

Abuse of Prescription Drugs Compared to Abuse of Over-the-Counter Drugs

by

Sindura Thota

Submitted to the Department of Health and Human Sciences

Eastern Michigan University

in partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

in

Clinical Research Administration

December 25, 2013

Ypsilanti, Michigan

Abstract

Drug abuse has become a major concern in the world. Abuse can occur with either prescription drugs or over-the-counter drugs. To discover which of the two types of drugs contributes more to drug abuse, information from recent surveys on the number of individuals who have abused prescription or over-the-counter drugs were collected. The data collected showed that the number of individuals abusing prescription drugs is more than the number of individuals abusing over-the-counter drugs. Information was also collected on why over-the-counter drug abuse is less appreciated than prescription drugs.

Keywords: prescription drugs, over-the-counter drugs, drug abuse

TABLE OF CONTENTS

Abstract 1

Introduction..... 4

Background 6

Health Effects of Prescription and Over-the-Counter Drug Abuse..... 10

Methodology 12

Results..... 13

Discussion..... 19

Conclusion 21

References..... 22

Appendix A: Measures for Prevention..... 26

Appendix B: Actions by the Government..... 29

List of Tables

<u>Table</u>	<u>Page</u>
Table 1. List of the Most Commonly Abused Prescription Drugs.....	8
Table 2. List of the Most Commonly Abused Over-the-Counter Drugs.....	10
Table 3. Prescription and Over-the-Counter Drug Abuse in 9th and 11th Graders	14
Table 4. Comparison of Prescription and Over-the-Counter Drug Abuse Among 8th, 10th, and 12th Graders.....	16
Table 5. Comparison Between Prescription and Over-the-Counter Drug Abusers	16

List of Figures

<u>Figure</u>	<u>Page</u>
Figure 1. Nonmedical use of Prescription and Over-the-Counter Medications by 12th Graders	13
Figure 2. Percentage of Prescription and Over-the-Counter Drugs Abuse by Teens.....	15
Figure 3. Prescription Drugs Abused by Persons Aged 12 or Older from 2002 to 2012.....	17
Figure 4. Psychotherapeutic Drug Abusers from 2002 to 2012.....	18

Introduction

According to the Food and Drug Administration (FDA, 2012), a drug is defined as:

- A substance recognized by an official pharmacopoeia or formulary.
- A substance intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease.
- A substance (other than food) intended to affect the structure or any function of the body.
- A substance intended for use as a component of medicine, but not a device or a component, part or accessory of a device.
- Biological products are included within this definition and are generally covered with the same laws and regulations, but differences exist regarding their manufacturing processes (chemical process versus biological process).

Drug abuse is defined as the excessive drug use that is inconsistent or unrelated to acceptable medical practice and is intended to cause damage to a person's health (Food and Drug Administration, [n.d]). Drug abuse is increasing, as individuals are taking drugs in higher quantities than prescribed, for an indication other than that prescribed, and taking drugs that were prescribed for another individual (Michael, 2010). Drug abuse can be of either prescription drugs, which are prescribed for a particular indication, or of over-the-counter drugs.

Controlled substances are drugs that are regulated by the Federal Controlled Substances Act and have the potential for dependence or abuse (awarerx.org, [n.d]). All controlled substances have the potential for abuse. Drug abuse can alter a person's thoughts and mood, and through the drug's action on the brain and spinal cord, some of these drugs can alleviate pain,

depression, or anxiety. Though these drugs are useful therapeutically, the “feel-good” effects can lead some users to abuse them (Drug Enforcement Administration, 2011).

Drug abuse caused by prescription drugs was compared to drug abuse caused by over-the-counter drugs. Michael (2010) stated that the concern over drug abuse is increasing, as it can lead to respiratory depression, withdrawal seizures, and a dangerous increase in blood pressure when the drugs are combined with alcohol or other drugs. According to Levine (2007), prescription and over-the-counter cough and cold medication abuse have become a national health concern for adolescents. The primary purpose of this research was to discover whether prescription or over-the-counter drugs are abused more.

Background

Statewide norms are provided by the biennial statewide California Student Survey (CSS), which is sponsored by the Office of the Attorney General. The CSS conducts a survey on individuals who use alcohol, diverted prescription and over-the-counter drugs and illicit drugs for feelings of euphoria. The purpose of the survey is to find the total percentage of respondents who tried at least one such drug in their lifetime (Austin & Skager, 2006).

The Partnership Attitude Tracking Study (PATS) is a national organization that tracks teens' drug and alcohol use and their parents' attitudes toward the abuse of substances by teens. During the year 2012, one in four people aged 12 to 18 abused prescription drugs (PATS, 2012).

The Drug and Alcohol Services Information System (DASIS) is a cooperative program between the Substance Abuse and Mental Health Services Administration (SAMHSA), an agency of the U.S. Department of Health and Human Services, and the state Substance Abuse Agencies to gather all of the information on the range of substance abuse. DASIS helps in collecting information on the number of individuals abusing prescription drugs, over-the-counter drugs, alcohol, and illicit drugs (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012).

Prescription Drug Abuse

According to the National Institute of Health, [n.d] prescription drugs are medicines that are used to treat injuries and illnesses. These drugs, which can only be obtained by prescription from a registered medical professional, are used to treat individuals with various health problems. When a drug is prescribed by a physician, the pharmacist gives the patient directions on how to use the prescribed drug. When prescribing a drug to a patient, the physician should be careful to prescribe the correct dosage and be cognizant of any interaction with the concomitant

use of other medications. A patient's previous health history is also important when prescribing certain drugs.

