

Prescription Drug Abuse among 12 to 17 Year Adolescents in the United States

by  
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A PROJECT

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## AN ABSTRACT OF THE THESIS OF

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Abstract approved:

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Ray Tricker

This study examines issues related to prescription drug abuse among 12 – 17 year olds in the United States; namely, the physiological effects of prescription medications, current treatments, and prevention methods. The following research questions are addressed: 1) What factors influence and promote the growing prevalence of prescription drug abuse among 12 to 17 year olds in the United States? 2) What efforts are being made to address/prevent the prescription drug abuse among 12 to 17 year olds in the United States? 3) What is the relationship between mental disability and prescription drug abuse among 12 to 17 year olds in the United States? 4) To what extent do gender and ethnicity have an effect on the prescription drug abuse among 12 to 17 year olds in the United States? and 5) To what extent does a history of substance abuse lead to current prescription drug abuse among 12 to 17 year olds in the United States? Conclusive answers to the above questions are difficult to establish because further research still needs to be conducted on the various factors surrounding prescription drug abuse among adolescents.

Key Words: prescription drug abuse, adolescents, nonmedical prescription drug use, prescription drug misuse, gender, ethnicity, mental disability, education

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presented on June 9, 2015.

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I understand that my project will become part of the permanent collection of Oregon  
State University, University Honors College. My signature below authorizes release  
of my project to any reader upon request.

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## **INTRODUCTION**

Nonmedical use of prescription drugs, NMUP or NMUPD, is a prevalent and growing problem among adolescents in the United States (Anderson-Butcher 2012). An average of one in 14 adolescents in the U.S. participates in NMUP relative to an average of one in 100 adolescents who do abuse nonprescription drugs (McCauley 2010). Currently, there are not many preventative measures being taken to reduce prescription drug abuse among adolescents. Necessary precautions need to be taken to reduce NMUP among 12-17 year olds in the United States.

There are three main classes of prescription medications that have abuse liability: opioids, benzodiazepines, and amphetamine-like medications. Opioids are used for pain relief, benzodiazepines as central nervous system depressants, and amphetamines for central nervous system stimulants (CDC 2011). Several factors contribute to the rise in nonmedical use of prescription drugs among teenagers. Past trauma, current substance abuse, gender, and ethnicity are a few of the elements affecting the rise in the drug abuse. Many times, friends and family willingly give their prescription medications to adolescents to help them (CDC 2011, NIDA 2014).

This literature review will focus on the factors that affect the NMUP of adolescents in the United States and the preventative measures that can be taken to curb the growing trend of nonmedical prescription drug use. The goal of this project is to address the NMUPD problem and give recommendations to prevent additional teenagers from using prescription drugs non-medically.

## **SIGNIFICANCE**

There is a serious problem of nonmedical prescription drug use in the United States among juveniles. According to the CDC, 71000 children (ages 18 or younger) were seen in emergency departments between 2004 and 2005 because of medication overdose (excluding abuse and recreational drug use and self-harm). For every one death from prescription painkillers, there are 825 nonmedical users and approximately 100 people die from drug overdoses every day in the United States (CDC 2011). The number of overdoses involving opioid pain relievers outnumbered the overdoses concerning heroin and cocaine by 2007 (NIDA 2014).

It is extremely easy for people to get a hold of prescription painkillers. About 55% of the drugs are procured free from friends or relatives (CDC 2011). According to the National Institute on Drug Abuse (NIDA 2014), more than half of 12<sup>th</sup> graders who used prescription opioids surveyed in 2010 were given or bought prescription opioids from family or friends.

## **BACKGROUND**

Prescription drug abuse is defined as

**the use of a medication without a prescription, in a way other than as prescribed, or for the experience or feelings elicited (NIDA 2014).**

The three most commonly abused prescription medications are opioids, central nervous system (CNS) depressants, and stimulants. According to NIDA, between 1991 and 2010 the amount of prescriptions sold by U.S. retail pharmacies for such drugs has increased (76 million to 210 million opioid prescriptions and 4 million to 45 million of stimulants). According to the 2005 U.S. National Survey on Drug Use and Health, non-prescribed use of pain relievers was reported by approximately one in 10 adolescents aged 12–17 years (9.3% in males and 10.3% in females) (Wu 2008). Results from an abuse surveillance program (Researched Abuse, Diversion and Addiction-Related Surveillance, or RADARS) indicated that opioid use, especially of OxyContin and hydrocodone, among street and recreational and street users has become prevalent (Cicero 2005). Compton (2006) reported that increases in abuse of these opioids appear to partly reflect changes in drug formulations and medication prescribing practices, as well as relatively easy access via the internet. Long-term administration of opioids has been associated with clinically meaningful rates of abuse or addiction even though the use of opioid analgesics for the treatment of acute pain appears to be generally benign (Compton 2006). The results of a self-administered Web-based survey of 9161 undergraduate students at a large public Midwestern research university indicated that the majority of undergraduates acquire prescription drugs from their peers (McCabe and Boyd 2005). Even though the study was done with college students, there are potential correlations with a younger population. As a result, a particularly urgent priority is the investigation of best practices for effective prevention and treatment for adolescents, as well as the development of strategies to reduce diversion and abuse of prescription medications (Compton 2006).

