
Prevention of Misuse of Stimulant Medications for Adhd

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Abstract:

This article reviews information about the irrational use of stimulants among high school and college students and its prevention by regulating the use of stimulant drugs by involving school health officials and physicians on recognizing the signs and symptoms of stimulant misuse, education on the risks and benefits of stimulant use, and opportunities for prevention of misuse. The goal of this activity is to enhance physician counselling of patients with attention-deficit hyperactivity disorder (ADHD) and decrease the rate of stimulant misuse and diversion.

Key words: Stimulant medication, ADHD, misuse

Introduction

People with ADHD persistently have difficulty concentrating and paying attention towards one or more daily activities and are impulsive than other people the same age. This pattern is usually evident when a child goes to preschool or in first grades of elementary school; the average age of onset of ADHD

symptoms is 7 years. Many people's ADHD symptoms improve during adolescence or as they grow older, but the disorder can persist into adulthood.

Mechanism of action of Prescription Stimulants?

They increase dopamine levels in the brain, a neurotransmitter associated with pleasure, movement, and attention. The therapeutic effect of stimulants is achieved by slow and steady increases of dopamine, which are similar to the way dopamine is naturally produced in the brain. The doses prescribed by physicians start low and increase gradually until a therapeutic effect is reached. Prescription stimulants have a calming and “focusing” effect on individuals with ADHD. Treatment of ADHD is done with stimulants and psychotherapy, that helps to improve ADHD symptoms and also improves patient’s self-esteem, thinking ability, social and family interactions.

Does Prescription Stimulants really help ?

With time many children start abusing prescription stimulants to boost their performance at academics in school as it is strongly believed that stimulants enhance memory and concentration abilities and promote wakefulness, but unlikely they do not enhance learning or thinking ability when taken by people who do not actually have ADHD and in fact decrease their academic performance.

Prescription stimulants are gradually abused by children by either taking increased dose or irrelevantly and as they suppress appetite, increase wakefulness,

and increase focus and attention, they are also abused for purposes of weight loss or performance enhancement. Because they also cause euphoria, these drugs are also frequently abused for recreational purpose

Affect of stimulants on the Brain?

When taken in doses and via routes other than those prescribed, prescription stimulants can increase brain dopamine levels rapidly, thereby disrupting normal communication between brain cells and producing euphoria and thus increasing the risk of addiction.

What Are the Other Health Effects of Prescription Stimulants?

Stimulants can increase blood pressure, heart rate, and body temperature and decrease sleep and appetite. When they are abused, they can lead to malnutrition and its consequences. Repeated abuse of stimulants can lead to feelings of hostility and paranoia. At high doses, they can lead to serious cardiovascular complications, including stroke.

Addiction to stimulants is also a real consideration for anyone taking them without medical supervision. Amphetamine products have been used as medication since the early 1880s, and the abuse

potential for these products has been observed and studied for nearly 100 years. Amphetamine misuse is considered to be principally related to the drug's euphoria-inducing effects. Chronic amphetamine abuse has been shown to result in malnutrition, paranoid schizophrenia-like mental illness, sleep deprivation, cerebrovascular accidents, and death. Specific amphetamine disorders (eg, amphetamine dependence and amphetamine abuse) and amphetamine-induced disorders (eg, amphetamine intoxication, amphetamine withdrawal, amphetamine intoxication delirium) are described in the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) classification. Furthermore, if stimulants are abused chronically, they produce withdrawal symptoms like fatigue, depression, and disturbed sleep patterns when stopped taking them.

Children diagnosed with attention-deficit/hyperactivity disorder (ADHD) are increasingly likely to continue receiving treatment—usually in the form of prescription stimulants—into their later teenage and young adult years. In addition, many people are also diagnosed with the condition during their high school and college years, which has led to a growing controversy over the extent of prescription stimulant use for ADHD. Approximately

4% to 10% of high school and college students suffer from attention-deficit/hyperactivity disorder (ADHD). Stimulants are classified as Schedule II drugs (ie, providing positive medicinal effects but also considerable abuse potential). The Controlled Substance Act mandates that Schedule II drugs may only be used if the drug is provided by a prescription written and signed by a licensed practitioner, and also dictates that a refill is only permitted if the patient returns to the practitioner for further assessment. Recent observations and academic research suggest that inappropriate use of stimulants in adolescents and young adults, both with and without clinically diagnosed ADHD, is a growing concern.

