

**ATTENTION DEFICIT HYPERACTIVITY DISORDER (“ADHD”)
AND SUBSTANCE ABUSE IN ADOLESCENTS**

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Increased recognition of attention deficit hyperactivity disorder (“ADHD”) in children, adolescents, and young adults has focused interest in its co-occurrence with addictive disorders. Data suggests that an increased risk for substance abuse occurs in older adolescents and young adults with ADHD. Moreover, an over-representation of ADHD has been reported in youth with addictions. This presentation discussed these co-occurring disorders and the relationship of ADHD and substance abuse.

First, it is important to define what is meant by substance abuse. Substance abuse occurs when there is a pattern of use that develops along with impairment and/or consequences. With more severe use dependence occurs. Dependence is the physiological addiction to a compound, usually with severe impairment. Examples include a child continuing to use the substance even while missing school, drinking before school, failing school, truancy, and driving while intoxicated. The phrase psychoactive substance use disorders (“SUD”) refers to drug use or dependence or alcohol abuse or dependence.

The mean age of onset of ADHD is three. Substance abuse in adolescents with a mean age of fifteen indicates a likely chronic condition of ADHD for an average of twelve years. Adolescents with ADHD are often seen with self-esteem problems. Poor self-esteem can be a result of having chronic ADHD. Just the self-esteem problems that go along with ADHD can lead to substance abuse. Adolescents with ADHD commonly have poor self-esteem, a poor self-image or both. Poor self-esteem is characterized by an adolescent who thinks, “I don’t feel good about things; I don’t feel good about the world; I’m not sure where I fit into the world.” Adolescents with a poor self-image do not feel themselves to be good physically. They have a poor picture of themselves. Having a child draw a picture of who he or she is provides remarkable information. The child looks normal, but draws a picture of an enormous person, or shows somebody with sharp teeth, with no brain, or somebody with zits. With ADHD, where

perceptual problems in thinking processing may be awry, a child's self-image is very different from what others think of the child.

Poor self-esteem is often found with poor academics. Poor academic achievement is one of the major risk factors for people abusing substances as they get older. Authors of the *National Co-Morbidity Study*, found that one of the biggest predictors of adolescents having serious problems with drugs and alcohol is academic under-achievement and ADHD is highly linked to that.

Poor ego development is found in those with poor self-esteem. Their personalities do not develop well. With substance abuse, poor ego development becomes an even greater problem. Substance abuse exacerbates self-esteem issues. In fact, active substance abuse not only worsens self-esteem but can worsen many child psychiatric disorders as well. It can also make the child look sicker than they actually are. So it is critical to have people stop their substance abuse in order to reassess what other issues must be addressed.

Peer groups are important in addressing both general substance abuse issues and also ADHD issues. Adolescents with ADHD tend to move toward peer groups that are not the groups desired by parents. Often the only peer groups that accept kids with ADHD into them are the alternative peer groups. Typically, these are teens who do not have good social relationships with one another, and they are often found in peer groups that are not a good fit. They are accepted into those groups because they are often followers, and they can become victimized. Often they may be found with peer groups that are involved with drugs and alcohol. Delinquent peer groups are highly influential on drug or alcohol abuse or dependence.

Another issue that is very important when working with these teens is to realize the importance of their friends. Often their friends are using drugs. Teens must be asked, "How many of your friends are using drugs?" Peer pressure has a large influence. Drug availability is another indicator. Working with adolescents in certain areas that are drug infested is particularly difficult. The word "drug infested" is appropriate because it indicates the level of infection and contagion in a community. It is a big problem. Reducing the flow of drugs into this country is a

good and reasonable policy. If the availability of drugs is reduced, drug use is reduced. If it is difficult to find the drug, prices go up, and that cuts down use of the drug.

Disregard for values is prominent in drug users. A teen with ADHD in a peer group, which has a disregard for values, must be extracted from that peer group. The treatment counselor must talk to the teen about that, because the teen will not listen to his or her parents. The counselor has much greater impact than the parents on this issue. Change in these psychosocial issues is a critical aspect in treatment of substance abuse. Peer groups are influential in the development of substance abuse, and if they are removed, there is improvement in substance abuse, independent of ADHD or any other issue.

In adolescents with substance abuse, there is a significantly high degree of ADHD. Psychiatric disorders such as oppositionality are more common in those with ADHD. Often psychiatric disorders are found along with substance abuse. Fifty percent of adolescents with ADHD are oppositional and about 10% of kids with ADHD have a conduct disorder. Conduct disorder refers to delinquency. Mood disorders as well as bipolar disorders are also found with ADHD. It is important to assess for those disorders because they may be driving some of the substance use.

