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DO NURSING AND PHARMACY STUDENTS PRACTICE WHAT THEY PREACH ON SAFE DRUG STORAGE AND DISPOSAL? A CROSS-SECTIONAL STUDY

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Abstract

Background: Research has confirmed a lack of knowledge regarding the risks of unused medications including diversion, misuse, or accidental overdose among health care professionals (Arabia, 2020). Nurses and pharmacists are often who patients interact with the most regarding medications; therefore, early education on proper storage and disposal is vital (Bowen, Rotz, Patterson, & Sen, 2017; Celio, Ninane, Bugnon, & Schneider, 2018).

Objectives: The study's objective is to explore safe drug storage and disposal knowledge, attitudes, and practices of professional pharmacy (Pharm.D.) and nursing students.

Design: This research is an exploratory cross-sectional study from May to September 2019.

Methods: An anonymous online survey was administered to a purposive sample of Pharm.D. and nursing students who were 18 years and older and enrolled in the site's accredited Pharm.D. and nursing programs (N=210). Responses were analyzed using descriptive statistics.

Results: Common disposal methods reported by students on their personal medications such as pills and liquids included discarding medications with the household trash (range 30% to 55%) and medication disposal products/bag (range 19% to 28%). More than half of the participants (50.4%) had unused prescription medication at home, 35% kept the medication for later use, and almost 20% of the participants reported sharing personal medications with others.

Conclusion: Although the majority of student participants had adequate knowledge of the appropriate methods for safe drug disposal, few reported using them for their own personal medications. The findings suggest there is a disconnect between the participants' knowledge of the appropriate methods of safe drug storage and disposal in a professional setting and their own practices. Further research is needed to explore and address the reasons for this disconnect. Additionally, findings from this research will assist in the development of and/or the improvement of interdisciplinary educational materials among pharmacy and nursing students.

Introduction

In 2019, more than 4 billion prescription drugs were filled at pharmacies in the United States (Shahbandeh, 2020), and the total cost of prescription drug sales was $507.9 billion (Tichy et al., 2020). For many Americans, taking medication is an essential daily routine. According to a survey conducted by the Centers for Disease Control and Prevention (CDC) in the years 2013-2016, almost half (48.49%) of persons had taken at least one prescription medication within the past 30 days (CDC, 2020; Martin, Hales, Gu, & Ogden, 2019). To ensure medications are effective and appropriately used, certain steps need to be taken: proper medication storage, disposal, and education on storage and disposal.

Previous research found that people tend to store their medication in the medicine cabinet, kitchen, and bedroom (Wieczorkiewicz, Kassamali, & Danziger, 2013). However, these locations do not meet the required conditions of proper storage. Improper storage can cause changes to the medication's appearance, degradation, and/or a lower potency.

Additionally, the dispensed and stored medications are not always consumed by the patient during the prescribed timeframe. A previous study found that two thirds of the dispensed medication were left unused, with more than 40% of patients citing improvement in health condition as the reason (Law et al., 2015). Unused prescriptions should not be viewed as leftover medication for later use. The availability of unused medication stored at home increases the risk of drug diversion, misuse, or accidental overdose, especially in children and young adults (McCabe, Teter, Boyd, Wilens, & Schepis, 2018; Mitchell, Nolte, Turner, Hamby, & Jones, 2018; Petrik, McNamara, Moeschler, & Blair, 2019; Schillie, Shehab, Thomas, & Budnitz, 2009). The growing problem with prescription drug misuse is alarming among children, adolescents, and young adults, with the top three medication classifications misused being opioids, depressants, and stimulants (SAMHSA, 2015). The misuse of prescription stimulants posed a problem in the college setting, as Kaye and Drake (2012) reported estimates of lifetime use ranging from 5 – 43% to reach desired academic achievement (Blevins, Stephens, & Abrantes, 2017).

Background

Federal agencies, including Drug Enforcement Administration (DEA), Food and Drug Administration (FDA), and United States Environmental Protection Agency (EPA), have recommendation on how patients should dispose of their unused medications. These agencies recommend that patients bring their unused medicine to a collection site or to a Take-Back event. Because of the growing awareness of the national opioid pandemic, the Secure and Responsible Drug Disposal Act was implemented in 2014. Through the implementation of this act, there is an increase in options and access for patients to properly dispose of their controlled medication. Patients can choose to use a mail-back program or a collection receptacle for their unused controlled substances. Patients may also drop-off their medication to other locations such as participating retail pharmacy, narcotic treatment program, and hospital with an on-site pharmacy (Drug Enforcement Administration 2014). Another option is

single-use disposal and drug deactivation system products. These products allow patients to safely dispose of medications at home and to lower the adverse effects of improper drug disposal on the environment (Bakshi, Korey, Fowler, & Banga, 2018).

Besides the consumer, health care professionals such as nurses and pharmacists can make a large impact on addressing the need for proper medicine disposal. Studies have shown that educating patients on the importance of proper unused medication disposal methods, including specifically controlled substances, have greatly increased the likelihood of patients performing this action (Buffington, Lozicki, Alfieri, & Bond, 2019).

