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Addiction Generation: Stimulant Abuse in College Students

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Abstract

Illicit use of prescription stimulants has come to the attention of clinicians, school administration, and the judicial system in recent years. Illicit stimulant use is defined as the use of prescription stimulants without a legitimate prescription or using stimulants inconsistent with the prescribed treatment plan, including diversion and inappropriate administration methods. These prescriptions have been known to cause serious side effects when taken incorrectly, yet their popularity as “study buddies” among college students has risen. The most current research has found that the percentage of undergraduate students abusing stimulants ranges from 8-43%, with an average of 17% of students abusing stimulants yearly. This literature review takes a comprehensive approach to the issue of stimulant abuse, attempting to give a glimpse into the seriousness of this issue. It examines the history and chemical make-up of stimulants, as well as the prevalence, motives, risk factors, and consequences of stimulant abuse in undergraduate college students. Finally, this paper proposes a three-pronged approach to decreasing stimulant abuse, led by colleges, medical professionals, and parents.

Addiction Generation: Stimulant Abuse in College Students

In 2017 the United States Department of Health and Human Services declared the opioid epidemic a public health emergency. An epidemic that claimed more than 500,000 lives ravished the nation.

The opioid epidemic racked American small towns and created pandemonium in metropolitan areas across the country. This crisis took lives, tore apart families, and ultimately ignored the physicians responsible for the carnage. The first wave of opioid overdoses began in 1999, a time when opioids were prescribed at increased rates. Two more waves have occurred since. Involving higher-powered opiates. In 2010, there was another spike in overdose deaths involving heroin. The most recent spike, in 2013, was attributed to manufactured fentanyl (CDC, 2021). The term opioid epidemic is now a household name. In the years following these spikes, we have moved from our initial shock and horror to a state of complacency tempered by occasional bouts of outrage and reform. However, even with the severity of this issue, it took 18 years for opioid overdoses to be declared a public health emergency. The opioid epidemic is well-known and well-documented, but another epidemic waits for its moment to take center stage. This time, we hope to catch it before it becomes a public health emergency.

A wave of new prescriptions has swept over America. Drugs such as Adderall, Ritalin, Concerta, and Focalin are being prescribed at alarming rates. From 2003 to 2011 the number of children aged 4-17 with an ADHD diagnosis and stimulant prescriptions skyrocketed from 4.4 to 6.4 million (CDC, 2021). These drugs, commonly referred to as stimulants, are prescribed by physicians, readily available, and advertised as harmless. However, unlike the opioid epidemic,

which focused mainly on 25–44-year old's (CDC, 2021), this wave of stimulant use targets 18–29-year old's (Board et al., 2020).

Literature Review

History of Stimulants

Though Attention Deficient Hyperactivity Disorder (ADHD) prescriptions dominate the use of stimulants today, they did not start as a cure for overactive children. The intended use for the compound known initially as beta-phenyl isopropylamine was as a decongestant. Chemist Gordon Alles discovered the compound now known as amphetamine while attempting to make a drug that could rival ephedrine at relieving asthma symptoms. (Rasmussen, 2008). Although he had no evidence the drug would effectively cure congestion, he patented amphetamine sulfate and amphetamine hydrochloride in 1932 as oral salts (Rasmussen, 2008). Unfortunately, Alles's vision of making the respiratory history books was short-lived. Amphetamines did nothing to help asthmatics, but during the human trials of his newly minted drug, he discovered a strange set of side effects. Those given amphetamines were unusually alert, their blood pressure climbed, and their minds seemed to race. Though he did not know it yet, Alles had just discovered what would eventually be the compound's most significant selling point. (Rasmussen, 2008).

Alles saw potential in amphetamines but did not have the resources to test its scope. His solution was to approach a Philadelphia pharmaceutical company, SKF, about a partnership (Hicks, 2021). SKF was already producing a variation of Alles's amphetamine compound as an over-the-counter inhaler and was eager to explore new ways the drug could be used (Rasmussen, 2008). Alles transferred ownership of the patent to SKF, and a lucrative partnership was born. To

truly reach their full potential as a viable option for doctors to prescribe, approval from the American Medical Association's (AMA) was needed. In 1937 amphetamines under the brand name Benzedrine Sulfate were given the AMA seal of approval, as no noticeable, severe, negative results had been found during human trials. SKF began to advertise the drug (Rasmussen, 2008).

The original plan to use amphetamines to cure asthma symptoms failed, but amphetamines were then produced and marketed as a cure-all for narcolepsy and Parkinsons' (Rasmussen, 2008). However, the market for these two conditions was small. Alles and SKF capitalized on the "feelings of well-being" (Hicks, 2021) subjects often described when taking amphetamines. The drug was next promoted as a cure for mild depression and marketed to overworked homemakers. The effects of this shift had long term effects that are still being felt today.

During World War II, the American military began supplying Benzedrine sulfate tablets to servicemen for "routine use in aviation, as a general medical supply, and in emergency kits" (Rasmussen, 2008, pg. 975). There were regulations on the use of Benzedrine, of course, but these were viewed more as suggestions. In 1945, a survey of fighter pilots revealed that 13 out of 85 pilots used these drugs whenever they felt the urge, not according to medical direction (Rasmussen, 2008, pg. 975). This hinted at the potential abuse of Benzedrine to come. Soon, consumption of Benzedrine skyrocketed as new uses were found for the pill, including weight loss, psychiatric disorders, and as energy enhancers. By the end of 1945, conservative estimates place the production of Benzedrine pills at 30 million tablets a month. This was enough to supply

half a million Americans with a daily dose of two tablets. (Rasmussen, 2008, pg. 975). It is no surprise that given its availability and attractiveness, abuse quickly developed.

Consumption of amphetamines saw another drastic increase after 1949, following Alle's and SKF's patent expiration. Amphetamines in various forms were now being prescribed as the psychiatric drug of choice. However, this would be challenged by the debut of monoamine oxidase inhibitors and tricyclic antidepressants in the 1950s. These drugs were ranked as superior by psychiatrists who now understood amphetamines' addictive properties and hallucinogenic side effects. The end of WWII saw a generation of young people addicted to the drug and experiencing extreme side effects (Rasmussen, 2008).

Nevertheless, prescription rates of amphetamines did not drastically decline as expected. After a brief foray into the world of antipsychotics, many physicians returned to amphetamines. A primary care physician explained in 1970, "only amphetamine kept certain patients "capable of performing or even enjoying their duties— that is, of managing their problems of living" (Rasmussen, 2008, pg. 978). Vast prescriptions of amphetamines could not continue without consequences, and these were made visible in 1970. Law enforcement authorities reported that 80-90% of amphetamines seized on the street were prescriptions manufactured by U.S. pharmaceutical companies (Rasmussen, 2008, pg. 980). These drugs, now commonly referred to as speed, because of their energizing effect, could be bought and sold with ease. No longer was a prescription necessary, amphetamines had hit the streets.

