Print ISSN: 2321-6379
Online ISSN: 2321-595X
DOI: 10.17354/ijss/2018/51

Original Article

Prescription Drug Abuse in the United States of America and a Proposed Multilevel Intervention Based on Social Ecological Model

Haritha Vardhini Katragadda[1,2], Jay Krishna Katragadda[3]

[1]MBBS, Department of Community Medicine, SRM Medical College Hospital and Research Center, Potheri, Tamil Nadu, India, [2]MPH, Department of Public Health, St. John's University, Queens, New York, USA, [3]CRRI, Department of Community Medicine, Shri Sathya Sai Medical College and Research Institute, Ammapettai, Tamil Nadu, India

Abstract

With a five-fold increase in the prevalence of prescription drug abuse, it is a raising epidemic in the United States of America. Opioids, benzodiazepines, amphetamines, and dextroamphetamine are commonly abused drugs. Public taxpayers in the states pay about $72 billion because of economic burden caused by prescription drug abuse. There have been interventions in the past but with limited success. This paper sheds lights on the prevalence, current prevention programs, and a proposed multilevel intervention based social ecological model. To tackle the problem of prescription drug abuse further studies based on multilevel interventions warranted.

Key words: Amphetamines, Drug abuse, Intervention, Opioids, Prescription drugs, Social ecological model

INTRODUCTION

According to Mayo Clinic, "prescription drug abuse is defined as the use of prescription medications in a way not intended by the doctors. Prescription drug abuse can be explained through various scenarios such as from taking a friend's prescription painkiller for a backache to snorting or injecting ground-up pills to get high" (Mayo Clinic, 2015).

There is a substantial rise in the prevalence of prescription drug abuse, with a five-fold increase in the U.S from the late 90's (Warner, 2011). The most frequently abused drugs are opioids, Central nervous system depressants like benzodiazepines, and stimulants such as amphetamines and dextroamphetamine (NIDA, 2016). The upward surge in abuse of prescription drugs has reached a total of around 14 million people in the U.S.

Access this article online

www.ijss-sn.com

Month of Submission : 12-2017
Month of Peer Review : 01-2018
Month of Acceptance : 01-2018
Month of Publishing : 02-2018

Men are twice prone to abuse prescription drugs compared in women (Raofi and Schappert, 2003). There have been studies estimating the economic burden of the prescription drug abuse which is about $72 billion, and this cost is covered by the public taxpayers (Prescription for Peril, 2007). There is a significant variation with race and ethnicity; American Indians/whites have the highest percentage of prescription drug abuse (Paulozzi *et al*., 2008). Geographic variation has been extensively studied; northwest and southeast have been noted to have the highest percentage of overdose rates due to prescription drug abuse (McDonald *et al*., 2012).

According the Mayo Clinic, prescription drugs' risk factors are identified as the following: (1) Alcohol and tobacco addiction, (2) age - high-risk group includes early 20's, (3) certain pre-existing psychiatric conditions, (4) lack of knowledge about the long-term harmful effects, (5) peer pressure and social environment, and (6) easier access to medicine.

The side effects of prescription drug abuse are many. These side effects include immunologic effects, hormonal changes, hyperalgesia, sleep changes, bladder disturbances, and cardiac effects. Immunologic effects: Prescription drug abuse results in increased frequency of diseases.

Corresponding Author: Dr. Haritha Vardhini Katragadda, 200/1, Vellala Street, Pursaiwalkam, Chennai - 600 084, Tamil Nadu, India. Phone:+91-9962061359. E-mail: harithavardhinichowdary@gmail.com

The pathophysiology is due to the immunomodulation at the central and peripheral receptors. Immunomodulation results in decreased natural killer cells, inhibits T-cell proliferation, decreased phagocytosis and nitric oxide release (Radulović and Janković, 2002). Hormonal changes: Decreased levels of testosterone results in decreased energy, decreased libido, and erectile dysfunction (Daniell, 2002). Decreased levels of estrogen results in reduced bone mass, osteoporosis, and sexual dysfunction (Daniell, 2008). Decreased levels of luteinizing hormone result in amenorrhea and hypomenorrhea (Oltmanns *et al.*, 2005). Decreased levels of gonadotropin-releasing hormone result in a decreased level of androgen hormone levels (Petraglia *et al.*, 1986). Hyperalgesia: It is also known as increased pain sensitivity. Opioid abuse causes increased secretion of the excitatory neurotransmitters, as well as changes in the spinal neurons due to apoptosis of the GABA neurons (Mao *et al.*, 2002). Sleep changes: They are common in opioid abuse, which includes an increased number of shifts in sleep-waking states (Koren *et al.*, 2000), decreased sleep time, sleep efficiency (Kurz and Sessler, 2003), delta sleep, and REM sleep (Pickworth *et al.*, 1981). Constipation and bladder disturbances: Most people suffer from constipation and bladder disturbances as a side effect. Chronic constipation can result in hemorrhoids, obstruction of the bowel resulting in possible bowel rupture; which in turn result in high rates of mortality and morbidity (Benyamin *et al.*, 2008). Cardiac effects: Vasodilation and hypotension as a result of histamine release are attributed to morphine abuse (Brunton *et al.*, 2006). Methadone abuse has been linked to Torsade des Pointes and QT prolongation syndrome (Shah, 2002).

