Pharmacist Intention to Provide Medication Disposal Education

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Background / Objective
Proper disposal of unused prescription drugs is an ever-increasing challenge as the number of prescriptions dispensed to patients continues to increase in the United States. Increases in improperly disposed or unused medications may contribute to increases in accidental poisonings, prescription drug abuse or misuse, and drug diversion. Between 2001 and 2008, over 200,000 children under the age of five had emergency department (ED) visits due to accidental prescription drug ingestion. The children were able to access these drugs in common storage areas, such as medicine cabinets, purses, pill containers, and countertops. Of the 2.1 million drug abuse visits to the ED in the US in 2009, more than 50% (1.2 million) involved use of prescription or over-the-counter (OTC) medications. This number has increased 98% from 2004, in which approximately 600,000 ED visits for prescription drug abuse were observed.

There are also environmental dangers associated with improper medication disposal. All medications, including antineoplastic agents, hormones, and non-biodegradable antibiotics, can potentially contaminate the water supply, though some medications, including opioids, are considered by the Food and Drug Administration (FDA) as appropriate to flush down the toilet in the absence of proper disposal. In California specifically, the Department of Resources, Recycling, and Recovery recommends not disposing of any prescription or non-prescription substances down the drain or toilet. CalRecycle also recommends disposing of medications in the trash if take-back or mail-back options are not available. Wastage of medications also directly translates to large unnecessary healthcare costs.

Community pharmacists are in a position to educate patients about proper medication disposal, which may help promote safety by decreasing the risk of prescription drug abuse and environmental dangers. This study aims to assess community pharmacists’ knowledge on medication disposal and their intentions to provide medication disposal education to patients. This is an adapted study on medication disposal research conducted by at Western University of Health Sciences College of Pharmacy that sampled pharmacists from the counties around Western University and California Northstate University. This study also aims to compare results of the San Diego County sampling to the Los Angeles and Northern California areas to determine similarities and differences as well as provide any evidence of generalizability of the data.

The theory of planned behavior (TPB) was chosen as a standard of measurement to evaluate pharmacist intention to provide medication disposal education in order to directly compare results to the previous study. TPB consists of four constructs that assess pharmacist attitude (individual’s positive or negative feelings about performing a behavior), subjective norm (individual’s perception of whether people important to the individual think the behavior should be performed), perceived behavioral control (individual’s perception of the difficulty of performing a behavior), and intention (individual’s plan to perform behavior). TPB is common in social cognitive theory research and has been used to assess multiple pharmacy and other healthcare settings.

Methods
Study Design
This was a cross-sectional qualitative study approved by the Institutional Review Board of University of California, San Diego, and was conducted by distributing paper surveys to community pharmacists in San Diego County.

Population and Sample
The study population consisted of community pharmacists located in San Diego County. Community pharmacies were identified by internet searches for pharmacies in the San Diego County. Convenience sampling was used in selecting pharmacists to administer questionnaires.

Survey
The administered survey was identical to the one used previously, with no modifications. Survey details are described in the previous study. The survey is used to ensure that the collected data can be appropriately compared to results of that study. The surveys were conducted in person by the study investigators at the sites randomly selected from the identified pharmacies. Pharmacies were contacted by phone prior to survey administration to determine availability to take the survey. Study investigators then went to the on sites to administer the surveys. Agreeing pharmacists at those sites were given paper forms of the questionnaire to fill out. Data collection was conducted between September 2014 and March 2015.
Figure 1.

Medication Disposal Education Frequency

- Every day: 3%
- Never: 8%
- Once a year: 3%
- Once a week: 44%
- Once a month: 42%

Figure 2.

Source of Pharmacist Education of Medication Disposal

- Pharmacy School
- Work Training
- Continuing Education
- Professional Organizations
- Other
- No Education
Data Analysis Methods
Written responses on questionnaires were consolidated into a secure and encrypted Microsoft Excel file and used as input for data analysis using STATA 14. Frequency, ranges, mean, and standard deviations were calculated for descriptive statistics. Comparisons of individual constructs between subgroups were measured, with a P-value of <0.05 being considered statistically significant.