Not all prescription drugs are addictive. Similarly, not all drugs produce mind-altering effects. The National Institute on Drug Abuse (NIDA, [n.d.]) stated that every year, millions of individuals abuse prescription drugs. Drug abuse can also be characterized as when a substance with a pharmacological effect is taken voluntarily for personal pleasure or satisfaction, rather than for medicinal use. Abuse of prescription drugs may be life-threatening and harmful to an individual when a drug is taken in a way other than how it is prescribed. One reason behind the increase in prescription drug abuse is that the drugs are often readily available at home, which increases the chance of abuse more so than administering the medicines for the prescribed indication (Michael, 2010). SAMHSA (2012) reported that nearly 52 million persons aged 12 or older abused prescription drugs for nonmedical reasons in 2008.

Abuse of prescription drugs can occur in one of three ways: (a) individuals fail to follow the directions on the prescription, resulting in the incorrect dose; (b) individuals administer drugs unnecessarily; or (c) individuals administer prescribed drugs that are not prescribed for them. In some cases, individuals take doses in combination with other drugs, such as alcohol, which is potentially dangerous. In other cases, individuals might prolong the administering of drugs, even though the actual indication for which the drug was prescribed was cured. Addiction to or dependence on a drug is a condition that ensues when an individual begins taking a drug and is unable to stop (Dowling et al., 2008). According to the Drug Enforcement Administration (2011), the most commonly abused prescription drugs are:

- **Opiates:** These drugs are taken by individuals to reduce pain and are mostly used after accidents or surgery.

- **Stimulants:** These drugs stimulate and speed up brain activity, causing individuals to feel more awake.
- **Sedative-hypnotic drugs:** These drugs slow down the activity of the brain, causing individuals to feel less anxious and sleepier.
- **Anabolic steroids:** These drugs affect growth and can also cause changes similar to those that occur during puberty. Some individuals abuse steroids to improve their looks or skill at sports.

The most commonly abused prescription drugs and their nonmedical side effects are provided in Table 1.

Table 1. List of the Most Commonly Abused Prescription Drugs

Drug Name	Nonmedical side effects
Amphetamines	Feelings of alertness and weight suppression
Barbiturates	Feelings of sedation
Benzodiazepines	Feelings of sedation
Dextroamphetamine	Feelings of increased alertness, increased ability to focus, less of a need of food and sleep, euphoria and self-confidence
Diphenoxylate	Feelings of euphoria
Meperidine	Feelings of sedation
Methylphenidate	Feelings of alertness and concentration
Oxymetholone	Reduction of body fat, ability to build lean muscle mass
Oxyandrolone	Provision of a harder and more cut appearance of muscles

Over-the-Counter Drug Abuse

Over-the-counter drugs are medicines that are obtained directly from a pharmacy without a prescription from a doctor (Bond & Bradley, 1996). An example of this is a retail or community pharmacy where drugs are available without a prescription. The advantage of these medicines is the convenient access to them. By accessing these medications, individuals are active participants in treating their illnesses. A perception also exists in the public that over-the-counter drugs are safer than prescription medications (Bissell, Ward, & Noyce, 2001; Hughes, Whittlesea, & Luscombe, 2002; Raynor et al., 2007). However, it is recognized that over-the-counter drugs have the potential for harm, such as their potential to cause dependency and addiction. Over-the-counter drugs can be dangerous and lead to overdose or death. Additionally, over-the-counter drugs are less expensive, when compared to illicit drugs, making them more prone to abuse.

According to Lessenger and Feinberg (2008), medications such as caffeine, salbutamol, docusate sodium and dextromethorphan (DXM) are liable to be abused. DXM is abused the most and used for the feelings of euphoria. Over-the-counter Coricidin HBP Cough and Cold tablets contain potent doses of DXM when compared to cough syrups. Diphenhydramine and dimenhydrinate are other drugs that are abused the most after DXM (Halpert, Olmstead, & Beninger, 2002). One of the most popular over-the-counter drugs for motion sickness is dimenhydrinate, and when it is abused, it can cause hallucinations. Herbal diet pills are also considered dangerous, as they are not well regulated by the FDA.

Cooper (2013) stated that over-the-counter drug abuse has been recognized as a problem that exists internationally. Research on over-the-counter drug abuse is needed to explore the extent of the problem and to provide a deeper insight into those who have been affected. Such

research is also needed by healthcare professionals to avoid harming the individuals that buy the medications, which are available over the counter and are liable to be abused.

The most commonly abused over-the-counter drugs and their nonmedical side effects are presented in Table 2.

Table 2. List of the Most Commonly Abused Over-the-Counter Drugs

Drug	Nonmedical side Effects
Dextromethorphan	Feelings of euphoria from larger amounts of the drug
Salbutamol	Feelings of euphoria
Docusate sodium	Ridding unwanted calories, weight loss
Caffeine	Shape maintenance through appetite suppression
Diphenhydramine	Feelings similar to that of being drunk on alcohol

Health Effects of Prescription and Over-the-Counter Drug Abuse

The National Institute of Drug Abuse (2013) stated that when administered as intended, over-the-counter and prescription drugs are able to treat particular mental or physical symptoms. However, similar to illicit drug use, when over-the-counter drugs are taken in different quantities or used for symptoms that are not indicated, they may affect the brain in many ways. For example, Methylphenidate which is used as a stimulant, achieves its desired effect similar to cocaine by acting on the same neurotransmitter systems. Oxytocin, a pain reliever, attaches to the same cell receptors that are targeted by illegal opiates such as heroin. Prescription depressants, such as penicillide, produce calming and sedative effects, similar to drugs such as 4-hydroxybutanoic acid (GHB) that are commonly used recreationally. DXM, when taken in high

doses, acts on the same cell receptors as phencyclidine (PCP) or ketamine and produces similar “out-of-body” experiences. Each of these classes of drugs, when abused, causes a direct or indirect pleasurable increase in the dopamine amount, which is in the brain’s reward pathway. Repeatedly taking these drugs to experience that feeling can lead to addiction. Abuse of prescription and over-the-counter drugs alters a person’s judgment and decision making, leading to behaviors which are dangerous, such as unsafe sex and driving when drugged.