Stimulant misuse of these medications is often predicated on students' misconceptions or a simple lack of knowledge on the associated risks. Indeed, many consider stimulants—whether obtained by prescription or illicitly—a convenient option to improve performance or to induce euphoria. There are 4 main types of stimulants used for the treatment of ADHD—the most commonly used options are amphetamines (mixed amphetamine salts immediate- and extended-release) and methylphenidate (osmotically-controlled release oral delivery system, diffucaps methylphenidate, spheroidal oral drug absorption system methylphenidate long-acting). Dextroamphetamine is another of the 4 main types of stimulants.

USE AND MISUSE OF STIMULANTS

: According to a 2002 survey of a single

US college, 35.5% of undergraduates reported using stimulants without a prescription, with greater frequency occurring in males compared with females. Obtaining Stimulants Through Illicit Means Amphetamine and methylphenidate products are acquired in a number of ways, such as from classmates, friends, clinicians, or through the Internet. School health officials should be aware that students misusing stimulant medications may employ various means to gain access to these medications, such as stealing pills from a teacher's desk (when a teacher is chosen to dispense medication to students), making arrangements with or exerting pressure on a classmate who has a legitimately prescribed medication, or presenting symptoms of ADHD at the college health center in an attempt to be prescribed a stimulant.

Studies have shown that students with and without ADHD misuse these medications to achieve euphoria. Pressures such as a persistent desire to succeed academically, erratic and poor sleep habits due to large workloads, and the persistence of underlying social and financial demands may place students at an increased risk for misuse of various drugs, including stimulants. Students often assume these drugs are safe to use for improving their energy levels, increasing their capacity for concentration, enhancing school performance, or for recreational use, while lowering their desire for sleep.

Stimulants are especially popular at the end of a school term when students will often use the drugs to stay awake through

the night to study for exams or complete academic projects.

Any type of student may misuse stimulants, but there may be an increased risk among students with low grade-point averages or those at very competitive schools.

Athletes may see stimulants as a way to help maintain physical fitness for their competitive sport or to improve their concentration.

Men appear to be more likely than women to misuse these drugs, but both sexes show similar motives for drug misuse.

Relationship of Stimulant Use to Substance Misuse:

Stimulants are used to

- Achieve a euphoric state
- Increase mental alertness
- Increase energy level
- Ease of obtaining these medications from peers or clinicians
- Reduce the pressures of academic life
- Seen as a part of a plan to improve poor grades
- Unsolicited "gift" from other students (eg, for sex or friendship)
- Belief that it is a safe practice
- Selling these medications to make money
- Consistent with a lifestyle of polypharmacy (illicit and nonillicit).

One study observed that adolescents with ADHD who went untreated had a 3 to 4 times greater rate of

illicit substance abuse patterns than those adolescents whose ADHD was treated with stimulants. A 13-year follow-up study of 147 individuals with ADHD confirmed data from 11 previous studies observing that illicit drug use in adulthood is not associated with childhood stimulant treatment of ADHD. A subsequent study examining adults who were prescribed stimulants as children also noted no increase in substance use or abuse patterns at a mean follow-up age of 26 years. Some research suggests a protective effect in which those who use prescription stimulants to manage their ADHD are less prone to using alcohol, cigarettes, marijuana, hallucinogens, or other drugs. Thus, it may be concluded that while stimulant abuse warrants caution in prescribing to avoid inappropriate use of these medications, withholding stimulants from legitimate ADHD patients may confer an increased risk of future drug abuse.

Misuse of prescription stimulant medication among college students: It is a prevalent and growing problem.

Significant risk factors for misuse of stimulant medication include being male, being a member of a college sorority or fraternity, struggling academically, having elevated symptoms of ADHD and/or depression, being a high sensation-seeker, and using/misusing alcohol, cigarettes, and/or other illicit drugs. Health care providers, particularly those that see adolescent or college-aged individuals, need to be informed about stimulant medication indications, risks, benefits, and side effects and aware and attuned to problems associated with stimulant medication diversion and misuse.

