The Needs and Opportunities for Medication Disposal Programs

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Abstract

The continued increase in the usage of medications has led to a variety of negative consequences, including adverse effects on our environment and an increase in misuse/abuse of these products. Improper disposal of unused medications results in significant effects to wildlife and the potential to adversely affect human cells. Increases in misuse/abuse have resulted in significant increases in emergency department visits for drug-related issues. Drug overdose is now the leading cause of accidental death in the United States. Education of both health care providers and the general public about these issues and the proper disposal of unused medications is crucial.

Keywords

medication disposal, medication misuse, medication abuse

Introduction

The use of medications and other pharmaceuticals continues to rise. In 2009, 3.9 billion prescriptions were dispensed in pharmacies in the United States, compared to 2.8 billion in 1999.¹ Although many prescriptions are filled in the United States, there are various reasons why these prescriptions are not used completely or as intended. Patients may prematurely discontinue medications due to side effects or changes in therapy, or medications that are intended to be used only as needed may expire before the quantity dispensed is taken.² In addition, it is estimated that more than 50% of Americans do not take medications as they are prescribed, and approximately one third do not finish the course of therapy or skip doses.³ Additionally, patients with terminal illnesses or those who die unexpectedly may also have unused medications. Unused or unwanted medications may lead to pharmaceutical waste in the environment, as well as potential medication misuse.

The magnitude of the growing prescription abuse problem has also been addressed by the White House and Obama Administration.⁴ In 2011, Prescription Abuse Prevention Plan was announced to expand the National Drug Control Strategy and emphasizes 4 areas: education, safe disposal, prescription monitoring, and effective enforcement. It is important to be aware of the potential dangers of improper disposal, as well as suggested methods and opportunities available to facilitate disposing of medications appropriately.

Environmental Impact

Medications can enter the environment in a variety of ways. These include direct disposal as trash or excretion by humans or animals. Although it is impossible to determine what percentage of the medications in the wastewater stems from improper disposal as opposed to excretion and bathing, trace elements of medications have been found in surface, ground, and even treated drinking water.⁵ While the amounts of medications in these sources are very low, there have been studies to suggest that the effects of medications at these levels range from gender and genital abnormalities in fish to adversely affecting human cells in a laboratory setting. Flushing medications down the toilet as well as rinsing them down the sink are commonly advised as means of disposal; however, evidence suggests that it may be a major contributor to the contamination of local water systems. By design, most water treatment systems are geared toward removing particulate matter, odor, oxygen demand, nutrients, and pathogens, but not the small dissolved components that would result from medications entering water sources. Analgesics, hormone therapies, and blood pressure medications are just a few that have been

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found in waterways in the United States.² Similar studies have shown that pharmaceutical products are present in wastewater and drinking water throughout the United States. It is clear that current disposal methods and water treatments do not adequately remove medications from our environment.

Medication Misuse

The increased use and availability of prescription medications has also led to an increase in the misuse and abuse of these compounds.⁶ Misuse and abuse are used interchangeably to denote the use of prescription or over-the-counter medications for nonmedical reasons or in a manner other than prescribed.⁶ It is estimated that 20% of the US population who are over the age of 12 years have misused prescription medications at least once in their lifetime, and 2.4 million people misused medications for the first time within the past year.⁷

The most commonly misused medications include over-the-counter medications, opioids, stimulants, and central nervous system depressants. The most frequently misused opioids include hydrocodone and oxycodone, whereas dextroamphetamine and methylphenidate are the most commonly misused stimulants. Central nervous system depressants that are commonly misused include both benzodiazepines such as diazepam and alprazolam as well as the nonbenzodiazepine hypnotics such as zolpidem, eszopiclone, and zalepon.⁶

The majority of these medications were obtained from sources other than through legitimate prescriptions. The most common source of medications is reported to be from friends or family members where the drugs are obtained either through gift, purchase, or theft.^{7,8}

This increase in misuse has also resulted in a significant increase in emergency department (ED) visits. In fact, between 2004 and 2011, there was a 100% increase in ED visits for drug-related events, with over 1 million visits attributed to the misuse of prescription drugs.⁹ This has also resulted in an increase in mortality associated with drug misuse. Drug overdose is now the leading cause of death from unintentional injury in United States and for the first time has overtaken traffic fatalities as the leading cause of death from unintentional injury.¹⁰