Stimulants such as caffeine strongly affect the cardiovascular system (NIDA, [n.d]). When taken in high doses, stimulants can raise an individual’s body temperature and cause irregular heartbeats, heart failure, or seizures. Hostility or feelings of paranoia have also been reported when high doses of stimulants are taken repeatedly.

(Lord et al., 2009) Opioids can affect an individual through constipation and drowsiness and depending on the dose, they may also affect breathing. The latter effects are more dangerous with opioids when they are taken with other drugs or alcohol. Overdoses of prescription opiates can lead to death

Central nervous system (CNS) depressants can slow brain activity and cause sleepiness and loss of coordination. Continuous use of CNS depressants leads to physical dependence, and users experience withdrawal symptoms when they discontinue use. Dextromethorphan can cause impaired motor function, numbness, nausea, vomiting, increased heart rate, and high blood pressure. The drug can also lead to hypoxic brain damage, which is caused by severe respiratory depression and lack of oxygen to the brain (Drug Enforcement Administration, 2006).

Methodology

The main focus of the research was to collect the data to analyze whether prescription or over-the-counter drugs were abused more. The literature search was done on government organizations that produce reports on the abuse of various drugs. These organizations conduct surveys to collect data on the number of individuals abusing drugs, not primarily prescription or over-the-counter drugs. From these surveys, data were collected on the number of individuals abusing prescription and over-the-counter drugs. Data collection was directed at the number of individuals that have abused prescription and over-the-counter drugs. The data collected were based on the number of abusers that were reported from 2001-2012 and also on the quantitative analysis on most prescription and over-the-counter drugs that were abused. Collected data were then analyzed to determine whether prescription or over-the-counter drugs were abused more.

Results

According to the Monitoring Future Study (2009), prescription and over-the-counter drugs account for 7 of the top 14 categories of drugs abused by 12th graders. Of the 7 prescription and over-the-counter drugs, Vicodin, Adderall, Tranquilizers, OxyContin, Sedatives and Ritalin are prescription drugs and Cough Medicines are over-the-counter drugs.

Figure 1 shows data of the percentage of abusers from a study that was conducted on 7 million 12th graders.

Figure 1. Nonmedical use of Prescription and Over-the-Counter Medications by 12th Graders

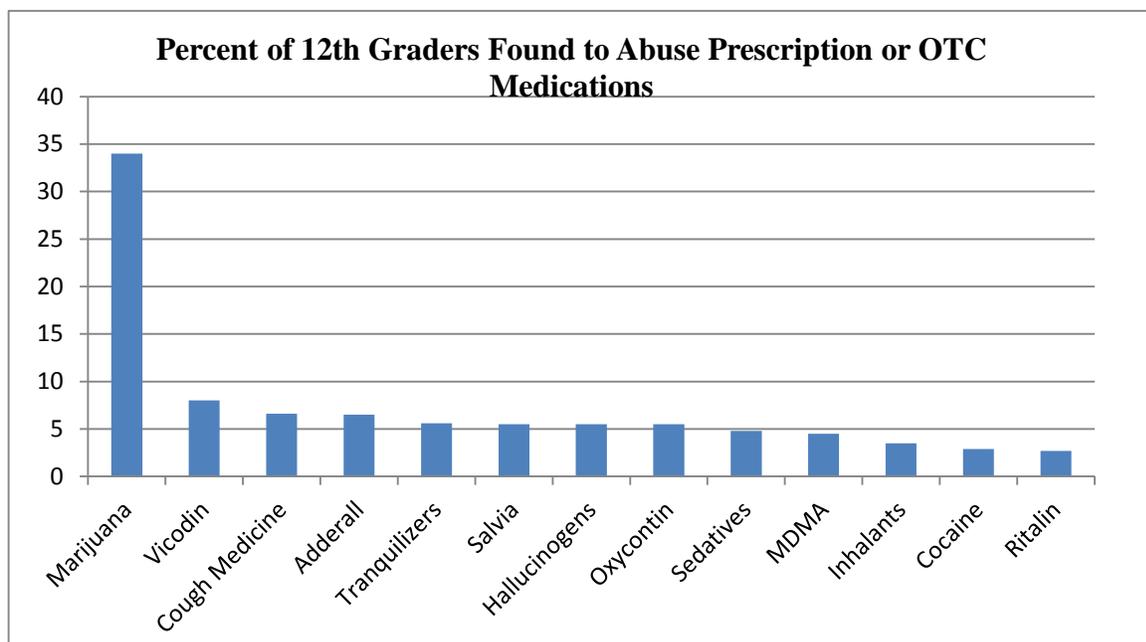


Figure 1: Adapted from "Prescription Drugs: Abuse and Addiction" from www.drugabuse.gov/sites/default/files/rprescription.pdf

The California Student Survey (CSS) conducted in 2005-2006 involved the assessment of the percent of 9th and 11th graders who abused prescription and over the counter drugs. The

10,638 students who participated in the survey were from a randomly selected representative sample of 113 schools. This survey was conducted under conditions of strict confidentiality and student anonymity. Table 3 presents the percentage of 9th graders and 11th graders who were found to have abused prescription and over-the-counter drugs by the CSS (2006).