Purpose

This paper provides information on the prevalence of the prescription drug abuse, the associated risk factors and effects of prescription drug abuse. This paper also sheds light on the prevention programs which are enforced in the society. This paper highlights the gaps in the safe use of the prescription drugs and prescription drug abuse. Based on theories from Social and Behavioral Health, we propose a multilevel intervention program based on the Social Ecological Model.

Current Public Health Interventions

At the moment, there are some policies in place to combat prescription drug abuse, but more needs to be done. Prescription drug monitoring programs (PDMPs) have recently been put in place to track and trace physician prescribed controlled substances. Thus, far 49 states have an active PDMP (CDC, 2016). This is a good step in the right direction, but all states should be on board. Missouri is the only state without a PDMP, and this must be addressed. An issue with the program is that not every state requires a provider to check the PDMP before prescribing certain controlled substances. PDMPs have illustrated changes in prescribing behaviors, use of multiple providers by patients, and decreased substance abuse treatment admissions (CDC, 2016). Legislation should be introduced requiring all physicians to check the PDMP system before prescribing.

The safe drug disposal act of 2010 signed by President Obama is another intervention which amended the Controlled Substances Act to provide individuals and patients who have lawfully acquired controlled substances an easy and safe way of disposing unused and expired controlled substances (Phillips, 2012). Unused controlled substances can be delivered by individuals to Drug Enforcement Administration (DEA) approved entities for safe and proper disposal. In addition, long-term care facilities and individuals entitled to a decedent's property can dispose of a resident's controlled substances to a DEA-designated disposal program (Phillips, 2012). Moreover, the National Prescription Drug Take Back Day occurs every 6 months. It is a critical tool in combating prescription drug abuse because an overwhelming number of prescription drug abusers report obtaining drugs from medicine cabinets, families, and friends (Phillips, 2012). The safe drug disposal act is the only piece of legislation to have been successfully signed into law since 2010. All other recently proposed prescription drug policy interventions have died in Congress.

Social Ecological Model: A Model for Proposed Intervention

The social ecological model is a model that incorporates five levels of influence specific to health behavior: Individual, interpersonal, institutional, community, and public policy. We believe the model should be utilized more often as a

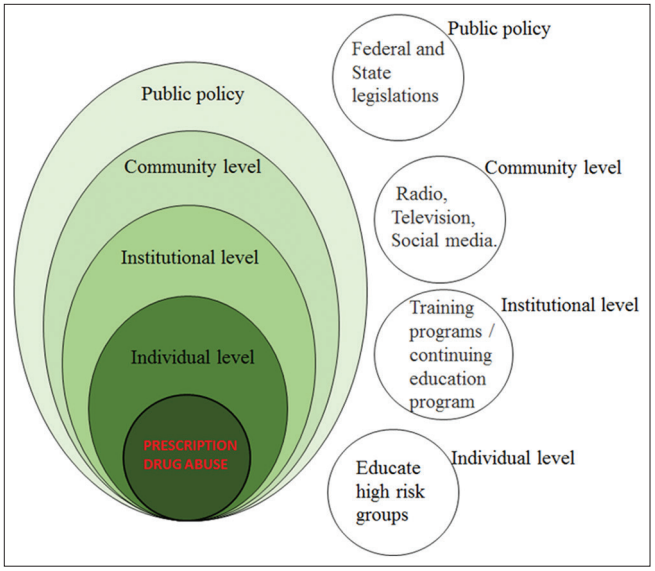

Figure 1: Levels of intervention for prescription drug abuse based on social ecological model

basis for intervention because it takes into consideration social, physical, and cultural aspects of an environment that can impact health. These aspects are crucial to include in any intervention, specifically in regard to prescription drug abuse [Figure 1].