Disposal Methods and Programs

There are a couple recommended and preferred methods for medication disposal. These include medication take-back events and disposal in household trash. While somewhat controversial, the Food and Drug Administration (FDA) also recommends flushing certain medications that may be harmful to household inhabitants, including children and pets, in addition to suggesting the return of

Table 1. Food and Drug Administration Recommendations for Household Disposal.¹¹

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- Take medications out of original containers
 - Combine with undesirable substance like kitty litter
 - Place mixture in disposable container with a lid and seal
 - Remove any identifying information on empty original container
 - Place the sealed mixture and empty original container in trash
-

unwanted or unused medications at medication take-back events.¹¹ These medications most commonly include narcotic analgesics and controlled substances. In the event that a medication take-back event is not available, the FDA recommends mixing of unwanted medications with an *undesirable substance* and then disposing the mixture in the household trash.¹¹ Table 1 outlines these recommendations from the FDA.

Ensuring that patients are properly educated and instructed on disposal methods is vital to prevent environmental harm and, potentially, medication abuse. A survey of pharmacy patrons in New York suggests that less than one third of patients receive information related to proper medication disposal.¹² However, previous counseling of proper disposal methods increased the likelihood that patients would return medications to a pharmacy or other recommended source rather than inappropriately discarding medications by flushing down toilets.²

To combat the increased number of medications available for misuse, abuse, and environmental exposure, medication take-back events have been increasing in number across the country. The Drug Enforcement Administration (DEA) sponsors 2 national take-back days throughout the year, in fall and spring.¹³ The inaugural event was held in fall 2010 with more than 4000 collection sites across the United States, and approximately 242 000 pounds of unwanted or unused medications were collected. The most recent event, held in spring 2014, had more than 6000 sites participate and more than 780 000 pounds of medications were collected. Locations of drop off sites can be found at the DEA Web site, http://www.dea-diversion.usdoj.gov/drug_disposal/takeback.

In addition to specific medication take-back days and household disposal, another option available to dispose of unwanted or unused medications is the Dispose My Meds Program.¹⁴ This service is available to the public and is sponsored by the National Community Pharmacists Association Foundation. There are currently more than 1600 pharmacies across the United States that participate in the program, making year-round disposal available to members of the respective communities. More information about the program and how to locate a participating pharmacy are available at the program's Web site, <http://www.disposemymeds.org>.

Educational Programs

Other programs have served to provide more education about proper disposal techniques. The American Pharmacists Association, the Pharmaceutical Research and Manufacturers of America, and the US Fish and Wildlife Service partnered to create an educational campaign titled SMARxT Disposal.¹² The program sought to provide awareness to the public about proper medication disposal that was environmentally friendly.

In addition, the Ohio State University College of Pharmacy developed an initiative, GenerationRx, in 2007 to provide medication safety and prescription abuse awareness to their local community.¹⁵ In 2011, Generation Rx partnered with the Cardinal Health Foundation and the American Pharmacists Association's Academy of Student Pharmacists to provide educational programming at the national level. The program currently targets youth, collegians, and adults through a variety of methods, including skits and other educational programming. Resources and toolkits are available at the program's Web site, <http://www.pharmacy.ohio-state.edu/outreach/generation-rx-initiative>.

Yet another program worth highlighting is sponsored by the National Associations of Boards of Pharmacy Foundation, AwareRx.¹⁶ This program provides resources to both pharmacists and student pharmacists as to safe acquisition, appropriate use, and education regarding abuse and misuse of medications. There are also additional resources that provide suggestions for identifying fraudulent prescriptions and how to improve safety and security in the pharmacy. More information can be found at the program's Web site, <http://www.awarerx.org>.

Conclusions

It is clear that proper disposal of unused medications is vital to reduce both the availability for misuse and the negative impact on our environment. Education of both health care providers and the general public about the potential problems and the proper disposal of medications are also crucial in helping reduce these harmful consequences, and are 2 of the 4 areas emphasized in the National Drug Control Strategy. Programs such as AwareRx, Generation Rx, DEA's National Drug Take Back initiatives, Dispose My Meds, and SMARxT Disposal may be expanded and implemented in communities in order to combat the problems associated with the increase in medication usage in the United States. Whether becoming a site for medication disposal, or simply making resources available to the public, many opportunities are available for pharmacists to reduce the environmental impact as well as prevent medication misuse and abuse. Other health care providers and public health workers, alike, also should encourage proper disposal and provide education whenever possible.

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