Individuals depend on drugs for health reasons but may also become dependent or addicted to them through behavioral abuse. Physical dependence is a result of normal adaptations to chronic exposure to a particular drug and generally includes withdrawal

symptoms and tolerance. Addiction can include physical dependence and it is characterized by compulsive drug seeking and use despite sometimes devastating consequences (NIDA 2014).

Opioids are pain medications that affect the parts of the brain controlling emotion. Main categories of opioids include oxycodone (e.g., OxyContin, Percocet), hydrocodone (e.g., Vicodin), morphine (e.g., Kadian, Avinza), codeine, and related drugs (NIDA 2014). Many people recognize morphine as a pain reliever before and after surgery, hydrocodone for a variety of conditions including dental pain, and codeine for mild pain.

There are three categories of central nervous system (CNS) depressants: benzodiazepines, non-benzodiazepine sleep medications, and barbiturates. Barbiturates have the highest risk of overdose out of the three categories and include phenobarbital (Luminal Sodium), mephobarbital (Mebaral), and pentobarbital sodium (Nembutal) (NIDA 2014). They are used mainly for seizure disorders and surgical procedures. Benzodiazepines are generally prescribed as short term use for a variety of conditions such as anxiety, panic attacks, and sleep disorders. Diazepam (Valium), alprazolam (Xanax), triazolam (Halcion), and estazolam (ProSom) are examples with the latter two being more sedating benzodiazepines (NIDA 2014). Lastly, non-benzodiazepine sleep medications normally have less side effects than benzodiazepines but act on some of the same brain receptors. Medications include zolpidem (Ambien), zalepon (Sonata), and eszopiclone (Lunesta) (NIDA 2014).

Stimulants have a variety of effects including elevating blood pressure, heart rate, and respiration along with increasing attention, energy, and alertness (NIDA 2014). Currently, they are used to treat only a few conditions such as ADHD and narcolepsy. The use of stimulants decreased due to the potential for abuse and addiction (NIDA 2014). Stimulants enhance the effect of certain neurotransmitters and can be considered cognitive enhancers. Common types include methylphenidate (Ritalin, Concerta) and dextroamphetamine (Dexedrine, Adderall). Medically, stimulants can be used to increase blood glucose, blood pressure, and heart rate, constrict blood vessels, and open breathing passages (NIDA 2014).

There are different treatments for addiction to various prescription drugs. Generally a combined pharmacological and behavioral treatment regimen is most

effective (NIDA 2014). Multiple medications exist for opioid addiction including naltrexone, methadone, and buprenorphine. All three medications act in different ways: naltrexone is an antagonist, methadone is an agonist, and buprenorphine acts in both agonistic and antagonistic ways (NIDA 2014). Methadone has been successful in treating heroin addiction although it has not been fully integrated as a way to treat opioid addiction. Vivitrol, a long-lasting version of naltrexone, is ideal for patients with limited access to healthcare or have trouble taking medication regularly (NIDA 2014). All three medications are being researched as ways of treating opioid addiction (NIDA 2014). Particular CNS depressants can cause potentially life-threatening withdrawal symptoms. Medically supervised detoxification should be used to properly taper dosage of the medication. Cognitive-behavioral therapy has been successful in helping patients cope with ceasing benzodiazepine use (NIDA 2014). Currently, there are no FDA-approved medications for treating addiction to prescription stimulants. As a result, a detoxification process followed by behavioral therapies and recovery support groups are recommended (NIDA 2014). More research needs to be conducted in this area to find effective medications for treatment, strategies for prevention and strategies to combat prescription drug abuse.

## TRENDS IN PREVALENCE

Multiple factors can have an effect on nonmedical prescription drug use (NMUP) among adolescents. Age, gender, ethnicity, socioeconomic status, location, past trauma and/or substance abuse, present use of other illicit substances, and mental disabilities all can have a role in the current NMUP among 12-17 year olds in the United States.

The people most at risk are:

**people who obtain multiple controlled substance prescriptions from multiple providers [...], people who take high daily dosages of prescription painkillers and those who misuse multiple abuse-prone prescription drugs, low-income people and those living in rural areas [..., and] people with mental illness and those with a history of substance abuse (CDC 2011).**

These results correlate with a study that suggested that the use of illicit drugs, being female or black, having a low socioeconomic status, and/or having detached parents are all indicators for a high risk of opioid misuse (Sung 2005). Another study among 6<sup>th</sup>-12<sup>th</sup> graders in Mississippi showed an increased risk for nonmedical use of prescription medications based on race, anxiety, mood and suicide-related symptoms, grade level, and substance use (Viana 2012). Similar results were obtained from a 2001 College Alcohol Study (Ford 2008). A wide variety of people were surveyed/in-depth interviews and differences in motives for age, race/ethnicity, and gender among nonmedical use of prescription medicines were found (Rigg 2010). Another study by Ford (2012) showed multiple indicators for ambien misuse including social bonding, depression, strain, peer substance use, attitudes toward substance use, age, income, race, religiosity, and other substance abuse.

According to Young (2012), between January 2000 and June 2011, nonmedical use of pain relievers was more prevalent than for stimulants, sedatives, and tranquilizers among out-of-treatment U.S. adolescents aged 12-17 years. Females were generally associated with pain reliever use and less with tranquilizer use. White adolescents also appeared to have a higher prevalence of nonmedical use of prescription medications (NMUPM), although there was some evidence to the contrary. Older age, delinquency, and illicit drug use were consistently associated with NMUPM.