Most of those with bipolar disorder have ADHD, but, in addition, many have substance abuse. If a person has ADHD and a psychiatric disorder, ADHD always starts first. We know that because ADHD starts at a mean age of three. Other co-occurring disorders with ADHD include depression, bipolar disorders, and anxiety disorders. Major depressive disorder (“MDD”), or depression, occurs in 20% to 30% of children with ADHD. Seventy-five percent of the time, depression in children starts before substance abuse. So, for a depressed child with ADHD who is getting involved in substance abuse, it is not likely that the marijuana is causing all the depression. It is more likely that the child may really have ADHD and depression and is also smoking marijuana. The same is true for bipolar disorders. Often, psychiatric disorders that co-occur with ADHD start before the substance abuse. Aggressive treatment of the disorder will reduce the risk of eventually having a substance problem.

At least half of children with ADHD have an additional disorder. In children who are ADHD and have an additional disorder, the percentage of kids with ADHD who are going to develop a substance problem begins to increase at age ten, and there is a major rise by thirteen. At age sixteen, it is far too late for parents to discuss substance abuse. Substance abuse is a pediatric disorder that starts at an early age.

About 80% of children with bipolar disorders also have ADHD. There is a great overlap, and these are some of the most difficult patients. In adults, alcohol and substance abuse are associated with bipolar disorder. Those adults who have the earliest onset of bipolar problems also have the highest rates of substance abuse.

CIGARETTE SMOKING, ADHD AND OTHER DISORDERS

Cigarette smoking is a gateway drug. If a person starts smoking at an early age, there is a very good likelihood that he or she will become a drug abuser and alcoholic. There is a physical reason to account for this. Free-basing nicotine changes the brain's receptors. It may even change the development of the brain, and probably even changes some of the genes turning on and off. Exposure to nicotine in an animal brain will make the animal more or less likely to go for other compounds. Nicotine stimulates the same parts of the brain that are associated with substance abuse. Cigarettes are a gateway to further abuse because bathing the brain with nicotine probably causes neuro-developmental changes that predispose a person to substance abuse.

By seventeen years of age, about 12% to 13% of adolescents are smoking. But in a group of seventeen-year-olds with bipolar disorder, 55% of the group is smoking. Onset of bipolar disorder in adolescence is a major risk for smoking. Most adolescents who developed bipolarity as a child or teen went on to smoke. These teens are out of control, they feel miserable, and nicotine clearly settles them down, helps them focus, and helps them get control of their thoughts.

With ADHD and smoking, smoking is both the signal and may actually be attenuating the brain's response as well. Smoking may change the nerve chemistry to a predisposition toward

later substance abuse. This is being studied now in longitudinal samples. Those with ADHD have a much greater likelihood of having a smoking problem than those in the general population. In addition, the likelihood of quitting smoking is reduced in those with ADHD.

It appears that aggressive treatment of children with bipolar disorders that includes a combination of counseling plus medications, may result in the reduction of the ultimate risk for cigarette smoking. This result was found in a sample of children with bipolar disorder with either an adolescent onset or a child onset.

SUBSTANCE ABUSE, ADHD AND OTHER DISORDERS

Most of those with bipolar disorder have ADHD, but, in addition, many have substance abuse. Children who have adolescent onset bipolar disorder are at the biggest risk for additional substance abuse problems. Those with childhood onset (younger than age twelve) show less likelihood for such problems. This result appears to be independent of treatment. However, since most of the child-onset subjects had been treated, the study will be replicated in the future with a family design.

If there is increased substance use during manic episodes, the substance may actually cool off the mania somewhat. In a study of bipolar substance abusers, some received lithium and some received a placebo. The patients and the treatment person did not know which was which. The placebo group did not improve and had a high degree of problems with substance abuse. The lithium treated group did get a lot better and had a major reduction in substance abuse.

The result is that it is important to assess youth with severe or binge substance abuse problems for bipolar disorder and to assess all adolescents with bipolar disorder for substance abuse.

Substance abuse problems are found in 15% of the general population and in 15% of children with ADHD. However, both our smaller study and the *National Co-Morbidity Study* showed that more than half (55%) of adults with ADHD have a significant drug or alcohol problem sometime in their life, compared to only 27% of the general population. These

percentages, which are equal in fifteen-year-olds, greatly increase by adulthood. One reason is that 95% of these adults with ADHD never received treatment for their ADHD. It was not identified in their childhood.

Fifty-five percent of adults with ADHD and 27% of the general population with substance abuse problems like alcohol. The adults with ADHD are much more likely to prefer drugs, and also much more likely to abuse both drugs and alcohol. There appears to be some degree of self-medication in these results that show that adults with ADHD prefer the whole class of drugs and alcohol. But when drug abusers were asked what was their drug of choice, there were no differences between the ADHD group and the control group -- with marijuana, cocaine, stimulants, hallucinogens, or opiates.

