tidigare använts för erhållande av annan examen.

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Abstract

Attention-Deficit Hyperactivity Disorder, (ADHD), is an established childhood psychiatric disorder, and it is the present diagnosis for children with major difficulties in the core symptoms; impulsiveness, attention and hyperactivity. The disorder is known to persist into adulthood and create major problems in coping with everyday life. With ADHD follows a vast variety of other conditions, which burdens the ADHD individuals even more. The major cause for the disorder is in heritage but also other possible explanations will be discussed. The main treatment for ADHD is psycho stimulants, such as methylphenidate and amphetamine. ADHD is associated with substance abuse and several articles in this essay will provide support for that. Is substance abuse in ADHD individuals a form of self-medication in order to ameliorate the symptoms or is the increased risk for substance abuse due to the stimulant medications? In this essay, I will describe what ADHD is, present what are its known causes, summarize the treatments available for ADHD, and discuss the relationships between ADHD and substance abuse.

Key words: ADHD, treatment, substance abuse

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1. Introduction

Attention deficit hyperactivity disorder (ADHD) has been acknowledged for the recent half-century. Explanations related to ADHD have been surprisingly consistent over time, but the name of the disorder has changed a couple of times. Early descriptions of ADHD were based on the origin of the disorder. Between 1930-1940s, the children with ADHD were called “brain injured” or “brain damaged” (Martin et al., 2005). Later, in the 1940-1950, the connection between the disorder and a brain damage was brought into light, and the deficit was called “minimal brain dysfunction” (MBD) (Modigh, Berggren & Sehlin, 1998).

In the 1960s, the term hyperactive started to be used for characterizing the children with ADHD because it was thought that the diagnosis of the disorder was based on behavioural criteria, not medical proof. It was logical because it described the observable behaviour. During 1970s, attention and concentration were thought to be more essential symptoms of ADHD than hyperactivity. Therefore, between 1980-1990, the importance was changed again, by recognizing attention and hyperactivity features as unique contributions of the disorder. The name was changed to Attention deficit disorder (ADD) (Martin et al, 2005). In The Diagnostic Statistical Manual, (DSM) which provides criteria for diagnosing ADHD in the USA, the name was changed again to “attention deficit hyperactivity disorder” in 1987, and that is the name used today (Modigh et al.,1998).

My aim with this essay is to bring forward an understanding of ADHD, explaining what it is, how it is manifested in children as well as in adults and what co-morbidities might co-exist with the disorder. Causes for being affected with ADHD will also be explained, such as

genetic factors and ontogenetic factors. The real aim with my essay, besides giving a view into what ADHD is and how it is manifested, is to investigate if ADHD is a risk factor for drug abuse. Is there a correlation between ADHD and drug abuse? Due to the fact that the main treatment for ADHD is psycho-stimulant medication such as methylphenidate and amphetamine (Barkley et al., 2003), questions have been raised if not the psycho stimulants used as medication treatment begets substance abuse in individuals with ADHD (Barkley, Fischer, Smallish & Fletcher, 2003; Wilens, Faraone, Biederman & Gunawardene, 2003; Biederman, Wilens, Mick, Spencer & Faraone, 1999; Wilens, 2003). An alternative to drug abuse besides the medication treatment can be a sort of self medication (Wilens, 2006) in order to ameliorate the cruel symptoms experienced due to ADHD. These questions together with a broad view of what ADHD is will be the main focus in this essay.

2. What is ADHD?

ADHD is the most common neurobehavioral disorder in children, and it is the diagnosis used for problems in three main areas; attention, impulsiveness, and activity. There are differences between simple hyperactivity and the psychiatric diagnose class of ADHD. Hyperactivity is a trait that is normally spread in the general population. The behaviour of non-ADHD children is regulated by environmental requests and the behavioural control increases with age. In contrast, ADHD children tend to have difficulties adapting their behaviour in response to their environment (Howlin & Udwin, 2002). Children with ADHD

can't concentrate or pay attention, they can't remain focused on an event or task, especially if it's boring and they get easily distracted by insignificant sights or sounds (Peacock, 2002).