Results

Demographics
A total of 36 surveys were administered and returned. A majority of the pharmacists (67%) were less than 41 years of age. A majority of the pharmacists were full-time staff pharmacists (63%) working for a chain, grocery store, or mass merchandiser (66%). Most pharmacists had a doctor of pharmacy degree (87%), but less than half received medication disposal education through pharmacy school (42%). Instead, a majority of pharmacists received information about medication disposal from work training (72%) and/or government agencies or professional organizations (58%). Few pharmacists (6%) did not receive any medication disposal information at all. Most pharmacists provided medication disposal education about once a month (42%) or once weekly (44%).

TPB Model Constructs
Table 2 lists descriptive statistics for individual TPB items, including percentage of respondents answering either positively or negatively for each statement.

Attitude
All pharmacists (100%) responded that they felt comfortable providing medication disposal education to their patients. All pharmacists (100%) considered it important that community pharmacists provide education on medication disposal, and a majority (97%) considered it a valuable opportunity to contribute to patients. Fewer pharmacists (77%), but still a majority, considered advocating the provision of medication disposal education to the community as an important step in moving the pharmacy profession forward. The combination of these scores indicates a positive attitude toward medication disposal.

Subjective Norm
A majority of pharmacists (88.5%) believed patients would like them to provide medication disposal education. Fewer, but still a majority of pharmacists (79%), believed other healthcare professionals would like them to provide medication disposal education. However, only 55% of pharmacists believed that other community pharmacists were providing medication disposal.

Perceived Behavioral Control
Approximately 36% of pharmacists believed that providing medication disposal education in the pharmacy would increase their workloads. A majority of pharmacists (75%) believed they would have the necessary time to provide medication disposal education on a regular basis in their pharmacies, and 83% of pharmacists believed they would have the necessary time to keep up with the rules and regulations of medication disposal for their practice areas. Overall, pharmacists showed positive perceived behavior control.

Intention
A majority of pharmacists (83%) indicated that they intend to provide medication disposal education as part of their consultations with patients. A majority of pharmacists (94%) also intend to actively work to ensure a role for pharmacists in provision of medication disposal education to the community. This demonstrates, overall, a positive intention to provide medication disposal education.

Knowledge
Most pharmacists (75%) were aware that the Drug Enforcement Agency (DEA) had recommendations regarding medication disposal. A majority of pharmacists (69%) were aware that local county agencies had recommendations for medication disposal specific to their communities, and 63% of pharmacists were also aware that the Environmental Protection Agency (EPA) had information regarding medication disposal. Only 50% of pharmacists recognized that the FDA provided recommendations for medication disposal. Very few pharmacists (22%) were aware that all of these organizations were information sources for proper medication disposal.

Methods to Dispose Unused Non-Controlled Medications

Figure 3.
| Variables                                                                 | Frequency (%) |
|--------------------------------------------------------------------------|---------------|
| Age (years) (n=30)*                                                       |               |
| 21-30                                                                    | 9 (30)        |
| 31-40                                                                    | 11 (37)       |
| 41-50                                                                    | 7 (23)        |
| 51-60                                                                    | 2 (7)         |
| Over 60                                                                  | 1 (3)         |
| Gender (n=30)*                                                            |               |
| Male                                                                     | 9 (30)        |
| Female                                                                   | 21 (70)       |
| Pharmacy practice experience (years) (n=30)*                             | 8.8 ± 1.7     |
| Highest pharmacy education (n=30)*                                       |               |
| BPharm                                                                   | 1 (3)         |
| PharmD                                                                    | 26 (87)       |
| Other                                                                    | 3 (10)        |
| Employment status (n=30)*                                                 |               |
| Full-time                                                                | 23 (77)       |
| Part-time                                                                | 6 (20)        |
| Relief / Per diem                                                         | 1 (3)         |
| Primary practice setting (n=30)*                                         |               |
| Chain (e.g. CVS, Ralphs)                                                 | 16 (53)       |
| Mass merchandiser (e.g. Walmart)                                         | 4 (13)        |
| Outpatient / Clinic pharmacy                                             | 10 (33)       |
| Position (n=30)*                                                         |               |
| Staff pharmacist                                                          | 19 (63)       |
| Pharmacy manager / Pharmacist-in-charge                                  | 9 (30)        |
| Other                                                                    | 2 (7)         |
| Past experience in providing medication disposal information (n=36)      |               |
| Never                                                                    | 3 (8)         |
| About once a year                                                        | 1 (3)         |
| About once a month                                                       | 15 (42)       |
| Every week                                                               | 16 (44)       |
| Every day                                                                | 1 (3)         |
| Source of medication disposal information (n=36)**                        |               |
| Pharmacy school                                                          | 15 (42)       |
| Work training                                                            | 26 (72)       |
| Continuing education                                                     | 9 (25)        |
| Government agencies or professional organizations                        | 21 (58)       |
| Other                                                                    | 7 (19)        |
| Have not received any education                                          | 2 (6)         |