Table 3. Prescription and Over-the-Counter Drug Abuse in 9th and 11th Graders

	Over-the-Counter	Prescription
9th graders	26%	37%
11th graders	25%	50%

Table 3. Adopted from "California Student Survey of Drug, Alcohol & Tobacco Use 2005-06" from http://www.wested.org/online_pubs/hhdp/css_11th_highlights.pdf. Values from the above table represent the percentage of 9th graders and 11th graders abusing prescription and OTC drugs among the total population participated in the study.

The National Institute of Drug Abuse collected the results of drug abuse among teens in the year 2008. Figure 2 illustrates the percentage of individuals that abused the different classes of drugs. Prescription drugs are abused the most (after marijuana), and over-the-counter drugs follow. The results indicate that among the 4.7 million survey participants, 19% had abused prescription drugs and 10% had abused over-the-counter drugs. The number of individuals abusing prescription drugs is higher when compared to that of over-the-counter drugs.

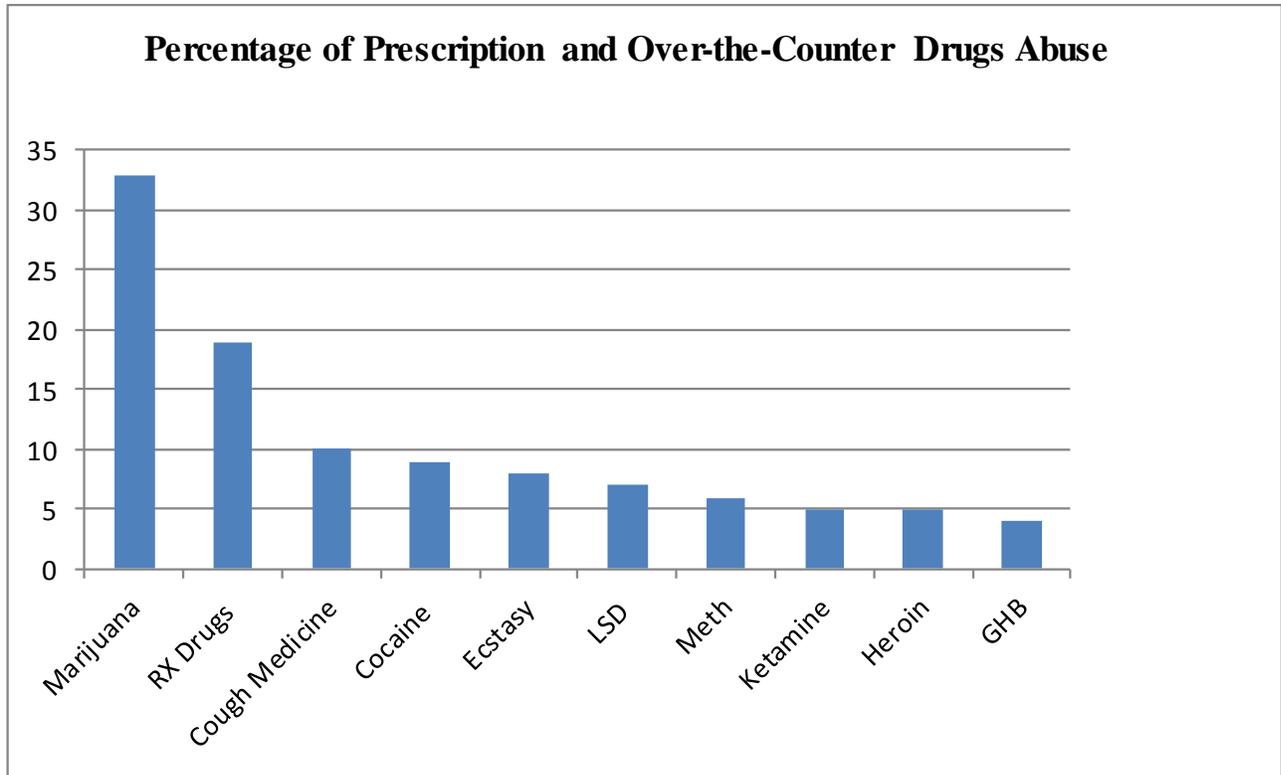
Figure 2. Percentage of Prescription and Over-the-Counter Drugs Abuse by Teens

Figure 2. Adapted from "DrugFacts: Nationwide Trends " from <http://www.drugabuse.gov/publications/drugfacts/nationwide-trends>

(PATS, 2012) PATS is one of the longest running national studies on the behavior and attitudes of the parent and teenagers towards the drug and alcohol use. The results of this survey provide information on all of drugs subject to abuse. Table 4 gives information about only the prescription and over-the-counter drug abuse from the survey. The survey was conducted on teens of grades 9 to 12. The survey was conducted from February to June 2012 and the teen sample was 3,884. The data in Table 4 represents the self reported data of the teens who participated in the study. The results of the survey indicate that 24% of the participated teens

have abused prescription drugs atleast once in their life time. Whereas only 7% of teens have abused over-the-counter drugs atleast once in their life time.

Table 4. Comparison of Prescription and Over-the-Counter Drug Abuse of Grades 9-12

Year	Over-the-Counter	Prescription
2012	7%	24%

Table 4. Adopted from "2012 Partnership Attitude Tracking Study" from <http://www.drugfree.org/wp-content/uploads/2013/04/PATS-2012-FULL-REPORT2.pdf>. (PATS, 2012) Values represent the total percentage of teens abusing prescription and OTC drugs participated in the study in the year 2012(n = 3884).

(DASIS, 2002) The Drug and Alcohol Services Information System gathers information about the individuals involved in prescription, over-the-counter, and illicit drug abuse on a yearly basis. Table 5 displays the survey results of individuals of age 19 – 25, who was admitted to the hospital following prescription or over-the-counter drug abuse in the years 1992, 1999, and 2002. The data from Table 5 shows that the number of individuals abusing prescription drugs is higher compared to those abusing over-the-counter drugs.