There is no real evidence for the idea that adults with ADHD, as they get older through adolescence and young adulthood, tend to abuse stimulants. However, there is interesting evidence for differences between those with ADHD and the general population in how they describe the effects of using marijuana. Both groups say they started because they wanted to get high. But when asked why they continued, adolescents with ADHD overwhelmingly said it altered their mood. This shows some evidence for self-medication. A number of people say that they smoke marijuana and they get paranoid. When asked why they continue to do it if they get paranoid, they will say they continue because it helps them settle down. It is the only thing that breaks that internal restlessness. Hyperactivity in kids with ADHD changes to an internal restless feeling in adults. It is treatable.

PHARMACOLOGICAL TREATMENT OF ADHD

ADHD is a disorder that is improved by pharmacological therapy. Treatment of adolescents who have a substance problem and ADHD requires both addiction therapy and medications. When using medications for this disorder, it is important to think about the abuse potential. It is suggested to start with anti-depressants and then anti-hypertensives, and then use caution when going to a stimulant medication. It is important to have frequent follow-up. Intensive monitoring is important. Questionnaires can be very helpful. Adolescents are very honest when they fill out a questionnaire. In addition, there is excellent urine toxicology now,

including urine tests that parents can buy. One is “On-Track” from Roche Laboratories. Hair tests and saliva tests may be ordered. Hepatitis and HIV tests may be taken from saliva. Parents will be able to get good information to counteract the denial that is part of addiction. The client may not abuse the stimulant medication, but they are likely to be hanging out with others who will be very happy to abuse those substances. There is pressure on these kids, who are often ostracized from their own social support networks, to go toward their “friends” who will take them under their wings.

When treating substance abuse, the goal is to see the substance use decrease. Abstinence may be somewhat unlikely, but we certainly want to see (1) the substance use reduced over time, (2) people shifting from their inappropriate peer groups, and (3) families engaged in treatment, rather than kicking the user out. It is important to be very clear with the teen about the difference between prescribed medication and abused drugs. You are telling them, “Don’t do illicit substances, but it’s okay if I put you on this controlled substance called amphetamine.” They must understand the difference.

Determining when to start medication with a teen with ADHD depends on how well the therapist knows the teen. The addiction can be done by connecting them to an addiction counselor or start engaging in some of the psychosocial issues by using family therapy treatment. Then they may restart their medicine. If this is a new client who is being seen for the first time, he or she must first get their addiction under good control and then be treated for the ADHD.

There are studies showing that if a person with bipolar disorder and substance abuse is treated for the bipolar problem through the substance abuse, it helps the addiction and it helps the bipolar issues. However, if there is an active abuse problem and an active ADHD, treating the ADHD does not help the addiction as much as it helps with bipolar disorder. Apparently ADHD is not a big enough engine to drive serious substance abuse. But it is a problem and it is a common co-occurring issue.

PHARMACOLOGICAL TREATMENT

In prescribing anti-depressants, we recommend starting with Wellbutrin or tricyclics.

Wellbutrin is an anti-craving medicine, it helps reduce cigarette smoking and it is easy to monitor. There is no concern about blood levels. It is a very safe anti-craving medication and nobody is going to hand it out as candy on the schoolyard.

With a stimulant medication, there is a certain level of abuse liability. Ritalin, which is methylphenidate, is in the lower spectrum of abuse. If a stimulant seems appropriate for a client who has ADHD and is an active substance abuser, the substance abuse should be cleaned up if possible. When the stimulant is introduced, consider the longest acting formula compound, highly supervised by parents, either Ritalin or one of the amphetamines. Pemoline is a reasonable choice, but there are some liver problems with its use.

In one study of adults with ADHD and cocaine abuse, use of methylphenidate led to some reduced cocaine craving and use and it did help the ADHD. However, the same result was not found under double blind controlled conditions. The medication did not make things worse. Even though those are compelling results, they are not strong enough in terms of treatment of the addiction. The addiction must be treated first and the ADHD treated next.

There is a big concern about the possibility of treating children with stimulant medications in early childhood possibly predisposing them to become substance abusers. Does giving children stimulants sensitize their brain the same way as nicotine, and will that create substance abusers? Does pharmacological therapy or treatment of ADHD actually reduce substance abuse? These are current unanswered questions.