To be diagnosed with ADHD, some criteria must be fulfilled. The difficulties caused by the core symptoms (hyperactivity, impulsiveness and inattentiveness), should have been present before the child reaches the age of seven, the difficulties must have been persistent for at least six months, they must have been pervasive and evident in at least two different situations and finally, they must be beyond their general developmental level (Howlin et al., 2002).

Half of the children with ADHD continue to have the same problems and symptoms into adulthood, while for some, the symptoms decrease with age (Modigh et al., 1998). Of the three core symptoms, hyperactivity is the most likely to be reduced with time, whereas problems with impulsivity and inattentiveness continue to exist (Howlin et al., 2002).

ADHD is a genuine medical condition and can have serious consequences if left untreated (Peacock, 2002). Children and youths who have problems adapting socially are at high risk of becoming drug abusers. According to Modigh et al (1998), a third of all drug abusers and a fifth of all alcoholics have this background disorder. ADHD is also one of the child psychiatric diagnoses that have a high probability to lead to violence (Lind, 1997).

A condition closely related to ADHD, but not to be confused with is deficits in attention, motor control and perception (DAMP). What differentiates DAMP from ADHD is that DAMP, in addition to hyperactivity, impulsiveness and attention disorder, also includes dysfunctional motor control and perception. This implies that DAMP accompanies difficulties

in controlling body movements, resulting in clumsiness and difficulties in maintaining order on the body extensions. These children have also problems with mental interpretations and mental experiences. 5,1% of all children at the age of 7 have DAMP (Howlin et al., 2002).

2.1 Co-morbidities which accompanies ADHD

ADHD is recognized to co-exist with other disorders in 50-80% of all cases and the term used for them is co-morbidities (Howlin et al., 2002). Learning disabilities are present in 25-50% of all children with ADHD creating difficulties coping with all learning areas in school (Martin et al., 2005). Mood disorders such as anger, anxiety, depression, and bipolar disorders can also co-exist with ADHD. In some cases, obsessive compulsive disorders which means that one need to think or do something over and over again and muscle disorders such as tics can also be present (Peacock, 2002). The more usual and disruptive disorders are oppositional defiant disorder and conduct disorder.

Because ADHD usually occurs with other oppositional disorders it makes it even harder for ADHD children to function normally in everyday life. Approximately half of all children with ADHD also have behaviour disorders. Oppositional defiant disorder (ODD) is the most common behaviour disorder and starts often before the age of eight. The behaviours due to ODD are beyond what is normal for the child's age and leads to major difficulties in coping with school, home and friends. These children are often aggressive, defiant, quarrelsome,

revengeful and mean. They can lose their temper easily and get angry, constantly argue with people, annoy and disturb other people on purpose, and often blame others for their behaviour (Biederman et al., 1995).

Conduct disorder (CD) is less common but is highly disturbing because it is characterized by aggression and disobedience of laws and norms. It is a behavioural pattern which often leads to dangerous deeds (Biederman et al., 1995). Conduct disorder (CD) is found in approximately 60% of the children with ADHD and 20-30% have antisocial personality disorder (ASPD) at the age of 20. The risk of developing negatively, from CD to ASPD and then to criminality and drug abuse, is related to study-failures, parental psychological disorders and drug abuse, family relationships, and also if the symptoms of ADHD/DAMP remain in adolescence and adulthood (Lind, 1997). Disney, Elkins, McGue & Iacono (1999) found that conduct disorder in individuals with ADHD increases the risk for substance use and abuse, especially in adolescents.

These negative behaviours create social difficulties which can make the environment react negatively towards the child. The child can then take the negative reactions as a sort of proof of failure, and make the child to continue misbehaving. (Modigh et al., 1998) 15-25% of all individuals with ADHD also have emotional disturbances, such as mood disorders and anxiety. These and other difficulties develop low self-image in the patients (Howlin et al., 2002).