It was during this time of rampant abuse, years after their creation, that public officials began to do something about the crisis. The Bureau of Narcotics and Dangerous Drugs, (predecessor to today's Drug Enforcement Administration,) and the FDA moved amphetamines

to a Schedule II drug (Rasmussen, 2008). This move from a Schedule III to a Schedule II placed limitations on the prescription of amphetamines and thoroughly regulated their use. Schedule II drugs require a new prescription for each fill, and doctors and pharmacists must keep careful records of dispensation. The FDA enacted limits on the production of amphetamines to minimize the supply hitting the market and narrowed its usage to approved disorders. Medical justification was now required for a prescription. Narcolepsy and ADHD were the only two disorders that remained approved for treatment with amphetamines (Rasmussen, 2008).

Pharmaceutical companies scrambled to retain their market. They revamped their approach and focused on what would become their most lucrative market yet. ADHD was a rising star in the world of mental illness. A diagnosis of ADHD was subjective, the doctor could fill out a quick questionnaire in the presence of the child and their parent, and 30 minutes later, they could leave with a prescription that would “fix” everything. In 2005, usage levels in children surpassed those of the previous epidemic at its height in 1970 (Rasmussen, 2008, pg. 981). American physicians found it difficult to resist prescribing stimulants for their youngest patients and their grateful parents, leading to the most recent surge in amphetamine use. This was compounded by the newly revised DSM-V manual, which made ADHD the most common neurodevelopmental disorder in children. The resulting surge in ADHD diagnoses was unprecedented and showed no signs of slowing. In his article, *Problems of Overdiagnosis and Overprescribing in ADHD*, Dr. Daniel Conners attempts to explain this surge. He explains that before the 1970s, a diagnosis was rare for children and almost unheard of for adolescents and adults (Conners, 2011). Then, between 1980 and 2007, there was an increase in ADHD diagnoses, almost eight times as many prescriptions were written and filled compared with the rates of 40 years before. (Conners, 2011).

Several complex factors in the early 1990s helped increase the popularity of stimulants. First, was the growing concern from child welfare advocates and mental health professionals over the stigma associated with a mental health diagnosis. Decreasing stigma was vital in increasing federal funding for special education programs. In 1990, the Individuals with Disabilities Education Act formally recognized ADHD as a disability, and schools were then required to make accommodations for students with this diagnosis (Conners, 2011). In addition, Congress expanded eligibility for Medicaid, especially for children to include coverage of psychopharmaceuticals, including stimulants (Conners, 2011).

A rapid increase in scientific knowledge about the long-term effects of ADHD was also happening at this time. ADHD's morbidity, neurobiology, and heritability gave grounds for researchers to suggest medical interventions. (Conners, 2011). Then in 1997, Congress passed the FDA Modernization Act, which encouraged the pharmaceutical industry to develop and test drugs intended for pediatric patients by extending their patent exclusivity. The burgeoning field of psychiatric healthcare was beginning to carve out its place in the medical realm and agreed that many complex psychiatric disorders seen in pediatric patients could and should be treated with medications (Conners, 2011). However, this increase in stimulant use was not a standalone issue.

Overview of Stimulant Use

The illegal use of prescription stimulants is an issue that has plagued America since the drug's conception in 1929 (Rasmussen, 2008). Originally used to fight congested noses, stimulants soon became a substance of abuse when American pilots realized their usefulness in keeping them alert on long missions. Once introduced to the American military, their misuse

spread. Soon, tired housewives and bored office workers used amphetamines to make their days more bearable (Rasmussen, 2008). This widespread misuse was just the beginning of a long road of abuse for stimulants. Now stimulant misuse centers on students, specifically college students, looking to get an edge in today's competitive academic world.

Stimulants have become the second most used illicit substance in the United States, following closely behind cannabis (Arria et al., 2013; Gomes et al., 2011; Weyandt et al., 2013). Rates of illicit use of stimulants by students are reportedly as high as 43% on some college campuses (Benson et al., 2015). Inappropriate use of prescription stimulants can have serious negative consequences, ranging from minor side effects like sleeping difficulties (Hartung et al., 2013; McCabe et al., 2014; Mulvihill, 2013; Weyandt et al., 2013) and headaches (McCabe et al., 2014; Mulvihill, 2013), to severe consequences such as depression (Benson et al., 2015; Chen et al., 2016; Lueck et al., 2019; McCabe et al., 2014), seizures (Haak, 2017; Mulvihill, 2013), adverse cardiac outcomes (Chen et al., 2016; Haak, 2017; Mulvihill, 2013; Varga, 2012), psychiatric comorbidities (Chen et al., 2016; Mulvihill, 2013; Varga, 2012) and even death (Chen et al., 2016; Haak, 2017; Mulvihill, 2013; Varga, 2012).

Stimulant abuse or misuse can be defined in many ways. However, for this paper, nonprescription stimulant abuse will be defined as the use of prescription stimulants without a legitimate prescription or using stimulants inconsistent with the prescribed treatment plan, including diversion and inappropriate administration methods. This literature review attempts to give a glimpse into the seriousness of this issue and suggest some interventions that may prove helpful in decreasing prescription stimulant abuse.

Prescriptions of antidepressants and antipsychotics also rapidly increased during this time.

Chemical Make-Up of Stimulants

Stimulants have a high potential for abuse because of their chemical makeup. Amphetamines and methamphetamines are chemical cousins, separated only by a methyl group. (Kish, 2008; Haile, 2012). These compounds act in the brain by elevating the levels of several neurotransmitters, namely, dopamine, serotonin, and norepinephrine, by stimulating their release from surrounding nerve endings (Kish, 2008; Haile, 2012). Dopamine and serotonin are commonly referred to as the ‘feel good’ neurotransmitters. They are involved in the brain’s reward response system, whose sole purpose is keeping us alive. This system naturally releases small amounts of dopamine and serotonin during activities like drinking, eating, and exercising. This system is the brain’s way of promoting activities that keep us healthy. This system can also be activated by dopamine and serotonin agonists, such as methamphetamines and amphetamines. When these substances are consumed, the cell receptors are damaged and cause excessive amounts of dopamine and serotonin to be released, resulting in the artificial high the consumer craves (Kish, 2008; Haile, 2012).

Methamphetamines are notorious for the speed at which they cross the blood-brain barrier. In more recent research, it has been discovered that methamphetamine damages the structural proteins in the blood-brain barrier and increases the barrier’s permeability to other molecules. Over time, this decreased protection leads to the accumulation of toxins in the brain, one of the key findings in long-term methamphetamine users (Northrop & Yamamoto, 2015). By damaging the receptors, methamphetamine and amphetamines prevent serotonin and dopamine

from being reabsorbed in the typical fashion. This results in a longer half-life as the body cannot clear the drug from the system as quickly (Kish, 2008). The half-life of methamphetamine is 10-12 hours, which is very dangerous when paired with many consumers' tendency to binge the drug, repeatedly dosing over 1-3 days. The accumulation in the body is toxic and eventually leads to overdose and death (Kish, 2008).

Similar to their chemical cousin, amphetamines have a half-life of 10-12 hours. This can lead to severe consequences when the drug is not taken as medically directed. At this point, it is not well-understood how certain chemical compounds force the release of neurotransmitters, but the effects of these compounds are well documented. Side effects are the same one's amphetamine users experience, albeit not as intense. Amphetamines cross the blood-brain barrier to reach their intended targets but at a much slower rate. The methyl group attached to amphetamines slows down the speed at which the compound crosses the blood-brain barrier, preventing the user from experiencing the full 'high' that methamphetamine users often do (Kish, 2008; Haile, 2012). This can be circumvented by taking higher quantities of amphetamines, something we have seen becoming more common in recent years (Benson et al., 2015).