Table 5. Comparison Between Prescription and Over-the-Counter Drug Abusers

Year	Over-the-Counter	Prescription
1992	580	28,420
1999	220	43,780
2002	600	77,800

Table 5. Adapted from "Characteristics of Primary Prescription and OTC Treatment Admissions: 2002" from <http://www.samhsa.gov/data/2k4/prescriptionTX/prescription.htm>. (DASIS, 2002) Values in the above table represent the number of individuals admitted to the hospital following prescription or over-the-counter drug abuse.

(SAMHSA, 2012) Results from the 2012 National Survey on Drug Use and Health (NSDUH): This survey provides the primary source of information regarding the nonmedical use of prescription and over-the-counter drugs and also the use of alcohol, tobacco and illicit drugs by individuals of age 12 years or older. Figure 3 presents the results of the data collected by the NSDUH from the individuals who are exposed to prescription drug abuse of psychotherapeutic.

Figure 3. Prescription Drugs Abused by Persons Aged 12 or Older from 2002 to 2012

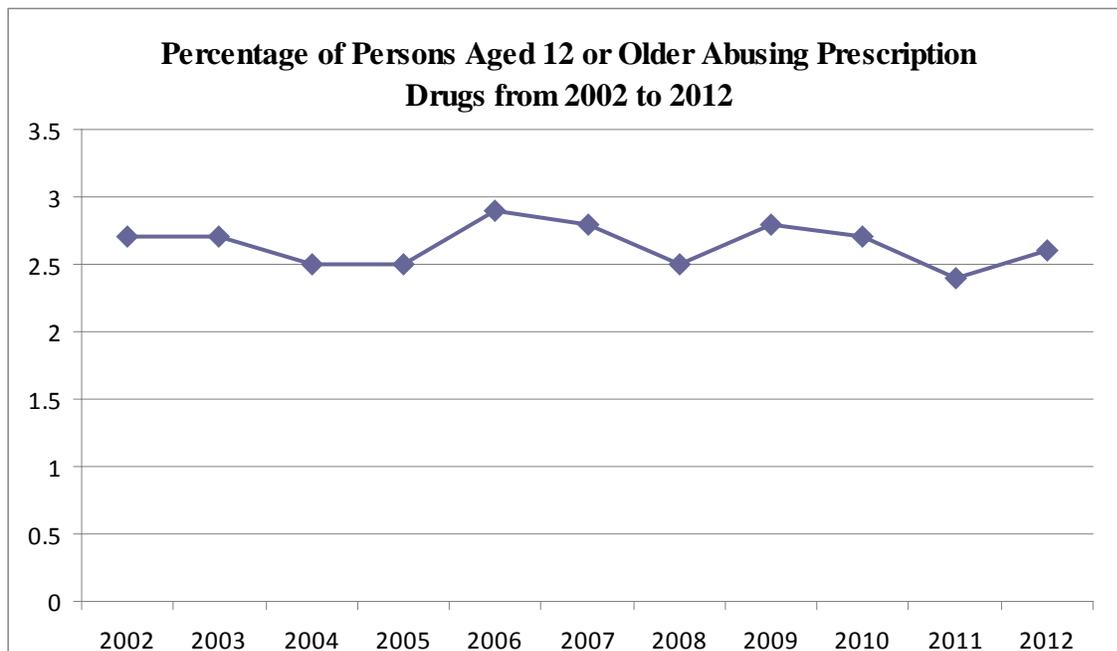


Figure 3. Adapted from "Results from 2012 National Survey on Drug Use and Health: Summary of National Findings" from <http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTabled/NationalFindings/NSDUHresults2012.pdf>

(SAMHSA, 2012) The results obtained from NSDUH showed that millions of people of age 12 years or older fall under the category of individuals using different types of psychotherapeutic drugs. These drugs mainly include sedatives, tranquilizers, stimulants, and pain relievers (Figure 4).