McCabe and Cranford (2012) reported: five motivational subtypes associated with nonmedical use of prescription opioids (experiment, relax, get high, pain relief, and affect regulation), four subtypes of prescription stimulants (weight loss/enhance energy, enhance energy/awake/high, experiment, and affect regulation), and five subtypes of prescription tranquilizers (experiment, get high, relax/sleep, relax, affect regulation).

According to the 2010 National Survey on Drug Use and Health (NSDUH), approximately 800000 Americans between the ages 12 and 17 participated in nonmedical use of prescription medicine in 2009 for the first time (NIDA 2014). More females than males between the ages of 12 and 17 take part in NMUP (Figures 1 and 2). Figure 3 shows sources of prescription narcotics for high school seniors. The internet is only the source for 1.1% of the seniors. There are illegitimate internet-based pharmacies where the adolescents could be getting the prescription medications from (Jena 2011).

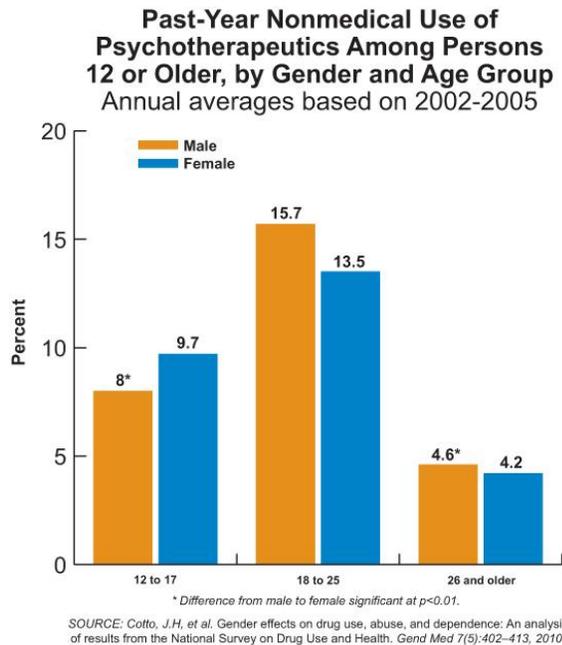


Figure 1. Past-Year Nonmedical Use of Psychotherapeutics Among Persons 12 or Older, by Gender and Age Group (NIDA 2014). There are significantly less males than females who participate in the nonmedical use of psychotherapeutics between 12-17 year olds.

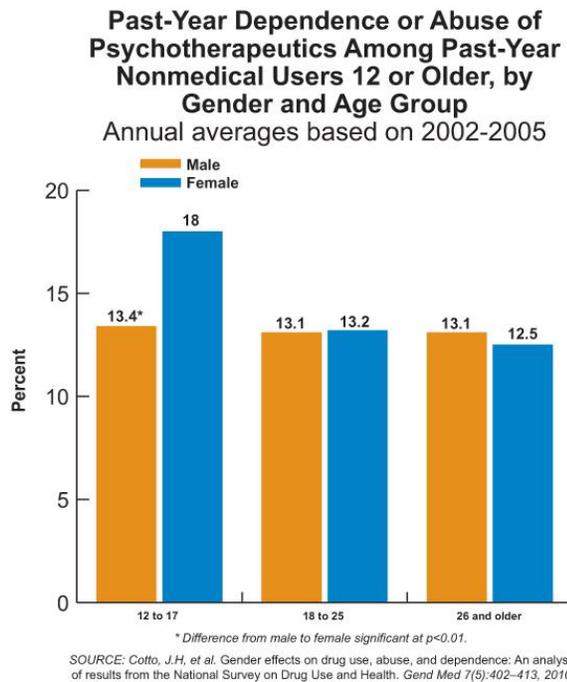


Figure 2. Past-Year Dependence or Abuse of Psychotherapeutics Among Past-Year Nonmedical Users 12 or Older, by Gender and Age Group. There is a significant difference in percentage of male and female users among 12-17 year olds (NIDA 2014).

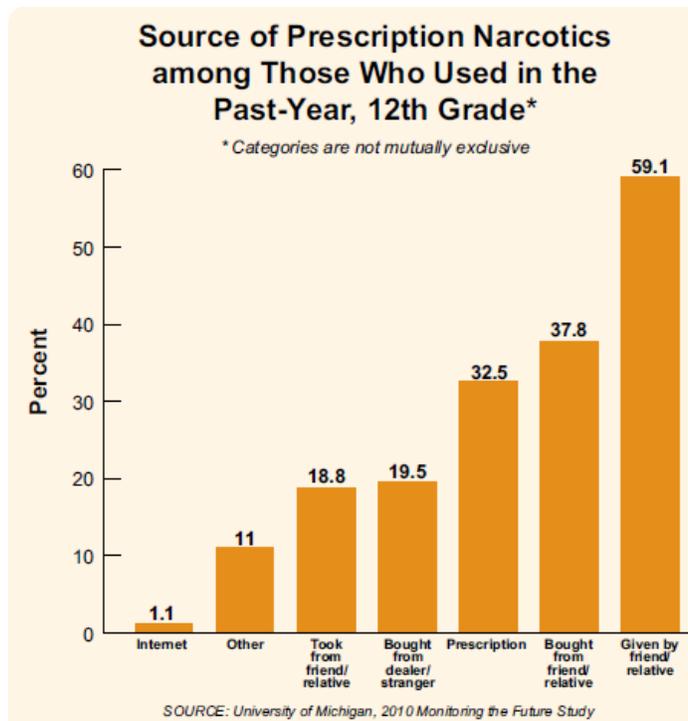


Figure 3. Source of Prescription Narcotics among Those Who Used in the Past-Year, 12<sup>th</sup> Grade. The most common sources of obtaining prescription opioids are friends and family members (NIDA 2014).