The similarities of methamphetamine and amphetamines extend into their side effects as well. They share a mechanism of action and produce similar results in those using them. The typical behavioral effects of methamphetamine include alertness, wakefulness, increased energy, a feeling of well-being, euphoria at high doses, and suppression of appetite (Kish, 2008 pg. 1680). Methamphetamine also causes activation of the cardiovascular and sympathetic nervous systems, resulting in increased heart rate and blood pressure, the usual cause of death in

overdoses. In more extreme cases, when methamphetamines are abused repeatedly, they can cause euphoria, hypersexuality, auditory, visual, and tactile hallucinations, and delusions, and psychosis. (Kish, 2008; Haile, 2012). In cases where methamphetamine has been abused for years, severe side effects such as suicidal ideation, depression, and drug-induced schizophrenia can occur (Kish, 2008; Haile, 2012).

Amphetamines bear some of the same side effects as methamphetamines. When taken as directed, these compounds also increase wakefulness, produce a feeling of euphoria, increase focus and productivity, and suppress appetite. When abused, these drugs can lead to mood swings and aggression, paranoia, hyperactivity, increased heart rate, and blood pressure, and visual and audible hallucinations (Kish, 2008; Haile, 2012). These often-pleasurable side effects contribute to the levels of abuse we are seeing in college students today. However, many are not aware of the risks when taking these compounds without a prescription or genuine need. The following section explores the prevalence of illicit stimulant use and what this means for those trying to stop illegal stimulant use.

Prevalence of Illicit Stimulant Use in College-Aged Students

The prevalence of licit and illicit stimulate use is a widely debated issue. The most current research suggests that the percentage of undergraduate college students aged who abuse stimulants ranges from 8%-43% (Benson et al., 2015). This is a vast range, and many factors play into the percentage of students using stimulants illegally including things like geographical location, Greek presence on campus, and school demographics can influence the number of students who use stimulants illegally. There are also methodological differences between the studies that may impact their results. In order to understand the nationwide prevalence of

stimulant use, it is crucial to have research that addresses different types of four-year colleges, universities, and trade schools. A meta-analysis published in the *Clinical Child and Family Psychology Review* by Benson et al. (2015) examined 30 articles and studies that measured the prevalence of stimulant abuse in college students from all over the Nation.

They started by searching various peer-reviewed databases with terms like “abuse of ADHD medication,” “abuse of stimulant medication,” and “college students” (Benson et al., 2015 pg. 52). This search resulted in 727 articles. This initial 727 were narrowed down after reading the articles’ titles looking at relevance, and 81 articles were kept. The abstracts for these articles were carefully read to determine their applicability and relevancy. These 81 articles had to pass five inclusion criteria points to make it into the final 30. The main focus of the article had to be the illicit use of ADHD medications. It had to be peer-reviewed, empirical, and use quantitative data analytic techniques (Benson et al., 2015 pg. 52). The articles must be written in English, only study undergraduate students, and could not focus on one type of ADHD medication for the risk of excluding relevant populations. If the article discussed multiple types of illicit drug use, the results had to be divided and interpreted individually to give unbiased data (Benson et al., 2015 pg. 52).

Once they had their 30 articles, they began to interpret the data from each study and compare the varying rates reported. After a comprehensive review of all articles, the average percentage of students who abuse stimulant medications ranges from 8%-43%, with the average being 17% (Benson et al., 2015 pg. 52). This is a much more significant percentage than acceptable, and the system that has allowed this needs reevaluation.

First, ease of access has played a significant role in helping those who intend to abuse stimulants get their hands on them. The most commonly cited source student get their stimulant medications without a prescription is from friends (Benson et al., 2015; Garnier-Dykstra et al., 2012; Haak & Keller, 2017; Varga, 2012). One of the studies included in the Benson et al. 30 study analysis asked students to report whom they had gotten their medication from. The largest group, at 39%, said they bought them off a prescription holder, followed by 36% reporting a prescription holder gave them the medications, and 12% admitted buying stimulants from a nonprescription holder (Benson et al., 2015 pg. 60). With this in mind, we may need to tailor our approach to educating the legal prescription holders on the consequences of their actions. Introducing policies and interventions that target high school and college-aged prescriptions holders could help decrease the diversion of stimulants (Benson et al., 2015 pg. 60).

When students are not buying, stealing, or being given prescription stimulants by a prescription holder, they may try to get their own prescription. In his comprehensive literature review on Adderall abuse on college campuses, Varga (2012) explains that the simplified diagnostic process for ADHD may make it tempting for students to fake a diagnosis to get a prescription. According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, diagnosing ADHD inattentive type requires the student to meet a few criteria. The criteria listed below are what greet the student when being assessed for ADHD.

Displays poor listening skills, loses and/or misplaces items needed to complete activities or tasks, sidetracked by external or unimportant stimuli, forgets daily activities, diminished attention span, lacks ability to complete schoolwork and other assignments or to follow instructions, avoids or is disinclined to begin homework or activities requiring

concentration, fails to focus on details and/or makes thoughtless mistakes in schoolwork or assignments. (American Psychiatric Association, 2013).

If a student answers ‘yes’ to five or more questions, they are considered inattentive type ADHD. Arguably, every college student meets these criteria. A student seeking a prescription does not even have to stress their moral compass to qualify for treatment. They can walk out of the doctor’s office with a prescription for Adderall that day. This ease of accessibility is sometimes tempered by a doctor’s unwillingness to prescribe large amounts of prescription stimulants at one time. Students often get around this safety concern by engaging in the practice of “doctor shopping” (Chen et al., 2016; Varga, 2012). Doctor shopping is the practice of visiting several doctors with the intent to obtain prescriptions from each one. Once the student has these prescriptions in hand, they fill them at multiple pharmacies to avoid suspicion (Varga, 2012). The only deterrent to this method is that most insurance companies will only pay for a 30-day supply of controlled substances at one time. To bypass this roadblock, many students will claim they do not have insurance and pay the ticket price for their second or third prescription (Varga, 2012).

Motives for stimulant use

The motives for stimulant use can vary from person to person. Some report using stimulants to lose weight or get high, but the reasons typically revolve around academic achievements. (Benson et al., 2015; Garnier-Dykstra et al., 2012; Varga, 2012). According to Varga (2012), the reasons behind stimulant use include academic pressure, collegiate lifestyle, socio-cultural factors, and accessibility (Varga, 2012). Accessibility was discussed previously, so we now turn to the other three factors.

First, this pressure to achieve academically stems from parental expectations, competing with peer groups, meeting collegiate admissions standards, and personal academic expectations (Varga, 2012). The pressure of coping with the fast pace of college life may also contribute to students' use of stimulants. An article published in the *Journal of Attention Disorders* explains that "ADHD symptoms of the newly diagnosed college student may be highly contextual and time specific and represent a normal response to temporarily increased demands on intellect and motivation" (Diller, 2010).