Suggestions for preventing misuse and diversion of prescription stimulant medications, including strategies for the individual and potential policy changes on college campuses, are offered.

Although stimulants have shown safety and efficacy in managing the symptoms of ADHD when taken in accordance with a clinician's guidance, there exists a significant potential for misuse. School officials, health centres, and students all play an important role in the prevention of stimulant misuse. As a result, education on the proper use of

stimulants and on the signs and symptoms of misuse and the health risks associated with misuse is an imperative.

Stimulant Misuse Prevention: School-Based Modifications and Education Drug misuse on high school and college campuses in the United States has been a challenging issue for decades. While officials should be encouraged to improve their knowledge and resources for managing students who misuse these medications, treatment of overt stimulant addiction is difficult and prevention remains the most effective approach. The medical literature provides abundant data to support the potentially positive effects of prescription stimulants for the majority of children, adolescents, and adults with ADHD. With the aim of preventing drug misuse, it is advisable that all students be educated on the medical, psychological, and legal consequences of illicit drug use and abuse. The misconceptions of many students regarding the safety and benefits of stimulants can be effectively countered with education about the potential adverse effects of these drugs, including drug dependence, abuse, tolerance, withdrawal, and overdose. Since there are no long-term studies (ie, longer than 24 months) on the use of stimulants for the management of ADHD, precise long-term effects—either adverse or positive—remain unknown. Nevertheless, it is clearly understood that addiction may result from abusing stimulants to achieve euphoria, especially if combined with alcohol.

Prevention Strategies for the Individual

The research findings summarized in this review suggest several specific strategies for preventing and reducing the misuse of stimulant medication among college students, a high-risk population. First, college students with a prescription for stimulant medication play a critical role. Not only do these students have a high rate of misuse themselves, but they are also the most common source from which other students obtain stimulant medication to misuse. It is therefore important for physicians who provide college students with prescriptions for stimulant medications to discuss the possible consequences of misusing or diverting medication, including potential negative health outcomes, legal consequences, and on-campus repercussions, for students caught diverting stimulant medications. These practitioners should also monitor their patients for signs of diversion, such as finishing a prescription early, doctor shopping, or urine drug screen which is negative for the prescribed substance. Utilizing a prescription monitoring program to access information on the

prescribing and filling of controlled substances can be a valuable tool in detecting multiple concomitant prescriptions for stimulant medications, number of providers writing stimulant medication, and information on the use of other prescribed controlled medications. Providers should also discuss safe storage of stimulant medications with patients, particularly if the student is currently living in a dorm setting or another community-type setting with the potential for lots of individuals in and around their personal belongings. Additionally, providers may wish to consider dispensing a small amount at each office visit until the patient has established responsible use of the medication, particularly if there are other findings or comorbidities that perhaps increase their risk of misuse. Pill counts and frequent office visits, as noted earlier, may also help prevent diversion. Perceived risk/harm associated with the use of stimulant medications has been negatively related to misuse. If college students were more aware of the risks associated with stimulant medication

misuse, with regards to both health and legal consequences, fewer students may choose to misuse stimulants. Educating patients and their families about the abuse potential of stimulants, as well as consequences of misuse such as psychosis and agitation, when prescriptions are given for stimulant medication, may help address the misperception that stimulant medications are benign, safe and without adverse consequences.

Steps for Improving Management of Stimulant Misuse on the School Campus

- Recognize the existence of this problem; survey one's campus environment
- Cooperation of university officials, health clinicians, college pharmacies, and local law enforcement officials
- Limit availability and access to prescription stimulants
- Educate high school and college students regarding the dangers of stimulant abuse
- Recognize signs of stimulant misuse and abuse and provide management options.