Various studies classified the type of use of prescription medications in the following categories: 1) nonusers (did not use controlled prescription medications); 2) medical-users (used their own controlled medications as prescribed); 3) self-treaters (engaged in nonmedical use for self-treatment motivations), and 4) sensation-seekers (engaged in nonmedical use for sensation-seeking motivations) (Boyd 2009). According to this study, the adolescents who used the prescription medications as sensation-seekers were the most likely to partake in problem behaviors (Boyd 2009).

## Gender

Females are more likely to engage in excessive medical use of prescription drugs although there is a higher risk for non-white females (Cranford 2013). Parental substance abuse problems also lead to an increased risk of multiple substance abuse. This risk is higher with females than males (Cranford 2013). Substance use indicated a higher risk of nonmedical opioid and stimulant use. There were higher odds of females abusing the medications that increased with age (Nakawaki 2012). The 2005 and 2006 National

Survey on Drug Use and Health indicated that male patients were more likely to purchase medication or acquire it from a physician whereas female patients were more likely to steal medications or obtain it for free (Schepis 2009).

### **Ethnicity**

There are different factors leading to prescription drug misuse for different ethnicities: According to Harrell (2009), among Caucasians, prescription drug misuse was related to age, alcohol use, marijuana use and delinquent behavior. Among Hispanic young adults delinquent behavior, inhalant use, and maternal warmth were associated with greater prescription drug use, while marijuana use was predictive of lower prescription drug misuse. Regular religious attendance at church was associated with lower prescription drug misuse among Black young adults. White adolescents are more likely to use prescription stimulants than Hispanic adolescents (Herman-Stahl 2006). Data from the 2005 and 2006 National Survey on Drug Use and Health indicated that African American adolescents were more likely to misuse opioids obtained from a physician whereas white adolescents were more likely to purchase opioids (Schepis 2009). A study among college students suggested that students who were white had a higher likelihood of nonmedical use of prescription medications (McCabe 2005). A study by McCabe (2011) using a web-based survey of secondary school students from two school districts in Michigan implied that diversion (giving away, trading, or selling) of controlled medications was significantly linked to being non-White among other factors.

### **Substance Abuse**

Many studies have been conducted to see whether a correlation existed between substance abuse and prescription drug misuse. Past substance use indicated future prescription drug misuse (Harrell 2009). Results from a web-based survey of 1086 7<sup>th</sup>-12<sup>th</sup> graders suggested that there is an association between nonmedical use of prescription medications and an increased likelihood of substance abuse problems (Boyd 2006). A study among college students found that students who reported higher rates of substance use (among other factors) were more likely to non-medically use of prescription medications (McCabe 2005).

Various motives are connected to different substance abuse (McCabe 2013c). A web-based survey of a racially diverse group of secondary public school students in the Detroit metropolitan area illustrated that people who used prescription drugs both medically and non-medically were more likely to report illicit drug use and probable drug abuse than nonusers (McCabe 2007). Data from the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule was used to analyze past-year prescription drug abuse, co-occurrence with other substance use disorders, and use of substance abuse treatment from 1991-1992 and 2001-2002. The co-occurrence of prescription drug use disorders and other substance use disorders increased, the past year prevalence and dependence of prescription opioids and sedatives increased, and substance abuse treatment was employed by only one-half of those with past-year prescription drug dependence (McCabe 2008).

A web-based survey of middle and high school students done twice over 2 years indicated that adolescents who report medical misuse of nonmedical use of prescription opioids for non-pain-relief motives over time have a greater probability of substance abuse (McCabe 2013b). A different survey based study on high school students found that co-ingestion of prescription opioids and other drugs was reported by close to 7 out of every 10 nonmedical users of prescription opioids in a year (McCabe 2012). A web-based survey of secondary school students from two school districts in Michigan was used to determine that substance use is more frequent among adolescents who diverted their controlled medications (McCabe 2011).

CRAFFT is a substance use brief screening test for adolescents that have applications in identifying the subgroups of nonmedical users of prescription opioids who are at the highest risk for a substance use disorder and users who could gain from proper pain management (McCabe 2012). As a result, CRAFFT could be used to tailor prevention methods towards certain at risk adolescents.

## **Location**

Data from the National Survey on Drug Use and Health was used to examine prevalence of stimulant diversion in the United States and indicated that it was not limited to metropolitan areas (Kroutil 2006). A study using surveys indicated that among

rural youth, males and marijuana users had higher odds of nonmedical use of prescription medications (Levine 2009). Higher rates of prescription drug misuse were reported for homeless youth (Rhoades 2014).

### **Social Bond**

A study using data for 1005 adolescents from the National Survey of Child and Adolescent Well-Being (NSCAW) indicated that nonmedical use of prescription medications was positively correlated with the amount of time in the child welfare system and negatively correlated with how close they felt to parents (Cheng 2012). Having strong social bonds with family indicate a lower likelihood of nonmedical prescription drug use (Ford 2009). More nonmedical prescription stimulant use correlated with adolescents who reported high family conflict (Herman-Stahl 2006).