Diller explains that many college students who believe they need stimulants to achieve an average level of functioning are just experiencing a normal response to the stressors of college life (Diller, 2010). However, this normal response could be detrimental to a student's academic career and produce life-altering consequences. Many of the students who turn to stimulants earned high marks in high school with relative ease (Varga, 2012). When they are slammed with the reality of balancing studies, extracurricular activities, and potentially a job, this straightforward approach to academics no longer works. Parents who are often paying for their child's education expect a certain level of performance from their offspring and cannot accept mediocrity (Benson et al., 2015; Garnier-Dykstra et al., 2012; Varga, 2012). While they have the best intentions, the pressure parents place on their children to achieve academic greatness is interpreted by overworked students as one more mountain they must climb. College students may feel forced to abuse stimulants to cope with the mounting pressure and anxiety (Varga, 2012).

The commonly held belief among many college students is that these drugs are cognitive enhancers. Much like how an athlete may use anabolic steroids to improve physical strength,

students view stimulants as “brain steroids” that enhance their cognitive prowess. Smith & Farah’s (2011) article in the *Psychological Bulletin* points out that stimulants are not magic pills. They hold no cognitive enhancement capabilities such as improving memorization or attention span. Students who abuse these drugs may experience a placebo effect, or the drugs themselves might alter a student’s perception of the quality of work and the amount done under the influence (Smith & Farah, 2011). These drugs enhance wakefulness, motivation, and energy, which could improve a student’s ability to do mundane tasks, but their cognitive capabilities remain unchanged (Smith & Farah, 2011).

A study published by *Addictive Behaviors* disproves the widely held belief that stimulants give students an academic edge (Arria et al., 2017). This study found that students who abstained from abusing stimulants during their first two years of college show a steady increase in GPA from their freshman to sophomore year. Those who abused stimulants consistently during the two years did not have an increase in GPA, and some showed a decline (Arria et al., 2017). This could be because those who abuse stimulants often skip classes, fail to turn in assignments, and then use stimulants to try and compensate before test days to make up for the deficits in their grades (Arria et al., 2017).

The second contributing factor to stimulant abuse is the collegiate lifestyle (Varga, 2012). After high school, students may be told that college will be the best years of their lives. This refrain is echoed repeatedly as orientation approaches, and many students feel pressured to make their college years even more impressive than their high school careers. Resumé building becomes the sole focus of getting involved with extracurricular clubs and events. Students are expected to enjoy the constant busyness, and many feel guilty if they do not participate in every

opportunity. The cycle of late-night parties, all-night studying, rigorous academic and extracurricular expectations, and perhaps a job could leave students feeling overwhelmed. Varga (2012) points out that this can cause burnout and exhaustion, and stimulants suddenly become a viable and attractive option (Kadison, 2005).

Finally, socio-cultural factors play into the problem of stimulant abuse (Varga, 2012). advertisements (Applequist & Ball, 2018). 16% gave information about the conditions targeted by the drug, such as prevalence and risk factors, leaving an astounding 84% of advertisements not addressing the conditions they are attempting to treat (Applequist & Ball, 2018). ADHD medication commercials are not immune to this phenomenon, and many advertisements focus on the positive academic consequences of taking stimulants.

With these four factors at play, it is little surprise that America has developed a stimulant addiction. These motives for use are widespread; almost every college student has been exposed to these pressures. What is not always equal across the board is the risk factors that many students have that may predispose them to use stimulants.

Risk Factors for Stimulant Abuse

Like many other addictions and illegal behaviors, several things predispose a person to use stimulants illicitly. The prevalence of substance abuse can vary greatly depending on the geographic region and competitiveness of the school. However, regardless of the rates of stimulant abuse, the risk factors remain relatively constant. While researchers often vary about the minute details of what predisposes a person to stimulant use, almost all studies have reported several key risk factors. Arria et al. (2013), found socioeconomic status could be a risk factor for

stimulant abuse. The mean family income was much higher for students who showed consistent stimulant abuse (Arria et al., 2013). This could be due to several things. Students from a higher socioeconomic background are often familiar with the medical system and have greater access to care and services. They may also have the funds to procure illicit substances and generally would not have severe consequences if caught with them (Patrick et al., 2012). Certain substances are associated with a higher socioeconomic class, such as alcohol, marijuana, and stimulants.

In contrast, smoking and methamphetamine use is associated with lower socioeconomic status (Patrick et al., 2012). This may also be due to the perceived ‘wrongness’ of certain substances. As previously stated, stimulants are viewed as safe and legal with minimal consequences for using them without a prescription (Applequist & Ball, 2018; Benson et al., 2015; Chen et al., 2016; Varga, 2012). Other substances, such as methamphetamines and nicotine, may be viewed as more wrong by those of higher socioeconomic status leading to lower usage of those specific substances (Patrick et al., 2012).

Other risk factors include race and gender. Caucasian and Asian ethnicities have the highest rates of stimulant abuse compared with Mexican and African American populations (Arria et al., 2015; Benson et al., 2015; Haak, 2017; Mulvihill, 2013). Males are also much more likely to use stimulants illicitly than females. (Benson et al., 2015; Haak, 2017; Mulvihill, 2013). This could be because males often have more sensation-seeking tendencies, which in and of itself is a risk factor for stimulant abuse (Benson et al., 2015; Lueck et al., 2019). It could also be attributed to higher numbers of males diagnosed with ADHD, leading to a larger pool of potential sellers for male users (Benson et al., 2015). Whatever the reason, the results are

consistent, reporting that, on average, male stimulant abuse is 9% higher than female stimulant abuse (Benson et al., 2015).

Greek life involvement is also consistently reported as one of the main risk factors for stimulant abuse. (Benson et al., 2015; Haak, 2017; Hartung et al., 2013; Mulvihill, 2013). However, Garnier-Dykstra et al. (2012) suggest that it is not Greek life specifically that leads to increased stimulant abuse, but a pattern of drinking and partying synonymous with Greek life. This is cohesive with reports of substance use disorders factoring into a person's propensity to abuse stimulants (Arria et al., 2013; Benson et al., 2015; Garnier-Dykstra et al., 2012; Hartung et al., 2013; Lueck et al., 2019). In the meta-analysis done by Benson et al. (2015), 16 of the 30 studies examined the relationship between substance use disorders and stimulant abuse. All 16 found a positive correlation between stimulant abuse and other substance abuse disorders. The most commonly abused substances were marijuana and alcohol (Arria et al., 2013; Benson et al., 2015; Garnier-Dykstra et al., 2012; Hartung et al., 2013).

Low grade point average (GPA) is also a risk factor for stimulant abuse, although the reasons why are debated. The first argument is that if a student uses stimulants to compensate for their lack of preparation, we will see an expected dip in GPA. This means that a low GPA itself is not a risk factor but an indicator that there is an issue in the student's personal life leading to a lower GPA (Arria et al., 2013). This dip in GPA does not necessarily need to be associated with an active social life. It could be associated with the ordinary busyness of college life. Regardless of the reason, students find little time to prepare for significant assignments and turn to stimulants to help them cope (Garnier-Dykstra et al., 2012). The second argument is that students who are academically challenged and already have a low GPA will use stimulants to try and give

themselves the boost they need (Benson et al., 2015). Both arguments have merit, but the first argument seems more compelling with the other known risk factors.