2.2 ADHD in children, adults and the developmental course

ADHD is divided into three types according to the symptoms experienced by the individual; predominantly inattentive type, predominantly hyperactive-impulsive type and combined type. The first type is dominated by attention deficits in tasks, instructions, details, organization, and this type of ADHD person is easily distracted. The second type is dominated by hyperactivity which raises problems in sitting still. The person might be, for example, constantly running around, feeling restless, be impulsive and constantly engage in fighting. The combined type is dominated by both of the previously mentioned types (Milberger, Biederman, Faraone, Chen & Jones 1996).

Children with ADHD are hyperactive, they have a hard time maintaining concentration, they cannot finish a game or something they have started, they are impulsive, cannot wait their turn, they are bad listeners, aggressive, and cannot take orders (Lind, 1997). They have problems listening, following directions or complete assignments, factors that make them perform poor in school. Some might drop out of school because they can't keep up. Their social skills are not as good as other children the same age and the family life is disrupted (Peacock, 2002).

Dupaul, Mcgoey, Eckert & Vanbrakle (2001) examined the behaviour of ADHD children and normal children in order to see if the ADHD children have more problems socially and behaviourally than other children. Their results illustrated that the children with ADHD displayed greater behavioural problems and were not as much socially skilled as the others. They behaved more consistently in an inappropriate manner; they revealed additional

negative social behaviour and scored inferiorly on pre-academic skills. Dupaul et al.'s (2001) conclusions were that young children with ADHD have a higher risk for social, behavioural and familial difficulties than others.

Until the late 1980s, ADHD was considered a childhood disorder, somewhat reduced in adolescence and completely absent in adulthood. Clinicians insured the parents that if they could get pass the hyperactivity in childhood, then the future would be unproblematic. Now there is obvious evidence that the core symptoms do not typically disappear when entering adolescence. Studies done by Russel, Barkley, Kevin & Murphy (2006) confirmed that 50-80% of the individuals tested continue to experience ADHD symptoms into adulthood

Difficulties and challenges are found in every step of the individual's age development. In preschool children, the symptoms of the disorder are mainly showed of in activities where focus is needed and also in cooping socially with other children. They are more disobedient with adults and are not as socially skilled as other children in their same age. Conflicts with peers continue to exist when they reach elementary school. They underachieve in school, they have problems with sleep, oppositional behaviour and they also tend to have a greater risk for exposure to accidents (Weiss, 2003).

Adolescents continue to have symptoms, mainly with stress difficulties and impairment in general activities. In school, the core symptoms of ADHD (inattentiveness, impulsiveness and hyperactivity) result in difficulties completing tasks and homework. Difficulties at home with their parents are also present and they tend to get into trouble more often than other adolescents (Weiss, 2003). They are not as socially skilled as others and they may engage

more frequently in bad activities, such as smoking, unprotected sex, irresponsible driving and use of marijuana.

When adults, the individuals with the disorder drop out of school more often, they have problems in relationships and they may have difficulties in maintaining jobs. Adults with ADHD experience, more often than others, depressions and anxiety and have an increased risk of participating in car accidents, abuse of drugs and they also tend to be less healthy than others. They have difficulties planning and organizing their finances, they tend to be socially isolated and have unstable relationships. Organizing activities in their homes are disrupted, such as cleaning, cooking or taking good care of their children (Weiss, 2003).

Having ADHD in childhood is a risk for developing co-morbid conditions in adulthood, such as anxiety, mood disorders, substance abuse and antisocial personality disorder. The degree of impairment is more difficult to establish in adults than in children (Russel, Barkley, Kevin & Murphy 2006).

3. The causes of ADHD

3.1 Genetic factors affecting brain functions

Between 1980s and 1990s, it was thought that bad parenting, head damages and too much sugar were causes for being affected with ADHD. Bad parenting is now known not to be a cause for ADHD, but might be a factor that can worsen the ADHD-children behaviour. Head

damages and too much sugar are also known not to be a cause for ADHD but the strongest cause for ADHD is in heritage (Peacock, 2002).