### **Trauma**

McCauley (2011) reported that increased physical and psychological injury indicated a higher risk of engaging in nonmedical use of prescription drugs. McCauley (2011) reported that lifetime history of delinquent behavior, history of witnessed violence, other forms of substance use/abuse, and lifetime history of PTSD were significantly associated with increased likelihood of NMUPD.

Among adolescent detainees, females abuse prescription drugs at a higher level than males (17% vs 10%) (Alemagno 2009).

### **Mental Disability**

Not many studies have been conducted about the relationship between mental disability and prescription drug misuse. A study among American college students found the nonmedical use of prescription drugs to be associated with relatively serious mental illness (Lo 2013). A 2007 National Survey on Healthy Behaviors and Preventive Health Utilizations of People with Intellectual Disabilities in Taiwan found that: “Down syndrome, possession of a Major Illness Card, a history of smoking, an additional impairment, reported health status, outpatient care and acceptance of other specific medical examinations” were all factors that correlated with the regular use of prescribed

medication by adolescents with intellectual disabilities (Yen 2009). According to Stewart (2013), in a study conducted in Ontario, Canada, the misuse of prescription medications by mentally disabled adolescents was associated with being female, having multiple psychiatric admissions, education, threat or danger to self, problem with addiction, history of emotional abuse, use of alcohol, past year use of opiates and cannabis, as well as symptoms of depression. It was less likely to occur among adolescents with a diagnosis of schizophrenia and adolescents who were admitted as a result of posing a threat or danger to others.

### **Access to Prescription Medications**

There are many places adolescents can access prescription medications, the most common being friends and family (NIDA 2014). The majority of adolescents who were prescribed medications in the pain, stimulant, antianxiety, or sedative categories during the 6 months prior to the study had unsupervised access to them at home (Ross 2013). Many high school seniors use prescription opioids non-medically through leftover prescription opioids. Leftover prescription medications are dangerous as they increase the odds of nonmedical prescription opioid use for people who obtained the medications from others (McCabe 2013a). Adolescent male athletes have an increased risk of misuse of opioids as playing sports gives more potential access to opioids (Veliz 2014).

## **PREVENTION METHODS**

Educational programs and the media are both prevention methods for prescription drug abuse among adolescents. NIDA currently has multiple public education projects including a National Drug Facts Week, PeerX (an online interactive campaign for 8<sup>th</sup> through 10<sup>th</sup> graders), a Drugs & Health blog, and a NIDA Science Fair Award for Addiction Sciences (Public Education Projects, NIDA). A newer method of prevention is drug monitoring programs. Oregon passed a bill in order to have the Oregon Prescription Drug Monitoring Program (PDMP) which allows better management of prescriptions and helps prevent doctor shopping (Oregon PDMP Public Portal). There are also medicine take-back programs that are good ways to safely dispose of the majority of medications. If communities do not have a medicine take-back program, consumers can contact collectors who are registered with the U.S. Drug Enforcement Agency (DEA) for proper disposal (U.S. Food and Drug Administration).

A study about messages on social media revealed that Twitter users who discuss prescription drug abuse online are potentially reinforcing a negative behavior by surrounding themselves with others discussing the topic (Hanson 2013). Although in this case social media was potentially reinforcing a negative behavior, there is potential for positive reinforcement. A novel semantic web platform called PREDOSE, Prescription Drug Abuse Online Surveillance and Epidemiology, is being developed to study prescription drug abuse through social media (Cameron 2013). Based on preliminary results, PREDOSE has strong applications for advancing drug abuse epidemiology (Cameron 2013).

Generation RX is a prevention strategy developed by the College of Pharmacy at Ohio State University and contains three toolkits that target different groups: youth, elderly, health professionals and other adults (Anderson-Butcher 2012). The various toolkits are a way to distribute facts about prescription drug abuse. For example, the youth toolkit is made as a presentation tool and contains interactive materials for activities that apply to various adolescent learning styles (Anderson-Butcher 2012). The Cardinal Health Foundation, CHF, provided funding to implement Generation RX into various youth-serving agencies in order to:

**1) increase awareness of prescription drug abuse, 2) increase knowledge of the dangers of abusing prescription drugs and how to reduce access to prescription drugs, and 3) increase interest in and develop skills to openly discuss issues related to prescription drug abuse (Anderson-Butcher 2012).**

Both adults and youth were surveyed after the completion of the entire program consisting of a training, workshop, or activity. Initial results provided many positive results including 87% of youth reporting that they would be less likely to share prescription drugs and 81% reporting that they are more aware of the dangers of prescription drug abuse (Anderson-Butcher 2012). Another study determined that prescription drug misuse among adolescents can potentially be reduced due to brief universal interventions (Spoth 2013).

A 2006 study looked at pharmacists' knowledge, attitudes, and practices relating to prescription drug abuse. Out of the 484 pharmacists surveyed, 29.2% had reported not having taken any sort of addiction education. The study implied that pharmacists who had taken addiction education were more likely to advise patients about prescription drug abuse (Sivagnanam 2011).