Lastly, a student's mental health can play a significant role in whether or not they engage in stimulant abuse. Perfectionism, impulsivity, and sensation-seeking are all risk factors for stimulant abuse (Benson et al., 2015; Garnier-Dykstra et al., 2012; Haak, 2017; Lueck et al., 2019). Depression is also linked to increased stimulant abuse (Lueck et al., 2019). The 2015 meta-analysis reports that "Symptoms of depression are related to misuse of stimulant medication among college students; however, directional effects have not been adequately examined" (Benson et al., 2015). Put simply, we know that depression and stimulant abuse are linked, but we still do not understand which one influences the other.

Students abusing stimulants are more likely to feel sad, depressed, and consider suicide than their nonusing classmates (Benson et al., 2015). More frequent abuse of stimulants resulted in more severe feelings of depression. This association can be viewed in several ways. Students who are depressed may misuse stimulants to improve their mood or improve other aspects of their life that are causing them concern, such as academics or social life (Benson et al., 2015). In this way, students with depression may self-medicate with illicit stimulants (Benson et al., 2015). Historically, stimulants have been used to treat minor cases of depression (Hicks, 2021; Rasmussen, 2008). Amphetamines cause a dopamine rush that would feel euphoric to a depressed brain and increase functioning for a short period (Kish, 2008; Haile, 2012). Thus, this argument bears some merit and should be thoroughly evaluated. Students suffering from depression should be encouraged to seek help, not try to self-medicate. Without the appropriate

course of treatment, depression symptoms will not lessen, leading to more complex mental health problems and even a mental health crisis.

The second argument is that stimulant abuse inadvertently causes depression. The association between poor mental health and stimulant abuse is well documented (Benson et al., 2015; Lueck et al., 2019). Students who have poor mental health are prone to extreme levels of anxiety and clinical depression. These same students report increased intent to abuse stimulants than their mentally healthy counterparts (Benson et al., 2015; Lueck et al., 2019). It is possible then that depression in persons who abuse stimulants is a direct result of misusing a drug that increases dopamine levels in individuals who are already prone to depression and anxiety. (Benson et al., 2015). Once the stimulant wears off, it leaves users acutely aware that they no longer feel the rush of dopamine and serotonin amphetamines provide. This can be a dangerous combination for individuals who already struggle with regulating their serotonin and dopamine levels.

Consequences of Stimulant Abuse

As previously discussed, the problem of stimulant abuse is rapidly increasing and cannot be ignored, as there are consequences for both the user and the systems involved. Currently, stimulants are the second most abused illicit substance, marijuana being the most used drug for college students (Arria et al., 2013; Gomes et al., 2011; Weyandt et al., 2013). Side effects of stimulant misuse can range from minor to life-threatening. Ranging from sleeping difficulties (Hartung et al., 2013; McCabe et al., 2014; Mulvihill, 2013; Weyandt et al., 2013), headaches (McCabe et al., 2014; Mulvihill, 2013), irritability (Hartung et al., 2013; McCabe et al., 2014; Weyandt et al., 2013), appetite reduction (Hartung et al., 2013; Mulvihill, 2013; Weyandt et al.,

2013), and reduced academic self-efficacy (Hartung et al., 2013), to more severe consequences like depression (Benson et al., 2015; Chen et al., 2016; Lueck et al., 2019; McCabe et al., 2014), seizures (Haak, 2017; Mulvihill, 2013), adverse cardiac outcomes (Chen et al., 2016; Haak, 2017; Mulvihill, 2013; Varga, 2012), psychiatric comorbidities (Chen et al., 2016; Mulvihill, 2013; Varga, 2012) and even death (Gomes et al., 2011; Haak, 2017; Varga, 2012). Overdoses related to stimulants are becoming increasingly common, which is reflected in the number of Emergency Department visits involving stimulants. According to Chen et al. (2016), the number of stimulant-related visits tripled from 2005 to 2010, and Haak (2017) claims they increased four-fold in the same period. Following this pattern, stimulant overdoses or severe side-effects in teenagers rose by 76%, as reported by Poison Control Centers (Chen et al., 2016).

This alarming rise in stimulant overdoses and adverse side effects is compounded because many users do not view stimulants as dangerous. 81% (Weyandt et al., 2016) of students who abuse stimulants admit to having very little information about the drug, its dosage, or potential side effects (Haak, 2017; Via, 2019). Despite the FDA black box warning, stimulants are viewed as safe because they are FDA-approved (Weyandt et al., 2013). Stimulant abuse also puts users at an increased risk for addiction and co-occurring substance use disorders (Chen et al., 2016; Garnier-Dykstra et al., 2012; Gomes et al., 2011; Hartung et al., 2013; Haak, 2017; McCabe et al., 2014; Varga, 2012; Via, 2019). Some students chose to take stimulants intranasally, which produces a much stronger reaction to the drug, and thus has more potential for addiction (Garnier-Dykstra et al., 2012; Varga, 2012). Most students do not use the medications in this way. However, for those that do, there are serious consequences. Intra-nasal administration leads to higher levels of addiction and graduating to more illicit substances in order to get the high they crave (Via, 2019).

Varga's 2012 literature review shines some light on the seriousness of stimulant abuse by using a personal testimony of a student-turned-drug user. "It all started with Ritalin and Adderall. I started taking them every day [to get high] and pretty soon it didn't work anymore and I needed something more. I needed a bigger, faster boost" (Varga, 2012). This young man's experience is not abnormal. Adderall abusers are 20 times more likely to experiment with cocaine and heroin once their body has built a tolerance to Adderall (Varga, 2012). The cavalier attitude towards stimulant abuse cannot continue. Students inadvertently risk their lives taking drugs intended to help them study more efficiently.

Besides the physical consequences of stimulant abuse, there are judicial consequences as well. Misusing stimulants is considered a felony in most states and can lead to prison time for those caught misusing the medications (Gomes et al., 2011; Hartung et al., 2013; Mulvihill, 2013; Weyandt et al., 2016). There are also school-mediated consequences for abusing stimulants. Most schools define using stimulants without a prescription as cheating, in the same vein as looking at another student's test (Weyandt et al., 2016). Students, however, view using stimulants much differently. According to Weyandt et al. (2016), 33% of Ivy League students believed that using stimulants was not a form of cheating. 41% thought it should be categorized as cheating, and 25% were unsure. There is a discrepancy between understanding the consequences of stimulant abuse and the risks perceived by students. The following section focuses on reducing the discrepancy and preventing stimulant abuse from claiming even more lives.

Interventions

The key to changing illicit stimulant use will revolve around changing the attitudes regarding stimulants' effectiveness and safety (Garnier-Dykstra et al., 2013; Judson & Langdon, 2008; Lueck et al., 2019; Mulvihill, 2013; Varga, 2013). The main points of education need to be about the ineffectiveness of stimulants as cognitive enhancers and the negative consequences of abusing stimulants. Both of these areas of information will be essential in lowering stimulant abuse. For example, Looby et al. (2013) examined whether challenging the positive beliefs about stimulant abuse would prove efficacious in preventing stimulant abuse long-term. Ninety-six high-risk students were chosen to participate after meeting the researcher's inclusion criteria. The term high risk was interpreted as GPA lower than 3.5, Greek involvement, binge drinking, and cannabis use for this experiment. The study required two laboratory visits and an online survey as a six-month follow-up. At the beginning of the study, all participants received the PSEQ-II, a 45 item Likert-type scale that assesses attitudes about stimulant abuse. Using a randomized controlled trial design, they assigned students to the control and the experimental groups (Looby et al., 2013).