People with ADHD have a smaller brain volume than other people, approximately 4% less brain volume. A study by Castellanos et al (2002) was made to determine whether the brain volume of ADHD children is smaller than in normal children. They compared the brain volume of 152 ADHD individuals between the ages of 5-18 and 139 matched control subjects with magnetic resonance imaging over time, both when the ADHD participants were medicated and un-medicated. The results illustrated that individuals with ADHD had considerably lesser brain volumes in all regions of the brain. When compared to the control subjects and to the medicated ADHD subjects, the un-medicated children with ADHD demonstrated lesser overall cerebral volumes and smaller total white matter volumes.

3.2 Ontogenetic factors affecting brain functions

Other causes that can give rise to ADHD are unfavourable conditions during pregnancy, when giving birth or in early childhood. Usage of medication throughout pregnancy or lack of care previous to birth can affect the developing child, as well as alcohol usage and other potential drugs (Peacock, 2002).

Low weight birth might be another cause for ADHD. Mick, Biederman, Prince, Fischer & Faraone (2002), performed a study in order to see if there is an association between low

weight birth (LBW) and ADHD. They studied 252 boys and girls with ADHD and 231 non-ADHD control subjects. The participants with ADHD were three times more likely to have been born LBW than the controls. This association demonstrate that 13,8% of all ADHD cases could be ascribed to LBW.

It is also speculated that smoking during pregnancy might be a cause for ADHD. Milberger, Biederman, Faraone, Chen & Jones (1996) made a study on the role of maternal smoking during pregnancy to see whether or not it might be a risk factor for ADHD. Subjects between the ages of 6-17 with ADHD participated, as well as control subjects, and first-degree genetic relatives of these subjects. The results showed that the ADHD individuals had a 22% of maternal history of smoking during pregnancy when compared to 8% of the normal subjects. These findings suggest that maternal smoking during pregnancy is a risk factor for ADHD.

4. ADHD and drug-abuse

Several studies that I have read are pointing at the same thing, namely that there is high risk for drug-abuse (Wilens, 2006; Wilens, 1998; Biederman, Wilens, Mick, Faraone & Spencer, 1998) and also criminality when affected with ADHD. They have shown that there is a strong statistical correlation between hyperactivity in combination with aggressiveness and antisocial development under adolescence and adulthood, associated with criminality and drug abuse.

Personality traits of the parents can be transferred to the child, especially traits like

anxiety-tendency, impulsiveness and aggressiveness. Children with criminal tendencies often live in families who have a lot of conflicts and they themselves can be aggressive and violent. Bad parenting can be reflected on the child so that the ADHD-symptoms become more difficult (Lind, 1997). Criminality is not inherited, but the personality traits inherited from the parents can heighten the risks. About half of all individuals with antisocial personality disorders are affected with ADHD. Almost 25% of all individuals in the prisons in Sweden have ADHD. Studies have shown that 55% of all the worse convicts in our country have ADHD (Lind, 1997). Substance abuse might be developed as a response to the failures experienced by the ADHD individuals in emotional, social and academic life (Wilens, 1998).

In individuals with dependency on or abuse of, for example, cocaine and mixed drugs, and in adulthood or childhood, 14-35% have been shown to be affected with ADHD. Studies done by Modigh et al (1998) on adults who are alcoholics have shown that 34-36% of them have ADHD. Relatedly, 11% of persons affected with ADHD smoke cannabis and 11% take central stimulating drugs. (Modigh et al.,1998)

4.1 Self-medication

The self-medication hypothesis is persuasive because ADHD is chronic and often linked to discouragement and failure which are factors of explanation in substance use disorder (SUD) in adolescence. Adolescents with ADHD use substances more often than other adolescents in order to calm their moods and to facilitate their sleep (Wilens, 2006).

According to Sullcan & Rudnik-Levin (2001), the self-medication attempts can be a way of

trying to ameliorate some of the symptoms that exist due to ADHD, but the drug disorder might also be due to their impulsive behaviour and poor judgement.