A LONGITUDINAL STUDY

In a longitudinal study of treatment of youth with ADHD, children between the ages of ten and eleven were studied, and then followed four years later in mid-adolescence around fifteen and a half years of age. Some of the group had no medication, and some were on medications. A third group was the control group. Urine samples were not taken. Structured interviews and self-reported information were used. There were no differences between the two groups (stimulant treated versus not stimulant treated) in terms of baseline delinquency, family

history of substance abuse and other risk factors for substance abuse independent of the medication status. The two groups were very similar.

Thirty-five percent of the children who were not receiving any treatment for their ADHD had a substance problem. There was a much lower risk for substance abuse in the stimulant-treated group. The children who were not treated were the ones who were developing abuse and dependence, not the children who were treated.

The same trend was shown with alcohol abuse and dependence, as well as with marijuana abuse. The unmedicated children showed the most abuse and dependence, while the medicated group showed lower rates of use similar to the control group. Medication seems to protect against substance abuse.

Recently, an article stated that stimulant treatment led to cocaine abuse in young adulthood. However, in this longitudinal study, there was more cocaine use in the unmedicated group than in the medicated or the control group. In addition, stimulant abuse was greater in the unmedicated group than in the medicated group. Also, hallucinogen abuse was highest in the unmedicated group than in the medicated and control groups. It is possible that other things may have accounted for the differences in substance abuse rates in the untreated versus the treated groups. And there may be different results in the future as these fifteen and a half year olds age. Studies are continuing at this time.

One issue with this sample is that it is predominately boys. Funding is continuing in order to study these boys from nineteen to twenty-two years of age. Though studying the smaller sample of girls was not funded, we are continuing to do so. Another issue is the problem of substance abuse in the sample. Even though adolescents are fairly forthcoming about substance use issues, it is important to have objective measures, especially for research study. This study uses self-reporting, as well as urine and hair sampling.

Unmedicated youth with ADHD in mid-adolescence we found to be at highest relative risk for substance abuse, while the medicated youth at mid adolescence were at lower risk for

substance abuse. Medication status was found to be protective. A 65% reduction in risk for substance abuse was found to be associated with treatment.

In summary, ADHD is a risk factor for substance abuse but not as strong a factor as it is for other issues found with ADHD, such as conduct and bipolar disorder. For those who are newly diagnosed with this combination, first treat the addiction and then sequence in with pharmacological therapy to treat the ADHD. When using pharmacological therapy, first use the anti-depressants and then use the stimulants.

And, importantly, we can say with relatively good confidence that stimulant treatment of younger children with ADHD either does not affect later substance abuse or it is protective against later substance abuse. Prevailing data are strongly in favor of treating ADHD to reduce later substance abuse. Though there are no data to show that a medicated child with ADHD has reduced potential for relapse to the addiction, experience indicates that relapse prevention is related to other issues, such as mood disorder or anxiety disorder, rather than to the ADHD.

The pharmacological sequencing of antidepressants and stimulants and stimulants is also applicable for kids under the age of twelve. There is good evidence of pharmacological response across the life span, with the same medicines that work in very young children working in adults with ADHD

CIGARETTE SMOKING AND TEENS

Though cigarette smoking clearly is bad for adolescents, it is not appropriate to start battling that issue when a client is first seen. Once a client is in the program, it is important to start talking about it. Cigarette smoking is not hopeless; something can be done about it. Cigarette cessation programs for adolescents are effective. Behavioral relaxation techniques help, as does therapy and education around cigarette smoking. For pharmacological treatment, nicotine patches are recommended. Teens prefer nicotine gum rather than nicotine patches. Children can overdose with nicotine toxicity from inhaled nicotine. Wellbutrin is strongly recommended.

One survey of adolescent in-patients showed that one-third of them want to stop smoking but they can't, two-thirds like cigarettes and do not want to stop and one-third can be treated successfully.

About the Presenter

Timothy E. Wilens, MD, completed undergraduate and medical school at the University of Michigan, and his psychiatric training at Massachusetts General Hospital. He is board certified in child, adolescent, adult, and addiction psychiatry. He is currently Director of Substance Abuse Services in the Pediatric and Adult Psychopharmacology Clinics at Massachusetts General Hospital, and is Associate Professor of Psychiatry in the Harvard Medical School. Dr. Wilens has extensive clinical and research experience in both pediatric and adult psychopharmacology and the Addictions having published over 250 articles, chapters, and abstracts. He has also recently written a popular book, *Straight Talk About Psychiatric Medications for Kids* (Guilford Press, 1999/2001). Dr. Wilens has federal funding from the National Institutes of Health as well as pharmaceutical support and is currently involved in pediatric and adult-related research projects including the characterization and treatment of attention deficit hyperactivity disorder ("ADHD") across the lifespan; overlap of ADHD, bipolar disorder and the addictions, the pharmacologic treatment of juvenile psychiatric disorders and studies of the children of substance abusing parents.

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