The experimental group received what they were told was a prescription stimulant medication during one visit and no medication during another in order to debunk the positive expectancies for stimulant abuse. In contrast, the control group received no intervention during either visit. Both groups were asked to complete a series of surveys during their lab visits assessing mood, arousal, and a wide range of cognitive abilities. At the end of the second lab visit, the experimental group was informed that the pill they took during the first lab session was a placebo and then participated in a 30-minute expectancy challenge. This challenge included

assessing students' attitudes and expectations for stimulant medication and the negative consequences of taking stimulants illicitly. Researchers explained in detail that any changes in cognitive performance witnessed during the placebo lab visit were purely due to students' expectations that they would perform better while using stimulants (Looby et al., 2013).

Researchers hypothesized that the students assigned to the expectancy challenge group would show a decreased use of stimulants compared with the control group at the six-month follow-up. While they did see a change in attitudes toward stimulant abuse at the end of the study, the interventions and control group had the same level of prescription stimulant use at the six-month follow-up. They concluded that to reduce stimulant abuse, the educational program has to include booster sessions regularly and emphasize the negative consequences of using stimulants alongside the uselessness of the prescriptions as cognitive enhancers. Ironically, all negative attitudes towards stimulants are not equal in their persuasive efforts. Guilt over participating in illegal activity and the fear of dependence ranked lower as deterrents than unpleasant side effects and long-term health issues. (Looby et al., 2013).

Guilt and fear as motivating are not universal as motivating factors, but they shed light on different areas that need to be targeted for effective education. Gaining the upper hand against the stimulant epidemic is going to require a three-pronged approach. Education needs to be targeted at students by colleges, medical professionals, and parents to be successful. College-led interventions are supported by much of the current literature surrounding prescription stimulant abuse (Chen et al., 2016; Garnier-Dykstra et al., 2013; Judson & Langdon, 2008; Looby et al., 2013; Varga, 2012; Via, 2019). They cannot solve the current problem with stimulant abuse. That issue is much more systemic. Nevertheless, they can help alleviate some of the issues with

stimulant abuse on their specific campuses. Varga (2012) suggests a framework that college campuses can use to help decrease illicit stimulant use.

Gaining an accurate picture of the problem may be difficult since stimulant abuse is self-reported, but this is an important step. To address the issue, we need to know how widespread it is. First, colleges need to step back and analyze the culture of their campus (Garnier-Dykstra et al., 2013; Varga, 2012). The level of acceptance on campus and the risk factors for stimulant abuse on their campus must also be examined. During this general assessment, colleges may find information about other causative agents on their campus. Things such as competitiveness, pressure from professors, poor mental health, and inadequate access to counseling or self-help groups can all contribute to stimulant abuse (Varga, 2012). While these findings can be disappointing to administrators, addressing them will benefit the college and student health.

Next, colleges should provide faculty and staff education. Education would include the signs and symptoms of stimulant abuse and addressing the topic with students safely and effectively. This training would include sessions for all campus faculty and staff. Sessions catered to residence hall and library staff should also be included as these are two places where transactions often occur. They are the staff most likely to encounter the suspicious behavior and mannerisms that often accompany illicit transactions and can help with supervision and prevention efforts. Involving the medical and psychiatric staff on campus will be invaluable in addressing this issue. We know that poor mental health is often associated with stimulant abuse (Benson et al., 2015; Lueck et al., 2019), so communicating with counseling centers about the signs and symptoms will be an essential step in preventing abuse. Coaches and the academic support staff are also likely to encounter students abusing stimulants. Student-athletes are some

of the busiest on campus and may turn to stimulants to help them get through the day (Benson et al., 2015; Garnier-Dykstra et al., 2012). These same students often end up on academic probation and encounter academic support staff whose goal is to help them stay in school. Both coaches and academic support staff provide avenues to address stimulant abuse.

Finally, education focused on the students themselves can help reduce stimulant abuse (Chen et al., 2016; Garnier-Dykstra et al., 2012; Judson & Langdon, 2008; Varga, 2012; Via, 2019). As we know from the research done by Looby et al. (2013), students' perceptions about stimulants abuse influence their choices most strongly. Many students perceive stimulants as safe with minor consequences for use (Applequist & Ball, 2018; Benson et al., 2015; Chen et al., 2016; Varga, 2012). We know from previous discussions that this is not the case. Therefore, addressing students' perceptions will need to be a focal point of education (Garnier-Dykstra et al., 2012; Judson & Langdon, 2008; Lueck et al., 2019; Varga, 2012; Via, 2019).

Many colleges have mandatory first-year orientation for students entering college. This would be an ideal place to present materials regarding stimulant abuse. These education sessions need to address three things. First, it is not safe or legal to take stimulants without a prescription. Emphasizing the negative consequences of abusing stimulants and their uselessness as cognitive enhancers will be the first step. Detailing the legal and physical consequences of stimulant abuse, as well as the college's policy on academic honesty, is an excellent place to start. Second, education should focus on students coming into college with a prescription for stimulants who might be asked to divert their medication (Benson et al., 2015; Varga, 2012). Many students are unaware that it is illegal to buy, sell, or trade medications, so education on this front may help reduce the willingness of students with prescriptions to supply their peers. Having a

representative from the Drug Enforcement Administration (DEA) explain that it is illegal to take another's prescription and sell or trade medications may make students more reluctant to divert their prescriptions (Varga, 2012). Third, students should be prepared for the academic rigors of college and briefed on the resources available to them (Garnier-Dykstra et al., 2012; Varga, 2012; Weyandt et al., 2016). Many students are not well-prepared for the increase in workload when moving from high school to college. It is relatively easy to get by in high school without spending much effort or developing good study habits. When these students are confronted by their first college course, they are often astounded at the amount of time it takes to master the material. Without good study habits, these students flounder and quickly become discouraged by the drop in their GPAs (Varga, 2012). This may lead to stimulant abuse to buoy their grade and keep pace with the many other claims on their time. One way to mitigate this is to include mandatory study sessions as part of class requirements. Many college classes and coaches include meeting with tutors as a large part of students' grades and eligibility. This approach can only do so much as a student's willingness to participate directly affects the outcomes. However, these built-in safety nets can help promote a culture of academic honesty and teach students prioritization.

