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Communication of Recommendations for the Disposal of Unused Prescription Opioid Medications by Stakeholders in the News Media

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Abstract

Objective

The opioid epidemic is a national public health emergency that requires a comprehensive approach to reduce opioid-related deaths. Proper and timely disposal of unused prescription opioids is one method to deter improper use of these medications and prevent overdose. The objective of this study was to understand how recommendations for disposing of unused prescription opioids, including both take-back programs and toilet disposal, are communicated to the public.

Methods

Two hundred sixty-three US newspaper articles published between January 1, 2014, and June 30, 2017, containing information on opioids and take-back programs were found using LexisNexis. Using content analysis, articles were coded for the presentation of and recommendation for opioid disposal practices, beliefs about environmental harm from toilet disposal, and additional strategies to reduce opioid supply. The entity responsible for the statement was also captured.

Results

Take-back programs were presented as a recommended disposal strategy for unused prescription opioids in 88.6% of coded articles. Toilet disposal was presented as a recommended disposal strategy for unused prescription opioids in 3.4% of articles and as harmful to the environment in 16.0% of articles. Individuals from health care, government, and law enforcement were primarily involved in discussing opioid disposal practices.

Conclusions

Although toilet disposal is recommended by the US Food and Drug Administration (FDA) for disposal of unused prescription opioids when a take-back program is not readily available, it was infrequently presented or recommended in news media articles. These results highlight the importance of improving communication of FDA guidelines for opioid disposal in the media, particularly by health care providers, government employees, and law enforcement officials.

Keywords

Public Health, Opioid, Disposal, Patient Education

Introduction

The opioid crisis is a national public health emergency. In 2016, 17,087 individuals died from prescription opioid overdose in the United States, which translates into approximately 46 deaths per day [1]. As a result, many have called for a comprehensive, multipronged approach to reduce the mortality and morbidity associated with the opioid epidemic [2]. Proposed interventions and regulatory efforts to address the opioid epidemic include addressing prescribing and monitoring practices, improving treatment for opioid use disorders, increasing the availability of overdose-reversing drugs, improving pain management strategies, and enhancing knowledge regarding the risks of long-term opioid use [3–5].

An estimated 42%–62% of prescribed opioids go unused in the United States [6]. Proper and timely disposal of unused prescription opioids is one method to decrease misuse of these medications. Recent research suggests that opioid disposal practices, as well as the communication of information on this topic to patients, is not standardized and is inadequate [7]. In a survey of US adults with recent prescription opioid use, approximately

61% who were no longer using their prescription reported that they planned to keep the medication for future use [7]. A minority with a leftover opioid medication reported using a take-back program (6.6%) or the toilet (9.1%) to dispose of unused opioids [7]. Almost half of respondents stated that they did not receive information on proper storage (48.7%) or disposal (45.3%) practices.

Stronger dissemination of current federal recommendations for the disposal of unused opioids may prevent accidental exposure or misuse of these medications. The US Food and Drug Administration (FDA) [8] recommends that expired, unused, or unwanted medicines be removed from the home as quickly as possible through medicine take-back programs or authorized Drug Enforcement Agency (DEA) collection sites. Additionally, the FDA [9] released a list of medications, which contains primarily opioid medications, that should be "flushed down the toilet as soon as they are no longer needed" if a take-back program is "not readily available." There may be reluctance to flush unused medications due to previous widespread communication that pharmaceuticals (e.g., estrogens and antibiotics) negatively impact the aquatic environment [10–16]. However, different classes of pharmaceuticals pose varying levels of risk to humans and ecosystems. Recent research evaluating the active pharmaceutical ingredients on the FDA flush list, in addition to naloxone and naltrexone, found negligible eco-toxicological and human health risks under most modeled disposal, wastewater treatment, and surface water scenarios [6]. Based on these results, the FDA states that the "known risk of harm, including death, to humans from accidental exposure to certain medicines, especially potent opioid medicines, far outweighs any potential risk to humans or the environment from flushing these medicines" [9]. Toilet disposal may play an important role in decreasing the unused opioid supply as take-back programs have been estimated to collect less than 2% of unused medications [17] and are unlikely to be used if they are farther than four to six miles from an individual's home [18].

The primary goal of this work was to understand how recommendations for disposing of unused prescription opioids, including both take-back programs and toilet disposal, are communicated to the public. News media communication was examined as it plays a key role in disseminating important health information to the general public and has been shown to influence both patterns of prescribing opioid medication among health care providers [19] and public discourse on policy topics [20]. The role that the news media plays in the communication of unused prescription opioid disposal practices has not been investigated. The secondary goal was to examine how these issues were presented by various stakeholders, such as pharmaceutical companies, medical/health care professionals, law enforcement officials, and government representatives.