Figure 4. Psychotherapeutic Drug Abusers from 2002 to 2012

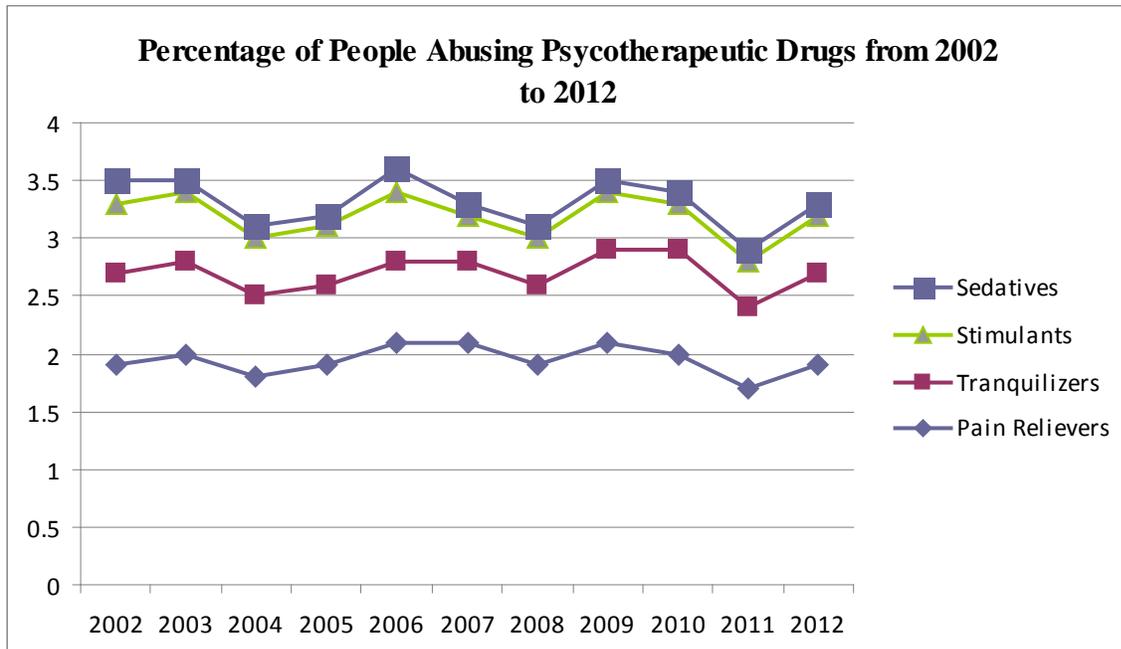


Figure 4: Adapted from "Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings" from <http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTabled/NationalFindings/NSDUHresults2012.pdf>

Discussion

The number of individuals abusing prescription drugs was higher compared to over-the-counter drugs in all surveys reviewed. The results of the CSS show that the percentage of the 9th graders and 11th graders abusing prescription drugs is higher compared to that of over-the-counter drugs (see Table 3). The results of the PATS (2012) also show that 3884 teens participated in the study, 1320 participants have abused prescription drugs, whereas only 271 participants have abused over-the-counter drugs (see Table 4). The results collected by DASIS in the years 1992, 1999, and 2002 have aggregate treatment admissions of 150,000 individuals abusing prescription drugs and 1,400 individuals abusing over-the-counter drugs. The total number of treatment admissions shows that prescription drug abuse is higher than over-the-counter drug abuse (Table 5). The results of the Monitoring Future Survey illustrate the top 14 most abused drugs. Of the top identified drugs, seven are prescription drugs and one is an over-the-counter drug. The results of the survey indicate that more prescription drugs than over-the-counter drugs are chosen for abuse (Figure 1). The results of the survey conducted by the National Institute of Drug Abuse show that 423,000 more individuals abuse prescription drugs than over-the-counter drugs (Figure 2).

Drug abuse has become a modern concern, as it was found that the cases that are registered in emergency departments have increased over the years (SAMHSA, 2012). Reports by SAMHSA (2012) show that abuse of over-the-counter and prescription drugs leads to serious health risks. Unintentional overdose deaths from prescription painkillers increased by 117% from 3,944 in 2001 to 8,541 in 2005. During the same four-year time span, treatment admissions for addiction to painkillers increased by 74%. Data submitted from hospitals in the year 2006 show that there were 741,425 emergency department visits involving nonmedical use of prescription

and/or over-the-counter drugs. Prescription and over-the-counter drug abuse consequences have extended beyond the personal health of those individuals who have abused them. Property and violent crime rates that are associated with prescription and over-the-counter drug abuse increased from 2003 to 2007.

Though over-the-counter drugs can be easily accessed, they are less prone to abuse because they must be taken in large quantities to achieve the desired effect. The number of individuals aged 12 and older abusing prescription drugs decreased from 2002 to 2012 (Figure 3). Though there is a decrease, a significant number of individuals are abusing drugs. Figure 4 gives a detailed description of the individuals abusing specific kinds of drugs. The number of individuals abusing pain relievers decreased from 566,000 in 2010 to 358,000 in 2012. The stimulant usage almost remained the same from 2009 to 2012. Methamphetamine use in 2012 was similar to 2011, but was lower when compared to that of 2006.

In accordance with the data collected, more teenagers abuse prescription drugs (~4 million) than over-the-counter drugs (~2.4 million). Both type of pharmaceutical may lead to serious problems, however. Sequelae include emergency department visits, and clinical effects that may be serious and life threatening.

Conclusion

Drug abuse has a great impact on individuals, as it can lead to many severe consequences. It was found that prescription drugs are abused more compared to over-the-counter drugs. The government is also taking steps to prevent drug abuse by increasing the awareness of it. It is concluded that while some rates of abuse seem to be decreasing, abuse of prescription and over-the-counter drugs in US is still a major public health issue.

References

Austin, G., & Skager, R. (2006). *California Student Survey of Drug, Alcohol & Tobacco Use*

2005-06. Retrieved October 31, 2013, from www.wested.org :

http://www.wested.org/online_pubs/hhdp/css_11th_highlights.pdf

Bissell, P., Ward, P. R., & Noyce, P. R. (2001). The Dependent Consumer: Reflections on accounts of the Risks of Nonprescription Medicines. *Health, 5*(1), 30.

doi:10.1177/136345930100500101

Bond, C. M., & Bradley, C. (1996). Over the counter drugs: The interface between the community pharmacist and patients. *British Medical Journal, 312*(7033), 758-760.

Retrieved December 1, 2013, from www.bmj.com:

<http://www.bmj.com/content/312/7033/758?view=long&pmid=8605465>

Controlled Substances - Prescription Information - Get Informed - AWA Rx E. (n.d.).

Retrieved December 2, 2013, from www.awarx.org:

<http://www.awarx.org/get-informed/prescription-information/controlled-substances>

Combating Misuse and Abuse of Prescription Drugs: Q&A with Michael Klein, Ph.D. (2010).

Retrieved December 1, 2013, from www.fda.gov:

<http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm220112.htm>

Cooper, R. (2013). Over-the-counter medicine abuse - a review of the literature. *Journal of Substance Use, 18*(2), 82-107. Retrieved November 1, 2013, from

<http://informahealthcare.com/doi/pdf/10.3109/14659891.2011.615002>

County of Orange Health Care Agency (n.d.). *Prescription and Over-the-Counter Drug Abuse.*

Retrieved December 2, 2013, from www.dulia.org:

<http://www.dulia.org/Assets/StreetTrends/Prescription%20and%20OTC%20Drug%20A>

buse/prescription-over-the-counter-drug-abuse-report.pdf

DEA (2006). *Drugs and Chemicals of Concern: Dextromethorphan*.