## **SUMMARY**

Currently prescription drug abuse among adolescents in the United States is on the rise. The three most common classes of prescription medications are opioids, central nervous system (CNS) depressants, and stimulants. Generally, a different combination of behavior therapy and pharmaceuticals are used to treat addiction to the various prescription medications. Opioids are pain killers which bind to opioid receptors and reduce the perception of pain. CNS depressants provide a relaxing effect by acting on the neurotransmitter: gammaaminobutyric acid. All the prescription medications can have various side effects such as physical dependence on opioids, depress in respiration due to CNS depressants, and cardiac arrhythmia from stimulants.

Studies have been conducted in relation to gender, ethnicity, substance abuse, location, social bond, and trauma in relation to prescription drug abuse among adolescents in the United States. General trends show more females abusing prescription medications at younger ages. Past trauma, increased substance abuse, and less strong familial bonds all show correlation to a higher risk of nonmedical use of prescription medications. There have not been many studies on the relationship between mental disability and prescription drug abuse among adolescents in the United States. There have been studies conducted among adults and adolescents in other countries and have potential correlations to the trends among adolescents in the United States.

Both education and social media have applications for prevention of prescription drug abuse among adolescents. Currently, educational programs are more prevalent. Generation RX uses presentations in the form of various interactive materials that appeal to different learning styles of adolescents in order to teach them about the dangers of prescription drug abuse. A novel web platform, PREDOSE, is being developed to further the knowledge base of drug abuse epidemiology.

## **RESEARCH QUESTIONS**

The following research questions address important issues that relate to prescription drug abuse among 12 to 17 year olds in the United States:

1. What factors influence and promote the growing prevalence of prescription drug abuse among 12 to 17 year olds in the United States?
2. What efforts are being made to address/prevent the prescription drug abuse among 12 to 17 year olds in the United States?
3. What is the relationship between mental disability and prescription drug abuse among 12 to 17 year olds in the United States?
4. To what extent do gender and ethnicity have an effect on the prescription drug abuse among 12 to 17 year olds in the United States?
5. To what extent does a history of substance abuse lead to current prescription drug abuse among 12 to 17 year olds in the United States?

**QUESTION 1: What factors influence and promote the growing prevalence of prescription drug abuse among 12 to 17 year olds in the United States?**

Many factors influence the growing prevalence of prescription drug abuse among adolescents. Gender, ethnicity, substance abuse, location, social bond, trauma, mental disability, and access to prescription medications are all factors that influence the growing prevalence. According to the CDC (2011), using multiple substances, low-income, living in rural areas, and mental illness are all risk factors for prescription drug abuse. Consistent with a study by Sung (2005), low socioeconomic status and illicit drug use are also factors. The study also found gender, ethnicity, and weak familial bonds to be factors that influence the high risk of opioid misuse among this age group. A study by Young (2012) indicated that older age, delinquency, and illicit drug use were all associated with the nonmedical use of prescription medication among adolescents. Most studies did not discuss the extent to which delinquency was a risk factor for prescription drug misuse. These studies provided evidence that rather than just one factor, a combination of factors generally contributes to this trend.

Most of those factors influence rather than promote the rise of prescription drug abuse. Easy access to medications and social bonds would have more of an effect in promoting the use of prescription medications over the other factors. A study by NIDA (2014) showed that the most common sources for prescription medications for nonmedical use are willing friends and family members. This illustrates that family and friends promote the nonmedical use of prescription medications by willingly providing them. Peers are also a major influence, especially among adolescents and their desire to fit in.

Although in-depth studies on trends before and after education have not been conducted, studies on educational strategies demonstrated that education is indeed a factor. The study by Anderson-Butcher (2012) on Generation RX, a prescription drug abuse prevention strategy based on education, showed that 87% of youth who went through the program were less likely to share prescription drugs. Therefore youth who have been counseled by pharmacists are less likely to abuse prescription drugs (Sivagnanam 2011). Parents and adolescents need to be educated because socially prescription drugs are seen as better than other illicit substances.

The growing prevalence of prescription drug abuse among this age group continues to be an issue that challenges parents, medical professionals, and members of the pharmaceutical professions. It is clear that future efforts to reduce prescription drug abuse will need to focus on a multi-faceted approach. This approach would include progressively persuasive laws surrounding prescription drug abuse, educational strategies that involve effective decision making and problem solving strategies.

**QUESTION 2: What efforts are being made to address/prevent the prescription drug abuse among 12 to 17 year olds in the United States?**

Due to the rise in prescription drug abuse among adolescents, more research in educational methods and social media are investigating ways to prevent prescription drug abuse. PREDOSE is a web platform being developed for social media that facilitates further epidemiological research of prescription drug abuse (Cameron 2013) The platform uses social media to gain insight into prescription drug abuse via online shared opinions and conversations that health professionals otherwise potentially would not know about. The research is taking advantage of the increased reliability on technology and social media to further research and consequently prevention methods.

Generation RX is an education tool for various target audiences (Anderson-Butcher 2012). It is used as a presentation tool with various interactive materials for youth and accounts for multiple learning styles. In a survey-based study on pharmacists, many pharmacists reported as not having much addiction education (Sivagnanam 2011). The results indicated that pharmacists with more addiction education were more likely to counsel their patients. These results can feasibly be extended to other health professionals as well.