Methods

A content analysis of news media articles was performed to understand how information related to opioid takeback programs and toilet disposal is communicated to the public. News media articles published between January 1, 2014, and June 30, 2017, were identified using the search terms (opioid* OR opiate* OR painkiller*) AND (take back OR "take back" OR takeback) in the LexisNexis database. LexisNexis is a database that includes newspapers, news magazines, TV and radio broadcast transcripts, wire services, state and federal law cases, and law reviews from >6000 sources worldwide [21]. Only newspaper articles were selected to be retrieved. The search criteria were selected to identify articles that presented information related to take-back programs for unused opioid prescriptions and to evaluate how toilet disposal for unused opioid prescriptions was presented in these articles. Evaluating the communication of toilet disposal only in the presence of communication of take-back programs aligns with current FDA recommendations that toilet disposal be considered for medications on the FDA flush list as soon as medication is no longer needed and if a take-back program is not readily available. An additional inclusion criterion was publication in a US media outlet. Press releases and foreign news media articles were excluded. Articles with high similarity (documents that were nearly identical [22]) were removed

using the LexisNexis duplicate function. LexisNexis was accessed via an institutional account through the University of Minnesota.

LexisNexis features a relevance ranking algorithm that sorts search results based on their statistical similarity to the original search term(s). The purpose of such an algorithm is to surface those documents most pertinent to the topic at hand. Articles were sorted by relevance to the search criteria, and the first 75 articles retrieved based on the LexisNexis relevance ranking were coded for 2014, 2015, and 2016. For 2017, the initial 38 articles retrieved based on the LexisNexis relevance ranking were coded from January 1, 2017, to June 30, 2017. In total, 263 articles were coded for the presence or absence of the following codes: the presentation of and recommendation for opioid disposal practices (take-back programs and toilet disposal), the environmental harm from toilet disposal, the environmental safety from toilet disposal, and additional strategies to reduce opioid supply (e.g., reducing overprescribing, safe storage practices). After a code was identified, the entity, group, or individual accredited with that statement was captured using the following categories: 1) pharmaceutical industry, 2) law enforcement officials, 3) medical or health care professionals, 4) government representatives, 5) water utility, 6) other, or 7) unspecified.

Coding was completed by two authors (MLP and BDB), each responsible for hand-coding approximately 50% of the articles. First, each coder separately reviewed and coded 10 articles; they then met to discuss any discrepancies in the coding. Next, 20 articles were separately coded and were evaluated for interrater reliability; Cohen's Kappa was 0.79 (substantial agreement [23]), and all discrepancies were discussed. An additional 20 articles were coded and evaluated for interrater reliability; Cohen's Kappa was 0.87 (near perfect). After establishing strong interrater reliability, the remaining articles were coded separately by only one coder.

Results

Take-back programs were presented as a recommended disposal strategy for unused opioid medications in 88.6% of articles. Approximately 11% of articles retrieved contained the term "take-back," but the term was not used in the context of discussing a take-back program (e.g., these articles included colloquial use of the term such as a desire to "take back" control of one's life after an opioid use disorder). The majority of articles (85.2%) presented information recommending take-back programs as a method to dispose of unused prescription opioids without discussing toilet disposal. Toilet disposal was presented as a recommended option for the disposal of unused prescription opioids in 3.4% of the articles. Toilet disposal was presented as being harmful to the environment in 16.0% of articles, whereas toilet disposal was presented as not harmful to the environment in 0.8% of articles. Additional recommendations to reduce opioid supply were not widely presented in the articles (Table 1).

Table 1 Count and percentage of articles (N = 263) with primary codes present

Topic	Count of Articles with Code Present	Percentage of Articles with Code Present
Take-back programs		
Take-back program presented as recommended disposal option for unused prescription opioids	233	88.6
Toilet disposal		
Toilet disposal presented as recommended disposal option for unused prescription opioids	9	3.4
Toilet disposal of unused prescription opioids presented as harmful for environment	42	16.0
Toilet disposal of unused prescription opioids presented as not harmful for environment	2	0.8

Other strategies to reduce opioid supply		
Safe home storage practices	19	7.2
Minimize or change opioid prescribing practices	38	14.4
Nonopioid pain management interventions	15	5.7
Prescription drug monitoring programs	42	16.0

Figure 1 displays the stakeholders' statements in the news media regarding the appropriateness and safety of toilet disposal for unused prescription opioids. Most stakeholder groups presented toilet disposal as harmful to the environment more frequently than they presented toilet disposal as a recommended method for disposal. The greatest difference was observed for law enforcement officials, who suggested that toilet disposal of unused opioid medications was connected to environmental harm 91% of the time. Medical and health care professionals presented information related to recommendations for toilet disposal and environmental harm from toilet disposal at the same rate.