The Role of the Campus Health Centre Clinician: The health centre can serve as the hub of a drug abuse prevention effort to recognize, prevent, and manage prescription stimulant misuse and abuse among students. College health centre clinicians who prescribe stimulants should be knowledgeable about ADHD and its

treatments, should be able to recognize stimulant misuse as a serious problem, and should not be guided by preconceptions that stimulant misuse, abuse, and diversion are inevitable. Both clinicians and pharmacists need to be appropriately licensed to work with these drugs and observe DEA and local state laws for dispensing Schedule II drugs. High school health officials can help prevent diversion and misuse by forbidding students to be in possession of ADHD medication on school property, and to require a parent, guardian, or other appropriate adult to be responsible for the delivery and removal of medications from the school health centre. Medications should be administered to the student through the school nurse, with the name, prescribed dosage, and dosing schedule clearly labeled on the container. The DEA recommends that school nurses keep a detailed log to monitor the treatment history and schedule of each student. In addition, healthcare providers wishing to access additional resources on stimulant abuse may benefit from visiting the National Institute on Drug Abuse website at www.nida.gov/NIDAHome.html Stimulant Prescribing Protocols. It is important that clinicians follow strict and appropriate protocols when prescribing stimulant medications to students. College health centres may develop their own policies for stimulant prescriptions, including limiting the amount prescribed and requiring appropriate medical documents for an ADHD diagnosis, although state laws regarding the number of dosage units per prescription should be observed. National prescribing standards dictate that a

thorough neuropsychiatric evaluation be administered to any person requesting stimulants for attention-deficit problems. It is advisable that school policies require students requesting refills of their stimulant prescriptions to supply evidence from the prescribing clinician that a neuropsychiatric evaluation has been performed supporting a diagnosis of ADHD. The student should also supply documentation from the prescribing physician confirming that appropriate monitoring, via recognized rating scales—such as the Conners' Adult ADHD Rating Scales (CAARS)—has verified the effectiveness of the prescribed stimulant. If supportive documents are not available, the student should be carefully evaluated and screened by the school health centre. It is important that students with prescription stimulants understand that they are the main source of diversion to other students, and should receive education in the prevention of stimulant diversion. Additionally, students should be advised to not exceed the manufacturer's dose limits for prescription stimulants. Students with past or active drug abuse patterns should not be prescribed stimulants, as they are more likely to divert their prescription stimulants. It is also important that athletes be warned that methylphenidate is banned by the National Collegiate Athletic Association (unless "medically warranted"), the US Olympic Committee, and the International Olympic Committee. Health centers should aim to balance the provision of services for students possessing an ADHD diagnosis with the ability to recognize students who are misusing stimulants. Students illicitly

using stimulants may present with a variety of signs and symptoms . Clinicians should be aware that individuals who insist that only a large dose is effective may be diverting the drug for money or personal abuse. Unexplained clinical features that do not fit with previous health records should prompt suspicion for drug misuse activity as well. Demanding times within the academic year, such as during finals, may lead to increased demand for stimulants. More students than usual may visit health services presenting unexplained anxiety, irritability, excited speech, tachycardia, hypertension, and confusion. Students with various unexplained negative behaviours, such as extreme irritability, depression, or violence, may be involved with illicit substance abuse, and prescribing stimulants should be avoided as these students are at increased risk for the development of stimulant misuse, abuse, and dependence.

College Policy Changes for Prevention of Misuse

Policy changes on college campuses could also help to reduce diversion of stimulant medications. For instance, education about the risks associated with stimulant medication misuse could be incorporated into other alcohol and drug prevention programs that are already in place at

colleges and universities. Many colleges/universities require all first-year students to complete an online substance use education/prevention/assessment tool. Some of these, such as Alcohol Edu and The Alcohol CHECKUP TO GO have demonstrated some success in reducing college student alcohol use in follow-up evaluations . Information about misuse of stimulant medication could be included in these existing programs. Moreover, members of certain organizations (eg, fraternities or sororities) that are known for an increased risk of substance use/abuse among members are also sometimes required by their national chapters or host colleges/universities to complete a “risk management” class, which addresses behaviors such as binge drinking and drunk driving. Since one of the demographic factors most strongly related to stimulant medication misuse is Greek organization membership , presenting information about stimulant medication misuse to these groups during these classes could help reduce misuse on college campuses.