The Generation RX toolkits are developed for multiple audiences including health professionals. If the studies can be replicated for Generation RX, it would be advisable to use the toolkits for health professionals, especially since many do not have a lot of education about addiction. Additionally, more research needs to be done on the application of social media as a prescription drug abuse prevention tool. Currently, PREDOSE is part of one of the only published research in the area. According to Hanson (2013), Twitter users who talk about prescription drug abuse surround themselves with similar people online. Potentially, advertisements or suggested links that appear in social media, such as Facebook, could focus on prescription drug abuse prevention rather than prescription drugs or pharmacies.

Educational programs and social media platforms are currently being researched in order to expand the knowledge base about prescription drug abuse and to gain insight into educational strategies to best help prevention methods. It is apparent that future prevention methods should incorporate better education strategies, such as Generation

RX, and use the growing technology to its advantage. These strategies should take into account the cognitive development of the age group that is targeted along with various learning styles. For example, introducing discussion groups for older students will allow them to interact with their peers and older individuals and will guide them to clarify their perceptions and viewpoints in order to engage in safer and well-structured decision making.

### **QUESTION 3: What is the relationship between mental disability and prescription drug abuse among 12 to 17 year olds in the United States?**

There were no relevant studies that examined the correlation between prescription drug use and mental disability among adolescents in the United States. Studies were found from Canada and Taiwan among various age groups. The research that is used for adults from other countries provides interesting opportunities for comparison to United States adolescents in similar socioeconomic classes.

A study by Lo (2013) reported a relationship between nonmedical use of prescription drugs and serious mental illness among American college students. Even though the study was conducted with college students, similar results could likely be expected in adolescents in the same socioeconomic classes. A study of adolescents in Taiwan also found a correlation between intellectual disabilities and the regular use of prescription medicine (Yen 2009). Just as with the previous study, these results could be indicative of a possible correlation among adolescents in the United States and prescription drug misuse, assuming similar lifestyles and living situations. The last study used for the literature review was for adolescents with severe mental health problems in Ontario, Canada. The study by Stewart (2013) focused on factors within adolescents with mental health problems that correlated to prescription drug misuse. The study provided evidence of gender and past substance abuse as being risk factors for prescription drug abuse among adolescents.

The studies that were looked at provide a good starting ground for future studies in the United States. Currently, it is hard to determine the relationship between mental disability and prescription drug abuse among adolescents in the United States but if the trends among adolescents and adults in other countries hold true, it could be said that there is a positive correlation between the two. More research definitely needs to be conducted in this area in order to better understand to what extent mental disability plays a role in prescription drug abuse among adolescents in the United States as compared with other factors.

Prescription drug abuse among adolescents with mental disabilities is a current problem. Research is limited. Research investigations in this area have not examined mental disability, including ADHD, depression, bipolar disorder, and schizophrenia.

**QUESTION 4: To what extent do gender and ethnicity have an effect on the prescription drug abuse among 12 to 17 year olds in the United States?**

Multiple studies showed a correlation between prescription drug abuse among adolescents and both gender and ethnicity. In general, for the 12-17 year age group, females are more likely to abuse prescription medications than males (NIDA 2014). Although females have a greater likelihood of engaging in excessive medical use of prescription drugs, there is a higher risk for non-white females (Cranford 2013). This demonstrates that females are at a much higher risk than males in this age group for prescription drug abuse.

There are different factors leading to prescription drug misuse for different ethnicities. A study by Herman-Stahl (2006) determined that white adolescents are more likely to use prescription stimulants than Hispanic adolescents. This study provides evidence of a higher risk of prescription stimulant abuse among white adolescents even though other studies demonstrate a higher risk for general prescription drug abuse among non-White adolescents. A study by Schepis (2009) indicated that African American adolescents were more likely to abuse prescription opioids. A study among college students suggested that students who were white had a higher likelihood of nonmedical use of prescription medications even though a web-based survey of secondary school students implied that diversion of controlled medications was significantly linked to being non-White among other factors (McCabe 2011). The diversion of medications is just as important as prescription drug abuse. Stopping diversion of prescription drugs will be a good way to help prevention of the drug abuse among adolescents.

There were a lot of studies that examined the reported abuse of prescription medications as compared to actual prescription drug abuse. There could be multiple reasons for this but the most likely seems to be that many studies were using surveys that had inherent biases in them. It is likely that not everyone answered truthfully.

Gender and ethnicity both seem to have a big impact on the levels of prescription drug abuse among adolescents although gender has more consistent trends than ethnicity. It was interesting that females abuse more prescription medications at younger ages but males abuse them at about the same level or at higher levels as age increases. This could be due to females abusing a greater variety of drugs as they get

older and abuse other substances more than prescription medications and/or males just abuse prescription medications more as they get older.

It is difficult to compare gender or ethnicity to other factors, such as substance abuse, as they are very different. Gender and ethnicity are inherent traits that cannot be changed. It is clear that future prevention strategies should take into account the greater risk for adolescent prescription drug abuse among females and different genders along with stopping prescription drug diversion. Further research needs to be conducted on the relationship between prescription drug use and ethnicity as there are not many studies focused on purely ethnicity and prescription drug abuse. Most studies look at ethnicity in combination with other factors. Additionally, there are not many consistent results regarding ethnicity in relation to prescription drug abuse. It was difficult to find two studies that looked at the exact same ethnicity and prescription drug.