According to Castaneda, Levy, Hardy & Trujillo (2000), ADHD is believed to be present in 17-40% of all individuals who are dependent on cocaine. Because ADHD individuals receive a paradoxical reaction from cocaine, (instead of feeling excitation they experience beneficial effects), it might be used as a form of self-medication. ADHD individuals experience relaxation, improved attention, improved ability to think and mood stabilization from cocaine. The explanation to this might be that both cocaine and methylphenidate has almost the same effects on the brain (Wilens, 1998).

An association between ADHD and cigarette smoking has been found and it is thought that ADHD is a considerable factor for children before the age of fifteen to begin smoking cigarettes. Exposure to nicotine can make the brain more vulnerable to later SUD and this may explain why almost half of all smokers who carries ADHD, go on to later SUD (Wilens, 2006). Sullivan & Rudnik-Levin (2001) studies also confirm that nicotine dependence is indeed more common in ADHD individuals than in those without the disorder.

4.2 The overlap between ADHD and substance abuse

Clinical and public health research has found the overlap between ADHD and substance use disorder (SUD) to be of great interest. Substance abuse appears usually in adolescence or in premature adulthood and is found in approximately 10-30% of U.S adults. One third to one half of all asolescence with SUD carries ADHD. SUD is considered a risk factor for ADHD,

namely because it appears after the disorder and not before (Wilens, 2006).

According to Wilens (1998), the presence of ADHD is a risk factor for abuse of alcohol and other drugs (AOD). AOD seems to emerge early in individuals with ADHD and it also progresses quicker. It is suggested that ADHD and AOD occur more often together than what would be anticipated by chance.

Biederman, Wilens, Mick, Faraone & Spencer (1998) tested to see the effects of the development from substance abuse to dependence and different kinds of substance abused. (unclear sentence) 239 adults with ADHD diagnosed in childhood participated, both females and males, as well as and 268 healthy adults. The results showed that ADHD was correlated to a two time greater risk for psychoactive use disorder (PSUD). The subjects with ADHD were more likely to develop a drug disorder, i.e. they were more likely to continue to take drugs and eventually develop a dependency. The conclusion of Biederman et al. (1998) is that when having ADHD, the risk of psychoactive substance use disorder is high. Suffering from an alcohol disorder heightens the risk of developing a drug disorder, end up in substance dependence, and then substance abuse. According to Biederman et al (1998), ADHD is indeed correlated with PSUD.

Additionally, Biederman et al., (1995), investigated whether psychiatric comorbidity is a risk factor for PSUD. They compared 120 adults that had a clinical diagnosis of ADHD in early childhood to non-ADHD adults. They found that there was a higher lifetime risk for PSUD in the ADHD-individuals than in the comparison subject without ADHD, with a percentage of 52% against 27%. The ADHD adults had a higher rate of drug use disorders than the comparison subjects. The increased risk for substance use disorders in the ADHD

adults was independent of psychiatric comorbidity. Biederman et al's (1995) conclusions were that not only did the psychiatric comorbidity increase the risk for PSUD in ADHD individuals, but ADHD itself proved to be a significant risk factor for substance use disorders.

Sullivan & Rudnik-Levin (2001) also investigated the association between ADHD and substance abuse and according to them, ADHD is an independent risk factor for substance abuse. Additionally, In Gothenburg, there have been studies done on people in order to show how their lives have turned out when having the disorder ADHD. In a comparison with a group of healthy children, 58% of the "sick children" with ADHD turned out bad in life while only 13% of the healthy ones had the same outcome. None of the children got any special treatment. In total there were 101 adult people that were followed up, 39 of them being girls. The children were diagnosed with ADHD at the age of seven, and of the 55 persons that fulfilled the criteria's as children, 19% had become criminals and had an antisocial personality disorder at the age of 22. 24% of the group with ADHD was alcohol addicted, while only 4% in the healthy group had the same problem. The education level was much lower and 58% had trouble reading and writing in the ADHD-group. Only 15% had the same difficulties within the healthy group. (Beckman, 2000).