These efforts from colleges to reduce stimulant abuse will be helpful but will not solve the problem on their own. Including medical professionals in the fight against stimulant abuse will make success much more likely (Garnier-Dykstra et al., 2013; Via, 2019; Weyandt et al., 2016). Via (2019) outlines how clinicians can play a vital role in helping stop illicit stimulant use. "It is important for all providers interacting with patients prescribed stimulants to ask about prescribed medication adherence and verify prescriptions each visit via local/state prescription and drug monitoring programs." While lying to a provider about medication adherence is easy, it

is not as easy to divert medication when a medication regimen is in place. These medication regimens can involve random urine screens to test for concomitant drug use, capping the refills a patient can get without a follow-up evaluation, and changing their prescription to a non-stimulant if abuse is suspected (Via, 2019). Clinicians must learn to recognize the signs associated with stimulant diversion or abuse, such as sensation-seeking behaviors, binge drinking, mental health problems, and abnormal physical symptoms such as changes in their appetite, tachycardia, high blood pressure, hair loss and twitchiness (Benson et al., 2015). In individuals with a history of a substance use disorder, physicians should steer away from prescribing stimulants or implement intensive monitoring systems (Garnier-Dykstra et al., 2013; Lueck et al., 2019, Via, 2019). Clinicians should also be aware of potential medication-seeking behavior from young adults who self-report ADHD symptoms but do not meet the criteria for the disorder when interviewed by medical professionals (Garnier-Dykstra et al., 2013).

However, for physicians to reach their full potential, it is crucial to educate them on the importance of their intervention. A study by Wedyandt et al. (2016) found that most primary care physicians do not discuss “misuse, diversion, or potential consequences and side effects” of stimulant misuse. The reason behind this is that nearly half of all physicians found it difficult or uncomfortable to discuss the potential dangers of stimulants with their patients (Wedyandt et al., 2016). In this situation, it is easy to point the finger at physicians, but realistically, these clinicians have never received training on distributing information regarding highly addictive medications. Physicians and pediatricians would greatly benefit from training on discussing the dangers, consequences, and side effects of medication misuse with patients (Varga, 2012; Wedyandt et al., 2016). Medical and pharmacy school curricula should include sections on prescription abuse and diversion and how to prevent it. These professionals are often required to

complete continuing education classes to maintain the currency of their license. Including stimulant abuse awareness as one of these topics can help keep stimulant abuse in front of clinicians' minds.

Finally, parents should be involved in the fight against stimulant abuse (Garnier-Dykstra et al., 2013; Varga, 2012; Weyandt et al., 2016). The most recent data (Weyandt et al., 2016) suggests that the onset of stimulant abuse peaks in high school. Therefore, children are still typically living at home, and parents can pick up on the signs of stimulant abuse. Varga (2012) points out that "More often than not, parents know when something is wrong, potentially even before the student realizes it." Having parents involved is also crucial for combatting stimulant abuse as parents are often the source of academic pressure (Benson et al., 2015; Garnier-Dykstra et al., 2012; Varga, 2012). Informing parents of the health consequences that could be associated with pressure to achieve could mediate this issue. Because parents place pressure on their children out of love, addressing this will require tactfulness and understanding. Encouraging parents to keep conversation lines open with their children and be supportive as they transition to college is one-way parents can help decrease their children's pressure. Making parents aware of the difficulties their child may experience adjusting to living away from home and surrounded by peers can also help make parents more sensitive to changes in their child's demeanor (Varga, 2012).

Gaps in the Research

This comprehensive literature review highlights several areas for future research. First, while risk factors for stimulant abuse (Applequist & Ball, 2018; Arria et al., 2013; Benson et al., 2015; Chen et al., 2016; Garnier-Dykstra et al., 2012; Haak, 2017; Hartung et al., 2013; Lueck et

al., 2019; Mulvihill, 2013; Varga, 2012) are thoroughly discussed, there is very little research on protective factors. Protective factors are defined as “a characteristic at the biological, psychological, family, or community (including peers and culture) level that is associated with a lower likelihood of problem outcomes or that reduces the negative impact of a risk factor on problem outcomes” (O’Connell et al., 2009). Knowing that Greek life, an extracurricular activity, is a risk factor for stimulant abuse (Arria et al., 2013; Benson et al., 2015; Garnier-Dykstra et al., 2012; Hartung et al., 2013; Lueck et al., 2019) it stands to reason that various other extracurricular activities could function as protective factors. In this situation, protective factors could be healthy study habits, positive parental involvement, or religious affiliation. There has been very little research done into protective factors. Knowing these might help parents and colleges get students involved in activities that reduce the risk of stimulant abuse.

Second, knowing why students divert from stimulants is going to be necessary to develop policies and programs that can prevent diversion from occurring. While there is research on why students abuse stimulants (Diller, 2010; Applequist & Ball, 2018; Arria et al., 2017; Benson et al., 2015; Chen et al., 2016; Garnier-Dykstra et al., 2012; Smith & Farah, 2011; Varga, 2012), there is not an adequate amount of research on why students divert stimulants. The available research focuses on purely qualitative reasons, which leaves much to be desired. It appears most students divert their medications to appear socially adept, help out friends, or for financial gain (Benson et al., 2015). As Benson et al. (2015) points out, “Studies that rigorously examine reasons for diversion using quantitative methods are needed.”

Third, more research into the cognitive effects of stimulants would help determine appropriate strategies to prevent stimulant abuse. Several studies to date address this topic

(Benson et al., 2015; Garnier-Dykstra et al., 2012; Smith & Farah, 2011; Varga, 2012), but many of these studies observe correlations between the use of stimulants and GPA, which can be misleading. As previously discussed, students may find themselves with little time to prepare for assignments and use stimulants to cope (Garnier-Dykstra et al., 2012), or these students may already experience academic difficulties and use stimulants in the hope that it will keep their GPA from dropping even further (Benson et al., 2015). We cannot determine whether stimulants effectively prevented a drop in GPA, or if using stimulants to study the night before a test is profitable. To test the effects of stimulants on cognitive performance, we would need to have two groups of students, one who used stimulants the night before a test to study and the other who received a placebo. Experimental double-blind studies could provide beneficial information. At this point, no research has been done along these lines.

Finally, no research has been done on the impact of campus culture on stimulant abuse. Because stimulant abuse is a problem primarily found in college students, investigating whether specific campus attitudes and policies lead to misuse would be insightful. For example, many campuses clearly list the consequences for drug or alcohol abuse but do not mention the consequences for stimulant abuse. There are often no consequences for those caught diverting stimulants, leading to bolder attitudes about selling or giving their stimulants to friends. It could be that this nonchalance is contributing to misuse on specific campuses. Also, many students receive a diagnosis of ADHD while in college. It could be that lax diagnostic processes increase the rates of stimulant abuse as well. The recommended diagnostic process currently involves obtaining information about the individual's behavior from multiple sources, ruling out other diagnoses, and following a set of objective tests indicating an ADHD diagnosis. Many campus practitioners do not follow the recommended diagnostic guidelines for the sake of time (Varga,

2012). These poor diagnostic practices can extend to practitioners outside of college campuses and begin to affect children and adolescents. Further research is needed on the effects of campus policies on stimulant abuse and diversion.

Application to Nursing

This research sheds light on a genuine issue that needs to be addressed by today's healthcare and education professionals. It is helpful to view this issue through Nursing Theorist Jean Watson's Philosophy and Science of Caring model. Watson's model defines health as "a high level of overall physical, mental, and social functioning, a general adaptive-maintenance level of daily functioning, the absence of illness or the presence of efforts leading to the absence of illness" (Watson, 2021). Simply put, health is not just an absence of disease, but achieving a level of harmony between physical, mental, and social functioning. In the context of stimulant abuse, nurses cannot define health as the absence of addiction or illicit drug use. There are motivational factors behind illicit stimulant use that must be explored to help patients reach holistic health. Nurses can play a prominent role in stopping illicit stimulant use.