Finally, the most commonly reported motives for misuse of stimulant medications among college students are academic in nature (eg, to study more, to concentrate better) , and many students who misuse for these reasons feel the desired effect is achieved. Colleges and universities may need to improve the identification of students who are in need of academic assistance/supports and offer these interventions earlier in students' college careers to prevent stimulant medication misuse as a "quick fix." Such interventions may include teaching students skills such as note-taking and academic goal setting and educating students about the link between sleep deprivation and poor concentration .

Motives For Misuse and Perceived Risk

Researchers have also evaluated college students' motives for misusing stimulant medication and the risks they associate with misuse. All of the studies that asked misusing students about their motives for misuse reported that the most commonly

endorsed motives were related to academics. "To concentrate better while studying" , "to improve study skills" , "to stay awake to study longer" , and "to improve concentration" were some of the most commonly endorsed motives in these studies. Nonacademic reasons, such as to get high, to prolong effects of alcohol and other drugs, and to lose weight, were less commonly endorsed. In studies where participants were able to indicate multiple motives for misuse , very few students misused for only nonacademic reasons.

Academic Outcomes Associated with Misuse

Interestingly, despite academic motives being most common for college students who report misusing stimulant medication, a number of studies have found a negative association between academic outcomes and misuse of stimulant medication. Misuse is also significantly related to other detrimental academic behaviors such as skipping class and less studying.

Psychological Correlates of Misuse

Researchers have evaluated the relation between several different psychological variables and misuse of stimulant medication. The strongest association is between symptoms of ADHD and stimulant medication misuse. Studies are consistent in reporting a significant correlation between greater symptoms of ADHD and higher rates of misuse or a significant difference in rates of misuse between those who have an ADHD diagnosis and those who do not. One study found that 71.1% of stimulant medication misusers screened positive for adult ADHD symptoms [17]. Another study found that for every standard deviation increase in attention problems, the odds of becoming a stimulant misuser increased by 1%. Although the literature base is smaller than for ADHD, several studies have suggested a significant difference in symptoms of depression between stimulant medication misusers and nonusers.

Treatment

There are currently no FDA-approved medications to treat stimulant medication

misuse. In fact, studies exploring pharmacotherapy for stimulant medication misuse are limited.. Generally speaking, efficacious behavioral treatments, such as contingency management (CM), cognitive behavioral therapy (CBT), skills training, motivational interviewing (MI), relapse prevention, couples and family treatments, and drug counseling, exist for drug abuse . CBT, cognitive therapy, CM, MI, and community reinforcement approach (CRA) have been explored for stimulant dependence and are currently the primary interventions for amphetamine-type stimulant dependence . Similar to pharmacotherapy studies, most psychotherapy studies to date have examined primarily cocaine and methamphetamine dependence and not misuse of stimulant medications. In fact, no studies examining psychotherapy for stimulant medication misuse were found by our group in a search using the PubMed database. Therefore, discussion of psychotherapeutic interventions that may be efficacious for stimulant medication misuse extrapolates outcomes from studies

of stimulant dependence, appreciating this is an approximation and imprecise as there are significant differences between stimulant medication misusers and those dependent upon stimulants such as methamphetamine or cocaine. Offering a psychosocial intervention may require referral to more specialized treatment services than can be offered in a general primary care clinic. Additionally, harm reduction techniques for stimulant medication misusers to reduce the medical and social consequences can be considered as well as prevention strategies and methods, which can be utilized in any treatment setting or in high-risk populations, such as college students.

Key Points:

1. Health care providers, particularly those that see adolescent or college-aged individuals, need to be informed about stimulant medication indications, risks, benefits, and side effects and aware and attuned to problems associated with

stimulant medication diversion and misuse.

2. Diagnosing ADHD can be invaluable for individuals with the disorder, thus the ability to perform a thorough and accurate assessment is important; equally important is the ability to assess when ADHD is not present.

3. Education and prevention strategies to prevent misuse and diversion should be provided if stimulant medications are indicated. College programs and policies can also utilize prevention strategies, provide education to students, and assist those with academic difficulties.

Comorbidities are common and should be explored thoroughly as they may play a role in continued stimulant medication misuse and outcomes. Various treatment techniques and modalities can be explored further with each patient, based on the individual and their particular needs.

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