The Ecological Model of Health Behavior emphasizes the environmental and policy contexts of behavior while incorporating social and psychological influences (Glanz, 2008). According to the Social Ecological Model, there are five sources of influence on health behavior including: Interpersonal, intrapersonal, institutional, community, and public policy. Therefore, this model has been chosen because of its ability to provide a comprehensive framework for understanding multiple and interacting determinants of health. The ultimate purpose of the Ecological Model of Health Behavior is,

"To inform the development of comprehensive intervention approaches that can systematically target mechanisms of change at several levels of influence. Behavior change is expected to be maximized when environments and policies support healthful choices, when social norms and social support for healthful choices are strong, and when individuals are motivated and educated to make those choices (Glanz, 2008)."

The Social Ecological Model of Health Behavior recognizes individuals as embedded within larger social systems and describes the interactive characteristics of individuals and environments that underlie health outcomes (Golden and Earp, 2012). This demonstrates the key strength of this particular model, its focus on multiple levels of influence. This allows for expanded options for interventions and impacts multiple aspects of environmental influence. Unlike interventions that only reach individuals who choose to participate, this model incorporates community, institutional, and policy influences that affect entire populations (Glanz, 2008). Interventions which involve policy and environmental aspects, "establish settings and incentives that can persist in sustaining behavior changes (Glanz, 2008)." Individually directed interventions can often times become poorly maintained, whereas this model can avoid that problem.

Recommendations

A multilevel intervention should involve education and legislative strategies. The education strategy should focus on high school students, providers, and the general public. Education of high school students will focus on the addictive qualities of prescription pain medication, and the particular side effects associated with abuse of these drugs. Education should also focus on better training of providers regarding safe storage and disposal, identification of treatment and treatment of pain, alternative modalities including acupuncture, improved coordination with pain management clinics, and integration of mental illness assessments. Finally, public education campaigns through mediums such as television and social media should be engaged. The legislative aspect will focus on state and legislative support for physical and mental examinations before the prescription of painkillers, mandatory creation of state databases to track prescription drugs and require doctors to check before prescribing, and prioritization of resources for treatment programs. As can be seen, this is a multilevel approach involving the individual, institutional, community, and policy level of the Social Ecological Model of public health intervention. This intervention can be broken down into four levels:

Individual level

Educate high school students. Many young people believe prescription drugs to be safer than illegal drugs. In 2014, youths 12–17 years of age and young adults 18–25 years of age were more likely to have misused prescription drugs in the past year than adults 26 years or older (Substance Abuse, 2015).

Institutional level

Educate providers on mental health, non-pharmacological pain treatment alternatives such as acupuncture and non-narcotic therapy, and substance abuse and overdose prevention through training programs or continuing education programs. These modules should urge providers to coordinate pain management with complementary and integrative care providers.

Community level

Public education campaigns on non-sharing of prescription medications as well as safe storage, use, and disposal of medications. Messaging through radio, television, billboards, and social media.

Policy level

Support federal legislation to require individuals to have physical and mental examinations before they are prescribed pain medications. Support federal legislation requiring all states to create a PDMP that tracks each time an individual patient is prescribed a controlled substance by a provider. Legislation must also be supported requiring physicians to check the PDMP before the prescribing. Re-introduction of the prescription drug abuse prevention and treatment act of 2013 mandating provider education and supporting public education. Finally, policy should encourage federal and state legislatures to prioritize resources for support of evidence-based substance abuse treatment programs that include medication-assisted treatment and supportive counseling (American Public Health Association, 2015).

CONCLUSION

The issue of prescription drug abuse has been apparent for many years. As mentioned in this study, there has been a substantial rise in the prevalence of prescription drug abuse in the U.S since the late 90's. So far, previous interventions have been successful yet limited. To deal with this public health epidemic that is claiming millions of lives in the U.S., an approach and intervention using the social ecological model are needed to reduce the rate of abuse of prescription drugs. Therefore, to tackle this, we concluded that it must be done through a multilevel approach which involves targeting the individuals, the institutions, the communities, and the policymakers.

REFERENCES

American Public Health Association. Prevention and Intervention Strategies to Decrease Misuse of Prescription Pain Medication. Available from: https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2015/12/08/15/11/prevention-and-intervention-strategies-to-decrease-misuse-of-prescription-pain-medication. [Last accessed on 2015 Nov 03].

Benyamin R, Trescot AM, Datta S, Buenaventura R, Adlaka R, Sehgal N, *et al*. Opioid complications and side effects. Pain Physician 2008;11:S105-20.

Brunton LL, Lazo JS, Parker KL. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 11th ed. New York: McGraw-Hill; 2006.