4.3 Does stimulant medication beget later substance abuse?

The research done on central stimulating drugs on ADHD individuals and the risk for drug abuse later in life, have showed that the risks for substance abuse among children treated

with stimulants for ADHD are reasonably small. Barkley, Fischer, Smallish & Fletcher (2003) found no evidence that treatment with stimulants in children with ADHD increases the risk for substance use, dependence and drug abuse later in life. Contrary, Wilens, Faraone, Biederman & Gunawardene (2003) suggests that stimulant therapy in children is correlated with a reduced risk for consequent drug and alcohol use disorder. Biederman, Wilens, Mick, Spencer & Faraone (1999) determined the same, and found that un-medicated children had a higher risk for SUD in adolescence

Barkley, Fischer, Smallish & Fletcher (2003) examined whether stimulant treatment on children and high school children had an impact on the risk for substance abuse, dependence and abuse in young adulthood. 147 children with ADHD were followed up 13 years into adulthood and were interviewed about the duration of their stimulant treatment and their use of other substances. The results showed that the stimulant treatment in children was not an increased risk in trying or using drugs in adolescence and young adulthood. Their findings showed no evidence for stimulant treatment in children with ADHD to lead to substance experimentation, dependence, use or abuse in adulthood.

The results from Barkley et al (2003) that treatment with stimulant does not increase the risk for later substance abuse are also supported by Wilens (2003). In his article it is stated that pharmacotherapy of stimulants used in individuals with ADHD rather lowers the risk for later substance abuse. Medication has a protective effect on the development of later substance abuse. In sum, psychoactive treatment do not increase the risk for later substance abuse, it rather decreases it. Derived from this, it is believed that individuals with ADHD that does not receive medication for their disorder are at two-fold risk for development of

substance abuse during their life time (Wilens, 2003).

5. Treatment

In the 1930s, the first report of effectiveness of stimulant medication was found. It was given by Dr. Bradley to hyperactive children to improve their functions. The stimulant medication used was Dextro-amphetamine (Dexedrine). The stimulants calmed down the hyperactive children instead of making them more active (as the effects in non-hyperactive children would have been). Therefore, the effects of the stimulant medication were believed to be paradoxical. Dextro-amphetamine was used for a couple of years before Methylphenidate was discovered as an option for the treatment of ADHD (Martin et al., 2005).

5.1 Central stimulating medicines

Central nervous system (CNS) stimulant medication is the most commonly used drug treatment on individuals with ADHD. Amphetamine was first clinically used in 1937 by Charles Bradley, a psychiatrist who used it on brain injured children with severe headaches in order to minimize the pain. The children showed improvement in their behaviour, academic performance, self-management and attention. He published his findings in 1950 and when the first-double-blind placebo-controlled clinical test of dextroamphetamine and methylphenidate was made in 1960s, his findings were confirmed. Since then, 200 controlled tests of stimulants have been completed, and the efficacy of stimulants has been demonstrated.

Improvement has been found in the core symptoms of ADHD, increasing behavioural, academic and social functioning in 50-95% of children. In sum, stimulants are the most effective treatment for the specific disorder: they reduce the main symptoms and also aggressive behaviour, and are proven to increase vigilance and ability to do well on educational tasks (Barkley et al., 2003). There is scientific evidence that central stimulating medicines compared to placebo gives secure statistic evidence for reduced symptoms in children with ADHD. Stimulants are the only treatment form to date to have produced extensive improvement in the core symptoms of ADHD. Approximately 1,5 million children, that is, 2,8% of the school-age population are prescribed stimulants. Methylphenidate (Ritalin, Concerta, Methylin, Metadate) and amphetamine (Adderall, Dextrostat, Dexedrine) are the first line medication among children and adolescents (Russel, Barkley, Kevin & Murphy 2006). Methylphenidate is approved for treatment of ADHD in children 6 years old or older. Its effects are shown within 30 minutes and remains between 3-4 hours. It is problematic because many doses are required during a day. An alternative which also is a form of Methylphenidate, is Concerta which lasts for 12 hours and therefore is effective for an entire day (Marint et al., 2005). Methylphenidate is the main used stimulant, accounting for 77-87 % of all stimulant prescriptions since 1991 (Russel et al, 2006).