Retrieved December 4, 2013, from www.deadiversion.usdoj.gov:

www.deadiversion.usdoj.gov/drugs_concern/dextro_m/dextro_m.htm

Drug Abuse: MedlinePlus. (n.d.). Retrieved December 4, 2013, from www.nlm.nih.gov:

<http://www.nlm.nih.gov/medlineplus/drugabuse.html>

Drug Enforcement Administration (2011). *Drugs of Abuse*. Retrieved December 6, 2013, from

Drug Enforcement Administration website:

http://www.justice.gov/dea/docs/drugs_of_abuse_2011.pdf

National Institute on Drug Abuse (NIDA). *DrugFacts: Prescription and Over-the-Counter Medications*. (2013). Retrieved December 1, 2013, from www.drugabuse.gov:

<http://www.drugabuse.gov/publications/drugfacts/prescription-over-counter-medications>

National Institute on Drug Abuse (NIDA). (n.d.). *Drugs, Brains, and Behavior: The Science of Addiction*. Retrieved December 4, 2013, from www.drugabuse.gov:

<http://www.drugabuse.gov/publications/science-addiction>

Halpert, A. G., Olmstead, M. C., & Beninger, R. J. (2002). Mechanisms and abuse liability of the anti-histamine dimenhydrinate. *Neuroscience and Biobehavioral Reviews*.

doi:10.1016/S0149-7634(01)00038-0

Hughes, L., Whittlesea, C., & Luscombe, D. (2002). Patients' knowledge and perceptions of the side-effects of Over-the-counter medication. *Journal of Clinical Pharmacy and Therapeutics*, 27, 243-248. doi:10.1046/j.1365-2710.2002.00416.x

Lessenger, J. E., & Feinberg, S. D. (2008). Abuse of Prescription and Over-the-Counter Medications. *Journal of The American Board of Family Medicine*, 21(1), 45-54.

doi:10.3122/jabfm.2008.01.070071

Levine, D. A. (2007). "Pharming": the abuse of prescription and over-the-counter drugs in teens.

Current Opinion in Pediatrics. doi:10.1097/MOP.0b013e32814b09cf

Lord, S., Downs, G., Furtaw, P., Chaudhuri, A., Silverstein, A., Gammaitoni, A., & Budman, S.

(2009). Nonmedical use of prescription opioids and stimulants among student pharmacists. *Journal of The American Pharmacists Association*, 49(4), 519-28.

doi:10.1331/JAPhA.2009.08027

National Institute on Drug Abuse (NIDA). (2009). *Monitoring the Future*. Retrieved from

<http://www.drugabuse.gov/related-topics/trends-statistics/monitoring-future>

National Institutes of Health (2012, June). *NIH Senior Health: Prescription and Illicit Drug*

Abuse - Preventing Substance Abuse. Retrieved November 12, 2013, from

<http://nihseniorhealth.gov/drugabuse/preventingsubstanceabuse/01.html>

NIDA Drug Pubs. (n.d.). *NIDA Research Report Series: Prescription Drugs Abuse and*

Addiction. Retrieved December 3, 2013, from drugpubs.drugabuse :

<http://drugpubs.drugabuse.gov/online-only/nida-research-report-series-prescription-drugs-abuse-and-addiction>

Raynor, D., Blenkinsopp, A., Knapp, P., Grime, J., Nicolson, D., Pollock, K., & Spoor, P.

(2007). A systematic review of quantitative and qualitative research on the role and effectiveness of written information available to patients about individual medicines.

Health Technology Assessment, 11(5), 1-160.

Robertson, B., David, S. L., & Suman, A. (2003, October). *Preventing Drug Use among*

Children and Adolescents. Retrieved December 1, 2013, from

http://www.drugabuse.gov/sites/default/files/preventingdruguse_2.pdf

Substance Abuse and Mental Health Service Administration (2013). *Strategies and Interventions for Reducing Nonmedical Use of Prescription Drugs*. Retrieved from

http://captus.samhsa.gov/sites/default/files/capt_resource/nmupd_strategiesandinterventionslitreview10-23-13_0.pdf

Trust for America's Health (2013). *Prescription Drug Abuse: Strategies to stop the epidemic*.

Retrieved December 1, 2013, from tfah.org:

http://tfah.org/reports/drugabuse2013/TFAH2013RxDrugAbuseRpt12_no_embargo.pdf

U.S. Department of Health and Human Services (n.d.). *Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings*. Retrieved December 5, 2013

from www.samhsa.gov:

<http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/NationalFindings/NSDUHresults2012.pdf>

Volkow, N. D. (2010). *Prescription Drug Abuse*. Retrieved December 4, 2013, from

www.drugabuse.gov: <http://www.drugabuse.gov/about-nida/legislative-activities/testimony-to-congress/2010/09/prescription-drug-abuse>

Appendix A: Measures for Prevention

The following list includes measures to be taken to prevent prescription and over-the-counter drug abuse:

- The doctor should be informed in advance about all medications being taken, regardless of whether they are prescriptions or over-the-counter drugs, herbs, supplements, and alcohol usage. An individual should talk to the doctor about alternative medications with less addiction potential and an extended release. An individual should check with his or her doctor on a regular basis to ensure that the medication being taken is working exactly as expected. (National Institutes of Health, 2012)
- Directions should be followed carefully. The medication must be used only in the way in which it is prescribed. If the medication does not work in the way it was prescribed, neither the dosage should be changed nor should the use of the medication be stopped without talking to the doctor (National Institutes of Health, 2012).
- An individual should know what the medication does. Before taking the medication, and individual should ask the doctor or pharmacist about the medicine's effects. An individual should never use another person's prescription. Though a person may have a similar medical condition as someone else, the medication may not be the right medication or the dosage might not be right for that person (Robertson, B., David, S. L., & Suman, A., 2003)..
- Prescriptions should be ordered only from a trusted pharmacy. Some websites sell prescription and nonprescription drugs that are counterfeit and are dangerous. Additionally, parents should ensure that their children do not order drugs online (National Institutes of Health, 2012).