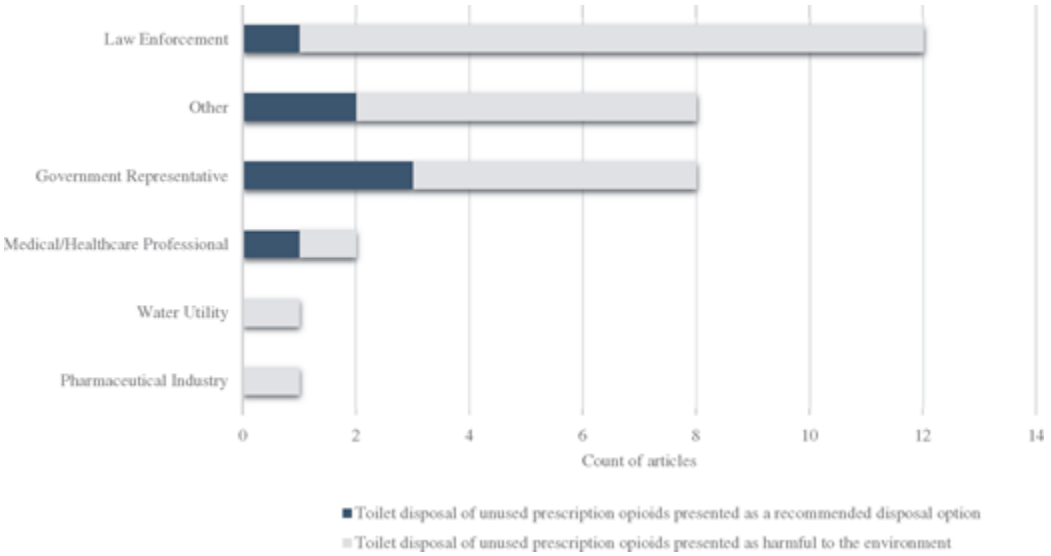

Figure 1 Presentation of toilet disposal as a recommended method to dispose of unused prescription opioids as compared with the presentation of toilet disposal of unused prescription opioids as harmful to the environment in news media articles.

Differences were observed in the frequency of articles that had codes presented by the various stakeholders. Law enforcement officials and government representatives were most commonly credited with making statements about take-back programs, with these groups being accredited with statements in 35.4% and 28.1% of the coded news media articles, respectively. Medical and health care professionals, individuals from the pharmaceutical industry, and individuals from water utilities were accredited with statements concerning take-back programs in 8.7%, 2.7%, and 0.0% of the articles, respectively. When discussed, statements about secure home storage practices (e.g., keeping opioid medications in a locked cabinet), minimizing opioid prescriptions or changing opioid prescribing practices, prescription drug monitoring programs, and nonopioid pain management treatments were primarily attributed to medical and health care professionals and government representatives (Table 2).

Table 2 Count and percentage (N = 263) of primary codes in articles by the various stakeholders involved in communication

Topic	Pharmaceutical Industry, No. (%)	Water Utility, No. (%)	Medical/Health Care Professional, No. (%)	Government Representative, No. (%)	Law Enforcement, No. (%)	Unspecified, No. (%)	**Other, No. (%)**
Take-back programs							
Take-back program presented as recommended disposal option for unused prescription opioids	7 (2.7)	0 (0.0)	23 (8.7)	74 (28.1)	93 (35.4)	39 (14.8)	24 (9.1)
Toilet disposal							
Toilet disposal presented as recommended disposal option for unused prescription opioids	0 (0.0)	0 (0.0)	1 (0.4)	3 (1.1)	1 (0.4)	2 (0.8)	2 (0.8)
Toilet disposal of unused prescription opioids presented as harmful for environment	1 (0.4)	1 (0.4)	1 (0.4)	5 (1.9)	11 (4.2)	17 (6.5)	6 (2.3)
Toilet disposal of unused prescription opioids presented as not harmful for environment	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.4)	1 (0.4)
Other strategies to reduce opioid supply							
Safe home storage practices	0 (0.0)	0 (0.0)	5 (1.9)	4 (1.5)	3 (1.1)	2 (0.8)	5 (1.9)
Minimize or change opioid prescribing practices	1 (0.4)	0 (0.0)	11 (4.2)	16 (6.1)	0 (0.0)	9 (3.4)	3 (1.1)
Nonopioid pain management interventions	1 (0.4)	0 (0.0)	7 (2.7)	6 (2.3)	0 (0.0)	1 (0.4)	1 (0.4)
Prescription drug monitoring programs	1 (0.4)	0 (0.0)	7 (2.7)	24 (9.1)	2 (0.8)	8 (3.0)	2 (0.8)