The children who has positive responses to the medicine have reduced problems in concentration, attention, hyperactivity and impulsiveness (Modigh et al., 1998). The children's overall functionality gets better, the school gets easier to pass and their social connections to other people improve.

The side effects of the medication are mild. Insomnia, reduced hunger, head and stomach aches, amplified irritability, tics and weight loss are some of the main side effects. Treatment with central stimulants at an early stage can give rise to neurobiological consequences. In order to shed light on how amphetamine can influence fetal development, a study has been done on mothers who have abused amphetamine under pregnancy. This study demonstrates that at the age of 14, a big part of the children have cognitive dysfunctional disorders (Zetterström, 2002).

In a study on dyslectic children with ADHD, a new form of treatment has been found. Fish oil and evening primrose oil was given to the children during 12 week period, and the ADHD-symptoms disappeared when compared to control subjects who received olive oil. These results are interesting because a lot of the symptoms correlated to ADHD are due to that the brains maturing process is somewhat delayed. (Zetterström, 2002)

5.1.1 Controversial opinions

There are controversial opinions when it comes to treating children with amphetamine because it is classified as narcotics. Using narcotics is illegal and giving it to children even in a very small dose, has raised controversial debates all over. The scientist's critic is that we are giving drugs to children, that the society's tries to make the children more co-operative (Lind, 1997).

In USA there have been public concerns that children might be over-medicated and that giving stimulants to children at such an early stage might increase the risk of substance abuse

later in life. The public concern is due to that the stimulants are almost chemically comparable to cocaine and that there is a high risk for exploitation and addiction. Another concern is that the stimulants can give rise to amplified sensitization to later drug exposure (Barkley et al., 2003).

The most important criticism concerning medication is that children's brains are not yet fully developed and that it is not yet known what the amphetamine actually does to the undeveloped brain. Others think that as long the children feels better and can function more normally, then medication should be used (Zetterström, 2002).

5.2 Treatment in adults with ADHD and substance abuse

According to Levin, Evans & Kleber (1999), 10-30% of all substance abusers are adults with ADHD. Because stimulant medication is the most effective treatment in children with ADHD, it is also the most studied treatment in adults. The medication for adult substance abusers with ADHD is of two types: non-stimulant medication and stimulant medication. Prescribing stimulants to treat substance abusers with ADHD is not directly safe because it can give rise to abuse of the stimulants. Even though non-stimulant medication such as desipramine and bupropion has been tested on substance abusers, none of them have so far proved to be of use. Methylphenidate has been the most reported treatment for substance abusers with ADHD. An alternative to methylphenidate is pemoline, because the risk for potential abuse is not as great. Pemoline may decrease drug abuse and improve ADHD symptoms. Even so, the non-stimulant medication should be considered first-line approaches

for adults with substance abuse and ADHD because the risk of abusing the medication is small.

6. Discussion

ADHD is a psychiatric diagnosis which affects rather a small part of the population, but is complex and is usually accompanied with a vast variety of other disorders. Managing and coping with normal everyday life is a struggle and results often in failures in relationships and academic performance. The normal life for us is a chaos in an ADHD individual's brain. Not only is it difficult to live with as a child, but it also persists into adulthood. People may not understand the underlying reasons for behaviours of ADHD individuals and may take distance from them, making them feel like they do not fit in.

Stimulant medication used for treatment of ADHD, do not cure the disorder, it only decreases the symptoms so that the individuals overall functionality improves. The main stimulant used is methylphenidate which has good effects and improvements in individuals with ADHD. The abuse prevalence is low and the bi-effects are rather minor. Parents and people all over may be concerned over the fact that the children receives amphetamine, but the doses given are small and it helps the children to cope better with its environment. A lot of question has been raised concerning the stimulant medication, if it begets later substance abuse. The answer I have found during my research is that stimulant medication do not beget later substance abuse, rather it is a protection against it. Children treated with stimulants have a decreased risk of abusing substances compared to those unmediated. Overall, my research has lead me to the conclusion that ADHD individuals do indeed have a greater risk for abusing substances. May it be a form of self-medication or a way to escape the cruel symptoms, there is still lack of knowledge in all respects.

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