**QUESTION 5: To what extent does a history of substance abuse lead to current prescription drug abuse among 12 to 17 year olds in the United States?**

Many studies show a positive correlation between substance abuse and prescription drug abuse both in terms of substance use affecting prescription drug use and vice versa. A study by McCabe (2005) found that college students were more likely to non-medically use prescription medications if they had high rates of substance abuse. This study provides evidence that substance abuse is correlated to prescription drug abuse. Even though the study is among college students, similar trends could likely be expected among adolescents. Although adolescents aged 12 – 17 are likely to not have past chemical abuse, those who partake in nonmedical use of prescription medications are likely to abuse substances in the future. According to Harrell (2009). Future prescription drug misuse is indicated by past substance use. This study resulted in similar trends as the McCabe 2005 study among college students.

As stated earlier, it is difficult to tell the extent of the effect of past substance abuse in relation to other factors that lead to prescription drug abuse among adolescents. Through the studies, it seems as if past substance abuse and gender are the two most influential factors when looking at trends for prescription drug abuse. Gender and past substance abuse are very different as gender is an inherent quality that is associated with a trend in prescription drug abuse and past substance abuse is an external factor that can be controlled. Future research should focus on establishing the extent to which past substance abuse leads to future prescription drug abuse as compared to other factors, both inherent and external.

Substance abuse is already a serious problem. Research has shown that a history of substance abuse among adolescents is a definite risk factor for prescription drug abuse. It is evident that future prevention techniques should incorporate strategies for dealing with potentially multiple addictions.

## **CONCLUSION**

Prescription drug abuse among 12-17 year olds in the United States is growing and prevalent problem. There are many factors that influence the increase in abuse including location (i.e. rural or urban), presence of a mental disability, and level of education. Gender and ethnicity are both inherent factors whereas past substance abuse is an external factor that can be changed. Multiple factors have more of an effect than any single factor. Currently research is being conducted, including assessing the value of social media in techniques for preventing prescription drug abuse. Education and social media both have many applications but education has more current research.

Many of the studies used survey, such as the National Survey on Drug Use and Health from NIDA or a Web-based questionnaire, to obtain data. Although, it was assumed that the data from the surveys was accurate but there is a possibility that not all answers were truthful.

## **RECOMMENDATIONS**

The following recommendations represent important issues that need to be addressed in relation to prescription drug abuse among adolescents in the United States:

- There needs to be an increase education in homes, schools, and among health professionals about prescription drug abuse.
- Homes and schools need to provide more education about prescription drug abuse.
- Social media needs to be incorporated into education and prevention techniques.
- Health professionals need to advise their adult patients on the risks of prescription drug abuse among adolescents.
- Medications not prescribed for adolescents need to be inaccessible to them.
- State databases need to record all prescribed medications to prevent “doctor shopping” among potential abusers.
- Medicine take-back programs need to be incorporated into every community for better disposal methods and less access to leftover prescription medications.
- Future research should focus on preventing the growth of nonmedical use of prescription drugs in the United States among adolescents.
  - Future research should: examine educational techniques that would effectively prevent prescription drug abuse (including prevention of diversion of medications), focus on potential correlations between mental disability and prescription drug abuse, focus on the trends related to prescription drug abuse related to ethnicity and gender, and look further into the best ways to educate health professionals and adolescents.

## **PERSONAL VIEWPOINT**

Overall, the research was interesting. I learned a lot about prescription drug abuse that I did not know prior to conducting the literature review. I had not heard about prescription drug abuse prior to taking a class on addictions a couple years ago. A lot of schools had programs like DARE and GREAT which used fear tactics on elementary and middle school students to try and convince them to not to do drugs. I find it curious that they never talked about prescription drugs.

Some studies about ethnicity had some opposing findings. I had expected that there were many factors that contributed to prescription drug abuse among adolescents but I had not realized the extent to which the abuse occurred. While a lot of research exists on many of the factors, there were surprisingly few studies pertaining to possible correlations between mental disability and prescription drug abuse. One of the studies covered earlier mentioned factors among severely mentally disabled adolescents who misuse prescription medications. It was interesting that some of the risk factors, such as gender (being female) and substance abuse, are the same for adolescents with mental disabilities and others in the same age group. It would be noteworthy to conduct additional studies to find out if any risk factors for prescription drug abuse differ between the two groups.

Additionally, I did not expect the varying levels of education on addiction that pharmacists receive and the effect that it had on their patient counseling. Considering that pharmacists need to be able to effectively advise adult patients to not give their children prescription medications, I would be very interested in further research of proper education among pharmacists and to what extent that correlation holds true with other health professionals.

The majority of the studies that I looked at used either a web-based survey or the National Survey on Drug Use and Health. I found it curious that so many studies used surveys. A lot of the articles did not mention the inherent bias in surveys so a lot of the numbers may vary. Most likely the trends will be the same but the quantitative values will not be. Accurate numbers would be useful to be able to tell the magnitude of prescription drug abuse among adolescents.

Coming up with and answering the five research questions gave me a lot of insight into the current research on prescription drug abuse among adolescents. The numerous factors that contribute to the rise in adolescent prescription drug abuse will require a multi-faceted approach, involving progressively persuasive laws and educational strategies focusing on more informed decision making, in order to have the most effective prevention techniques. Social media has numerous applications for current and future generations due to the integration of technology in daily life. Overall, I learned a lot from the research but I feel that a lot more studies need to be conducted in order to have a more complete understanding of each factor that influences adolescent prescription drug abuse and subsequently, the best prevention methods.

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