Discussion

This study provides the first examination of how recommendations for the disposal of unused prescription opioids are presented by various stakeholders in the US news media. Through content analysis, we found that toilet disposal of unused prescription opioids was rarely presented as a recommended disposal option in US news media articles. Toilet disposal was also commonly presented as harmful to the environment. This is in contrast to the FDA recommendation for toilet disposal of unused prescription opioids when a take-back program is not readily available given the significant risk that unused prescription opioids pose to human health. Discussing opioid disposal in the news media also presents an opportunity to present information about additional strategies to prevent opioid misuse, such as safe at-home storage, yet we found that these topics were rarely discussed concurrently with disposal recommendations.

We recommend that individuals who communicate opioid disposal recommendations to the public include information regarding the FDA-recommended practice of toilet disposal of unused opioids that are on the FDA flush list when a take-back program is not readily available. Furthermore, given the lack of harm to the environment and human health from opioids on the FDA flush list found in models evaluated by Khan and collagues [6], take-back programs may not need to be the primary disposal recommendation for unused prescription opioids. It may be beneficial for regulatory bodies to reconsider toilet disposal of unused prescription opioids as a method of equal importance as take-back programs. We posit that the past widespread communication that pharmaceuticals harm the aquatic environment [14] likely leads to doubt about the safety of toilet disposal of medicines and to stakeholder reluctance to relay this recommendation to patients or the public. Individuals making the recommendation for toilet disposal of unused prescription opioids may benefit from citing 1) that current evidence on the topic indicates negligible harm to the environment and humans from opioids on the FDA flush list [6] and 2) opioids are different than the pharmaceuticals and personal care products that have been reported to cause environmental impacts (e.g., the antidepressant medication fluoxetine [24], the synthetic estrogen used for birth control pills [14], the antidiabetic medication metformin [25], and antibiotics that can promote the spread of antibiotic resistance [26]).

As patient education can lead to an increase in the proper disposal of prescribed opioid medications [9], we suggest that all FDA-recommended opioid disposal options should be included in patient education for medications on the FDA flush list. Potential educational interventions could include providing written or verbal information to the patient upon prescription pick-up, labeling the medication bottle with disposal recommendations, and following up with the patient by letter or phone after the prescription's expiration. The Environmental Protection Agency advocates that medications should not be flushed unless the label or accompanying patient information specifically recommends doing so [27], indicating that accurate labeling of medication bottles and patient education is essential to facilitate appropriate medication disposal. Future research may benefit from exploring health care providers' knowledge and comfort in providing patient recommendations for disposing of unused prescription opioids via both toilet disposal and take-back programs.

A consideration for interpretation of this research is that Khan and colleagues' [6] study, which found negligible harm to the environment and humans from the medicines on the FDA flush list, was released after the examination of news media articles included in this study. Before this study, the ecological and human health impacts from opioids or the medicines on the flush list in the aquatic environment were largely unknown. Future research may benefit from examining changes in the communication of toilet disposal of unused prescription opioids after this study was made available to the public. A limitation of this study is that it is an evaluation of a small and noncomprehensive sample of a particular type of media. Other forms of communication (e.g., social media, local government advertisements, health department messaging) may communicate opioid disposal recommendations differently and thus likely play an important role in understanding how the public is informed

of opioid disposal recommendations. Another limitation is that the search strategy may have excluded articles that mentioned toilet disposal strategies without mentioning take-back programs. For example, this may have excluded news media articles targeted toward audiences in regions of the United States where take-back programs do not often exist (e.g., rural areas), and as such news media communication about toilet disposal of medications may simply not mention take-back programs.

Conclusions

The opioid epidemic is a national public health emergency that requires a comprehensive public health approach to enhance the prevention of opioid misuse and to reduce opioid-related deaths. Proper and timely disposal of unused prescription opioids is one opportunity to deter improper use of these medications and prevent overdose. Based on recent research [6] highlighting the negligible ecological and human health harm from opioids on the FDA flush list, we recommend improved accuracy in communicating the FDA recommendations for toilet disposal of unused prescription opioids when a take-back program is not readily available by various stakeholders in the news media. We also recommend that policy-makers consider toilet disposal of unused opioids as a disposal recommendation that is equal in importance to take-back programs.

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