CDC: Centers for Disease Control and Prevention. "What States Need to Know About PDMPs." Available from: https://www.cdc.gov/drugoverdose/pdmp/states.html. [Last accessed details 2016 Mar 23].

Coalition Against Insurance Fraud. Coalition Against Insurance Fraud. Prescription for Peril: How Insurance Fraud Finances Theft and Abuse of Addictive Prescription Drugs. Washington, DC: Coalition Against Insurance Fraud; 2007. Available from: http://www.insurancefraud.org/downloads/drugDiversion.pdf. [Last accessed on 2018 Jan 02]

Daniell HW. Hypogonadism in men consuming sustained-action oral opioids. J Pain 2002;3:377-84.

Daniell HW. Opioid endocrinopathy in women consuming prescribed sustained-action opioids for control of nonmalignant pain. J Pain 2008;9:2836.

Glanz KR. Health behavior and health education: Theory, Research, and Practice. San Francisco: Jossey-Bass; 2008.

Golden SD, Earp JA. Social ecological approaches to individuals and their contexts: Twenty years of health education & behavior health promotion interventions. Health Educ Behav 2012;39:364-72.

Koren G, Cairns J, Chitayat D, Gaedigk A, Leeder SJ. Pharmacogenetics of morphine poisoning in a breastfed neonate of a codeine-prescribed mother. Lancet 2006;368:704

Kurz A, Sessler DI. Opioid-induced bowel dysfunction: Pathophysiology and potential new therapies. Drugs 2003;63:649-71.

Mao J, Sung B, Ji RR, Lim G. Neuronal apoptosis associated with morphine tolerance: Evidence for an opioid-induced neurotoxic mechanism. J Neurosci 2002;22:7650-61.

McDonald DC, Carlson K, Izrael D. Geographic variation in opioid prescribing in the U.S. J Pain 2012;13:988-96.

National Institute on Drug Abuse; 2016. Available from: https://www.drugabuse.gov/drugs-abuse. [Last accessed on 2018 Jan 03]

Oltmanns KM, Fehm HL, Peters A. Chronic fentanyl application induces adrenocortical insufficiency. J Intern Med 2005;257:478-80.

Paulozzi LJ, Jones C, Mack K, Rudd R. Centers for disease control and prevention (CDC). Vital signs: Overdoses of prescription opioid pain relievers-United States, 1999-2008. MMWR Morb Mortal Wkly Rep 2011;60:1487-92.

Petraglia F, Porro C, Facchinetti F, Cicoli C, Bertellini E, Volpe A, *et al*. Opioid control of LH secretion in humans: Menstrual cycle, menopause and aging reduce effect of naloxone but not of morphine. Life Sci 1986;38:2103-10.

Phillips J. Prescription drug abuse: Problem, policies, and implications. Nurs Outlook 2012;61:78-84.

Pickworth WB, Neidert GL, Kay DC. Morphinelike arousal by methadone during sleep. Clin Pharmacol Ther 1981;30:796-804.

Prescription Drug Abuse -Mayo Clinic; 2015. Available from: http://www.mayoclinic.org/diseases-conditions/prescription-drug-abuse/basics/definition/con-20032471?reDate=22032017. [Last accessed on 2018 Jan 03]

Radulović J, Janković BD. Opposing activities of brain opioid receptors in the regulation of humoral and cell-mediated immune responses in the rat. Brain Res 1994;661:189-95.

Raofi S, Schappert SM. Medication therapy in ambulatory medical care; United States, 2003-2004. Vital Health Stat 2006;13:1-40.

Shah RR. Drug-induced prolongation of the QT interval: Regulatory dilemmas and implications for approval and labelling of a new chemical entity. Fundam Clin Pharmacol 2002;16:147-56.

Substance Abuse and Mental Health Services Administration. Specific Populations and Prescription Drug Misuse and Abuse. Available from: http://www.samhsa.gov/prescription-drug-misuse-abuse/specific-populations. [Last accessed on 2015 Dec 05].

Warner M, Chen LH, Makuc DM, Anderson RN, Miniño AM. Drug poisoning deaths in the United States, 1980-2008. NCHS Data Brief No. 81. Hyattsville, MD: National Center for Health Statistics; 2011.

How to cite this article: Katragadda HV, Katragadda JK. Prescription Drug Abuse in the United States of America and a Proposed Multilevel Intervention Based on Social Ecological Model. Int J Sci Stud 2018;5(11):102-105.

Source of Support: Nil, **Conflict of Interest:** None declared.