- Parents should discuss the dangers of the medication with their teenage children. The teens should be informed that though the medication is prescribed by a doctor, it is not always safe to use, especially when the child is already on another prescription medication and when it is prescribed to someone else(SAMHSA, 2013).
- Parents should set rules about their children’s prescription medication. The teen should be informed that it is not safe to share his or her medication with others or to use medications that are prescribed for someone else. Parents should emphasize the importance of taking the prescribed dose of medication and talking to the doctor before making changes to it(National Institutes of Health, 2012).
- Medications should be disposed of properly. For disposal information, an individual can check the label or the patient information guide. It is not advisable to flush the drugs down the toilet unless the pharmacist advises to do so. An individual can ask his or her pharmacist, recycling service department, or local trash company if there is a program that takes back medicine or accepts unused medication. Unused medications can also be placed in the household trash. However, before throwing them out, an individual should try to remove the medicine from its container and mix it with used coffee grounds, kitty litter, or other unwanted substances, in a sealed plastic bag(SAMHSA, 2013).
- The label should be removed and the individual’s identifying information should be crossed out before being thrown out. Teens can benefit from relief of cough, flu, and cold symptoms by taking cold medicines and over-the-counter cough medicines, based on the instructions on the manufacturers’ labels. However, parents should ensure that their children do not use cough and cold over-the-counter medicines outside of flu and cold season or after the child’s symptoms subside. Parents should help their children

understand the dangers of abusing over-the-counter cough and cold medicines (Robertson, B., David, S. L., & Suman, A., 2003).

- Parents should check all over-the-counter medications being kept in the home. The children should be questioned if the medicines begin to disappear. A teen's Internet use should be monitored. A few Internet sources sell DXM in powder form and in bulk quantities. These websites even encourage teens to share their experiences with others when using them. These sites are not regulated, so it is important for parents to be aware of their children's Internet usage. It is also important to know from which websites their children are receiving their information, which websites their children are spending more time on, and to whom the children may be talking (SAMHSA, 2013).

Appendix B: Actions by the Government

The following actions have been taken by the government to prevent drug abuse.

(SAMHSA, 2012) reported that an alarming number of teenagers are abusing prescriptions to obtain a feeling of euphoria. Youth are abusing these drugs in many ways. Some teens simply drink liquids, a few of them swallow pills; others snort or smoke the drugs by crushing the pills. A few of them melt or dissolve the drugs and inject them. Another way of abusing the drugs is to mix them with street drugs or alcohol. According to the Partnership Attitude Tracking Study (2006), an alarming number of teens have a false sense of security about abusing prescription and over-the-counter medications. A new risky activity found among some teens is *pharming*. This term refers to the trading of over-the-counter and prescription drugs, ingesting the drugs with other pills, or mixing the drugs with alcohol to obtain the feeling of euphoria. Teens usually abuse these drugs by ingesting handfuls, which can lead to a few bottles of pills or cough syrup a day.

The government is taking measures to reduce drug abuse. If these efforts continue, there could be a decrease in the abuse of drugs in the coming years. According to NIDA [n.d], supported researchers have organized and conducted large-scale epidemiological studies to investigate the sources and patterns of use of prescription drugs non-medically among high school and college students. The results from these studies suggest that increased efforts must be taken to inform students of the harms of drug abuse. The National Institute on Drug Abuse is also trying to develop medications for pain that bypass the brain, to decrease the potential of abuse. The National Institute on Drug Abuse also supports the researchers who work on

developing drugs that effectively treat patients with chronic pain in a way that causes them to be less addicted to prescription pain relievers.

According to Michael (2010), the FDA is working to reduce the abuse of prescription drugs while making sure that appropriate medical drugs are available to the patients who need them. The Food and Drug Administration's mission in reducing drug abuse is done by educating caregivers, patients, and healthcare professionals through drug labels, alerts, and medication guides. Before becoming available to the public, all drugs are evaluated first for their safety and efficacy by the FDA. During the drug review process by the FDA, certain data give information on whether the drug has an abuse potential; those drugs are included in the list of substances covered by the Controlled Substances Act. Drugs are available to patients only if the drugs are proven safe and effective for a particular indication. The Food and Drug Administration, in partnership with other government agencies, the pharmaceutical industry, and medical organizations, is making a combined effort to address the prevention of drug abuse.

These programs alter the balance between protective factors and risks for drug abuse in communities, schools, and families. According to NIDA, (n.d.), there are three types of prevention programs:

- Universal program: This program addresses protective factors and risks of all children who are in a given setting, like a community or a school.
- Selective program: This program targets children and teens who have indications of increasing their drug abuse.
- Indicated program: This program is designed for youth who have already started abusing drugs.

The Food and Drug Administration has tightened the control on prescription pain killers like the Vicodin and Lortab to decrease the abuse of pain killers. The Food and Drug Administration also announced that all drugs that contain hydrocodone as an active ingredient will be reclassified under Schedule II medication starting in December, 2013. As Schedule II drugs, pain killers will also be under strict control, like other narcotics that have a high potential for abuse (MedlinePlus, 2013).