*Numbers may not total 36 because of missing data.
**Multiple answers accepted.
| Construct               | Item Statement                                                                 | n  | % agreed* | % disagreed** |
|------------------------|-------------------------------------------------------------------------------|----|-----------|---------------|
| Attitude               | I am comfortable providing medication disposal education to the community according to all the rules and regulations in my practice area. | 36 | 100       | 0             |
|                        | It is important for community pharmacists to provide education on medication disposal to the patients. | 36 | 100       | 0             |
|                        | Providing education on medication disposal is a valuable opportunity for me to contribute to my patients. | 35 | 97        | 3             |
|                        | Advocating the provision of medication disposal education to the community will be an important step in moving the pharmacy profession forward. | 35 | 77        | 23            |
| Subjective Norm        | Patients in my community would like me to provide medication disposal education. | 35 | 89        | 11            |
|                        | Healthcare professionals would like me to provide medication disposal education to my patients. | 33 | 79        | 21            |
|                        | Other community pharmacists that I know are providing medication disposal education to the community. | 31 | 55        | 45            |
| Perceived Behavioral Control | Providing medication disposal education in my pharmacy will increase my workload. | 35 | 36        | 64            |
|                        | I would have the necessary time to provide medication disposal education on a regular basis in my pharmacy. | 36 | 75        | 25            |
|                        | I would have the necessary time to keep up with the rules and regulations of medication disposal for my practice area. | 37 | 83        | 17            |
| Intent                 | I intend to provide medication disposal education as a part of my consultation/counseling to my patients. | 36 | 83        | 17            |
|                        | I will actively work to ensure a role for pharmacists in the provision of medication disposal education to the community. | 35 | 94        | 6             |

*Included those who strongly agreed.
**Included those who strongly disagreed.
Pharmacists were aware that medications could be disposed of at National Drug Take-Back events, with 83% recommending it as a method of disposing noncontrolled substances and 89% recommending it as a method of disposing controlled substances. Controlled substances should not be flushed down the toilet or sink, but few pharmacists (8%) would recommend this method to their patients. Only 6% of pharmacists recommended taking noncontrolled or controlled substances back to the pharmacy. Mixing medications with undesirable substances and disposing of them in the trash is one of the recommended methods of disposing noncontrolled and controlled medications recommended by the DEA, EPA, and FDA. Only 42% of pharmacists recommended this method for noncontrolled substances, and 22% recommended it for controlled substances. One-third of pharmacists (33%) recommended other disposal methods for noncontrolled substances that include mail-back envelopes and contacting hazardous waste disposal sites.

While National Drug Take-Back day had the highest number of pharmacist recommendations for disposing medications, the second most recommended method was to return medications to nearby police stations for noncontrolled medications (61%) and controlled substances (67%). During this study, San Diego County had 26 drop-box locations.

Subgroup Analyses
No significant findings that differed from the sample population were found when stratifying data by age, gender, or practice settings.

Discussion
Despite disparate locations, study demographics in the San Diego County are remarkably similar to the sample collected in the previous study, which suggests small heterogeneity between groups and possible validity of generalizability of the data to at least Southern California.

A majority of surveyed pharmacists demonstrated positive intention to provide proper medication disposal education to patients as part of their consultations. The study results show pharmacists displaying favorable attitudes toward providing disposal education, but some pharmacists (36%) determined that providing this education to patients would increase their workloads, which may discourage them from doing so despite a majority (97%) recognizing the importance and value in doing so. This pattern is consistent with the results of the previous study.

Surveyed pharmacists showed limited education and training on medication disposal during pharmacy school (42%), which is consistent with past research. This suggests it may be beneficial to strengthen education on medication disposal in pharmacy school curricula. Pharmacists were able to recognize at least one organization (among DEA, FDA, EPA, and local agencies) that provided a source of medication disposal information, but only 22% of pharmacists were aware that all were sources of information. There were also inconsistencies in appropriate recommendations, indicating a need for programs or continuing education to keep pharmacists up to date on regulations and to familiarize themselves on proper disposal methods available in their practice areas.