According to Gallup, nurses have been ranked as the most trusted profession for 19 years in a row (Gaines, 2021). This trust places nurses in a unique position to interact with patients in a way that physicians may not have. Often, nurses are called upon to be educators for patients and families, which opens a window of opportunity to address critical information about drug diversion and abuse (Manworren & Gilson, 2015). Nurses have the opportunity to provide newly diagnosed patients with cautionary teaching, emphasizing the importance of taking their prescription as directed and the consequences of deviating from the prescribed course of treatment. New research points to the effectiveness of implementing universal preventative

substance abuse plans as soon as patients are prescribed stimulants (Via, 2019). These programs attempt to deter prescription stimulant abuse by providing prescription holders with the skills and information necessary to prevent abuse, diversion, and addiction (Via, 2019).

Specifically, we should provide teaching to youth entering high school or college about the temptations to view their prescriptions as “study buddies.” Explaining that these medications do not provide any cognitive benefits to individuals without an accurate diagnosis of ADHD can help decrease the reputation stimulants have as cognitive enhancers. Nurses should also take time to educate their patients on the seriousness of diversion (Manworren & Gilson, 2015).

Medications are prescribed for one person, and to give or sell medications is not only dangerous for a nonprescription holder; it is a federal offense. Nurses should be aware of medication-seeking behaviors when educating patients about their new prescriptions. Healthcare professionals should also be observing and screening for risky behavior in general that may indicate a pattern. This behavior can present as risky sexual practices, driving under the influence, and illegal substance usage (Via, 2019).

Nurses must ask about medication adherence at all follow-up appointments, and if abuse or diversion is suspected, intervene. Indicators of abuse may include requesting medication refills earlier than appropriate, claiming to have lost or misplaced their prescription, or asking for a different type of stimulant medication (Via, 2019). If a nurse suspects abuse, conducting random urine screens or requesting the provider change the prescription to weekly dosages can help prevent problems. Because depression and stimulant abuse can go hand-in-hand (Lueck et al., 2019; Benson et al., 2015), nurses should conduct thorough depression screenings on patients requesting stimulant medications. Monitoring patients with a history of mental illness for

stimulant abuse will be imperative, as will watching for any signs of mental illness, specifically signs of depression, in patients using prescription stimulants.

We nurses are being called to care for patients in novel ways that stretch and grow their knowledge and capabilities. If stimulant abuse is an issue that plagues a part of the population, nurses must learn to answer this threat and equip themselves to stand beside their patients. A nurses role in preventing stimulant abuse is pivotal, as nurses log the most contact hours with patients We may be the only avenue patients have to get the help they need and prevent the next health crisis. As Jean Watson says, “Maybe this one moment, with this one person, is the very reason we’re here on Earth at this time.” (Watson, 2021).

Conclusion

The fight against the stimulant abuse epidemic is not straightforward. Legislation addressing the issues of doctor shopping, accessibility, and doubling up on prescriptions could help reduce the flow of stimulants onto the market. However, legislation alone will not solve the problem. Educating students on the dangers of illicit stimulant use will be important in the fight against stimulant abuse. Moreover, changing the attitudes surrounding the effectiveness of stimulants as cognitive enhancers may help decrease student abuse. It is unlikely that our world will become less competitive; in fact, research points to a continued climb toward unattainable standards by the educational system (Varga, 2012). Therefore, educating parents on the importance of support, awareness, and honesty with their children, specifically those prescribed stimulants, can help students deal with the inevitable academic pressures. Finally, we need to examine the education of our healthcare professionals. The opioid epidemic has become a widespread problem recognized by healthcare workers and law enforcement. However, it took

seventeen years for the medical field to address this epidemic for the systemic issue it proved to be. Waiting for the stimulant epidemic to achieve that level of carnage is unacceptable.

Healthcare professionals need education on the importance of screening measures, the signs of stimulant abuse, and how they can help prevent abuse from occurring. Regardless of the tactics used to approach this issue, there is no easy, overnight solution. These recommendations will not solve the problem but could increase awareness and slow the spread of illicit stimulant use.

Addressing this issue will require a unified front from colleges, medical professionals, legislative bodies, and parents. Changing the future of America's relationship with stimulants will not be without its challenges. Ignoring the issue and continuing in a state of blissful ignorance would be much easier. As former President John F. Kennedy once said, "There are risks and costs to a program of action, But they are far less than the long-range risks and costs of comfortable inaction" (Presential Library and Museum, 2021). This is a fight for the future of America's youth, and a lackadaisical approach will bring no change.

Project Analysis

This project was particularly meaningful to me as I have fostered this idea since second semester of Junior year. I became interested in the subject after reading several books on the increase in pediatric prescriptions the United States has experienced in the last 50 years. I simply couldn't understand how these huge numbers of prescriptions were possible in such young patients. Through digging a little deeper I found that stimulant medications, those used to treat attention deficit hyperactivity disorder (ADHD), made up one of the largest categories of pediatric prescriptions. I knew from our pharmacology course that these medications had a somewhat sordid history and was intrigued. I began researching the chemical make-up of

stimulants and learned that amphetamines, a category of stimulant, is the chemical cousin to the infamous methamphetamine, and produce many of the same feelings and side effects. Once I learned this, I was hooked. I began sifting through articles dating back as far as 1967 that described the negative effects of stimulant medications and how these prescriptions had been misused almost from their conception. From there, my curiosity, and the project grew. I learned that these medications were commonly abused by college students with the belief that they would help them study longer and harder. I decided to focus on the topic of stimulant abuse for my honors research project and nursing research project. There were plenty of publications addressing the potential for abuse these medications held, approximately how many students abuse stimulants every year, and the negative health outcomes, but very few outlined interventions to prevent stimulant abuse. I found this troubling and set out to discover all evidenced backed interventions I could.

During the research period of my project, I sifted through hundreds of articles, reading abstracts, and expanding my research into new areas. I decided on a literature review structure, as I wanted to address so many things in my project. I wanted my literature review to be comprehensive, and address the most poignant issues, but I also wanted to address the interventions that could help address the issue. During the writing process I was also taking public health nursing, a course which opened my eyes to the potential for my research. Stimulant abuse is a far-reaching issue and affects more than just the college students abusing these medications. I began framing the topic as a public health issue and designated a section of my paper to exploring the impact stimulant abuse has on nursing. While portions are set up like a typical literature review, others read like a novel. This deviates from the traditional path of

research nursing, but I felt it allowed me to reach a greater audience by making the information more easily digestible.

At times, I was incredibly frustrated at the complete lack of concern shown for this issue that was becoming passionate about. Surrounded by sticky notes, highlighted text, and scribbled notes in the margins of articles I could not understand how the sense of urgency this issue invoked in me was not shared by the public. I felt the issue was disregarded by collegiate administration, medical professionals, and parents. At times, I felt like my research was pointless. After all, none of the research before mine had changed anything about the way the system operated. I knew that my presentation and paper would not change the general attitude, but I hoped that by adding a new voice to the chorus the issue might become more widely known. By the end of my project, I had compiled what I felt was the most relevant information on stimulant abuse and formulated a structure to address the issue. This project stretched me in new ways and opened my eyes to the impact research can have on nursing.

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