Despite the positive intention to provide education, and even if pharmacists were able to provide accurate information about medication disposal, only 42% of pharmacists reported providing this information to patients about once per month, and 44% provide this information once per week. Encouraging pharmacists to ask their patients about medication disposal or incorporating this information into consultation could help create opportunities to provide this education more frequently and establish pharmacists as a resource for medication disposal information. This may contribute to increasing medication safety by decreasing the risk of prescription drug abuse.

Figure 4.

Methods to Dispose Unused Controlled Medications

| Method                  | Response % |
|-------------------------|------------|
| Flush Medications       | 80         |
| Mix Medications with Substances | 60       |
| Return to Pharmacy      | 40         |
| Return to Police Station| 20         |
| Take Back Day           | 10         |
| Other                   | 5          |

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Interpretation of data collected in this study is subject to several limitations. Convenience sampling when collecting data and the small sample size may suggest limited generalizability of the results. The sample size was limited in part to the timeline for completion of the study and pharmacist availability to meet face-to-face to complete the survey. Survey responses may be biased toward social acceptability due to self-reported answers to survey questions, although surveys were anonymous to minimize this bias. Causality among variables in this study cannot be made since this is a cross-sectional study.

Conclusion

Demographics of the sample population in this study are similar to that of the Western University study. Results of TPB constructs are also similar to previous results. Attitude, perceived behavioral control, and subjective norm were all positive predictors of intention to provide medication disposal education, with the exception of the perception that providing this education would increase workload. As in the previous study, pharmacists appear to have insufficient knowledge in the area and are not providing recommended information to patients on a regular basis despite positive intention to provide medication disposal information. Programs to improve pharmacist knowledge about medication disposal should be advocated.

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References

1. IMS Institute for Healthcare Informatics. Medicines use and spending in the U.S.: A Review of 2015 and Outlook to 2020 (April 2016). https://morningconsult.com/wp-content/uploads/2016/04/IMS-Institute-US-Drug-Spending-2015.pdf (accessed 2017 April 2017).

2. Bond GR, Woodward RW, Ho M. The growing impact of pediatric pharmaceutical poisoning. J Pediatr. 2012 Feb;160(2):265-270.e1.

3. Substance Abuse and Mental Health Services Administration. Rise in prescription drug misuse and abuse impacting teens (April 2016). www.samhsa.gov/homelessness-programs-resources/hpr-resources/teen-prescription-drug-misuse-abuse (accessed 2018 March).

4. National Institute on Drug Abuse. Drug-related hospital emergency room visits (May 2011). https://www.drugabuse.gov/publications/drugfacts/drug-related-hospital-emergency-room-visits (accessed 2017 April).

5. Koplin DW, Furlong ET, Meyer MT, et al. Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999–2000: A National Reconnaissance. Environ Sci & Technol. 2002 36(6), 1202-1211.

6. Donn J, Mendoza M, Pritchard J. An AP investigation: Drugs found in drinking water. Associated Press. News.

7. Southern Nevada Water Authority. 2015 water analysis summary of pharmaceuticals and other emerging contaminants (2015). https://www.swa.com/water-quality/reports/index.html (accessed 2017 April).

8. US Food & Drug Administration. Disposal of unused medicines: what you should know. www.fda.gov/drugs/resourcesforyou/consumers/buyingusingmedicinesafely/ensuringsafeuseofmedicine/safedisposalofmedicines/ucm186187.htm#Medicines_recommended (accessed 2017 April).

9. California Department of Resources Recycling and Recovery (CalRecycle). Medication waste. www.calrecycle.ca.gov/HomeHazWaste/Medications (accessed 2017 April).

10. Tai BW, Hata M, Wu S, Frausto S, Law AV. Prediction of pharmacist intention to provide medication disposal education using the theory of planned behavior. J Eval Clin Pract. 2016 Oct;22(5):653-61.

11. Godin G, Bélanger-Gravel A, Eccles M, Grimshaw J. 2008. Healthcare professionals’ intentions and behaviours: a systematic review of studies based on social cognitive theories. Implementation Science. 3(1), 36.

12. Walker A, Watson M, Grimshaw J, Bond C. 2004. Applying the theory of planned behaviour to pharmacists’ beliefs and intentions about the treatment of vaginal candidiasis with non-prescription medicines. Family Practice. 21(6), 670-676.