As the healthcare professional who spends the most time with patients, nurses are important members of the healthcare team. They are in a prime position to educate patients on the importance of performing proper medicine disposal. Pharmacists, the drug experts, are another health care team member who has the responsibility of educating patients regarding medication use, storage, and disposal. As the last healthcare professional patients see, pharmacists are able to counsel patients on how to properly dispose of their unused or expired medicine. Therefore, both nurses and pharmacists are ideal for providing the proper education on medication disposal to patients.

While a number of studies exist in the United States and in other countries about safe drug storage and disposal knowledge, attitudes, and practices, they are mostly limited to the general public. Research is scarce on the knowledge, attitudes, and practices of drug storage and disposal among health care students, such as pharmacy and nursing students, who are on the 'front lines' in health care settings. These students are the future healthcare professionals who will be interacting with patients, and it is imperative that they learn how to address the growing issue of unused expired medicine and its disposal.

However, there have been no studies in the U. S. that examined nursing students' and pharmacy students' knowledge and attitudes, including their personal practice of safe drug storage and disposal. Therefore, this study explored the knowledge, attitudes, and practices of Nursing and pharmacy students on safe drug storage and disposal to increase the researchers' knowledge about the latter and to identify the need for education on these topics.

Methods

Study Design

This research was an exploratory, descriptive, and cross-sectional study conducted from May 2020 to September 2020. An anonymous online survey was administered to a purposive sample of professional pharmacy and nursing students. The study was approved by the university's Institutional Review Board (IRB).

Participants

The target population included nursing and professional pharmacy students enrolled and attending a public university in Houston. Nursing students from three different undergraduate baccalaureate tracks: traditional Bachelors of Science in Nursing (BSN), Registered Nurse (RN) to BSN, and second degree BSN were recruited in collaboration with faculty in the College of Nursing at the university. Professional pharmacy students from first year through fourth year were recruited in collaboration with student organizations and class officers at the College of Pharmacy. The total number of students who received the survey from both colleges was 400 students.

Instruments and Measures

The outcome measures in this study were the knowledge, attitude, and practice of nursing and professional pharmacy students regarding safe drug storage and disposal. The final survey instrument consisted of 41 items that were adopted or adapted from three different instruments and included a mix of open-ended questions and multiple-select questions. Thirty-three questions were adapted from previous studies of that examined safe drug storage and disposal. Table I, II, and III, in the appendices, show the specific questions adapted from each study. In Table I, the questions from Tong, Peake, and Braund (2011) study explored disposal practices for unused medications in community pharmacies. Table II has questions from Pankajkumar, Chacko, and Prakashkumar (2015) study, which explored the storage and disposal of medicines in homes of students. For Table III, it has questions from Bataduwaarachchi, Thevarajah, and Weeraratne (2018) which were over medication waste disposal practices from patients attending outpatient departments at a tertiary care institution. Table IV shows additional questions that were created by the principal investigator (PI). The items were divided into different sections. The first section covered the demographics of the participants. The following sections of the survey included items that measure the participants' opinion on prescriptions, over-the-counter (OTC) and controlled drug disposal methods, the participants' knowledge and awareness of medication they are/have been taking, the interaction with healthcare provider concerning their medication, the participants' storage practice, and the knowledge and practice of unused medication disposal.

Procedure

The initial survey was piloted on 9 professional pharmacy students for face validity. The feedback from the pilot testers indicated that grammar errors and additional clarification were needed to enhance the clarity of the questions. Pilot testers were excluded from participating in the final survey. Pharmacy student organization leaders and class officers distributed the survey through Listserv emails. Before beginning the survey, participants who met the inclusion criteria, which were Pharm.D or Nursing

student, age 18 years or older, and a student attending the university, were directed to provide consent to participate in this study.

At the end of the survey, participants were offered the choice of providing their email address to enter a raffle to win one of five $50 Amazon gift certificates. To enter their email address, participants were redirected to a different Qualtrics© survey. Responses from the two surveys were not linked and maintained the participants' anonymity.

Data

Data were entered and coded, then descriptive statistics were calculated for all survey items. All statistical analyses were conducted using SPSS Version 27 (SPSS Inc., Chicago, IL, USA). The results are expressed as numbers and percentages presented in the forms of tables and graphs. In addition, the associations between variables were determined by performing chi-square tests. A p-value < 0.05 was considered a statistically significant difference in all analyses.

Results

Of all participants (n=210), 139 (66%) were professional pharmacy students (PharmD), and 71 (34%) were nursing students. The majority of the participants (78.5%) were females, and more than a third were Asian (42.8%). Almost half of the pharmacy students were in their third year of their professional education (44%), and nearly two thirds of nursing students were enrolled in their second degree BSN program. Details are presented in Table 1.1 and Table 1.2.

When asked about their opinion on proper disposal of different forms of OTC unused and expired medications, the majority of pharmacy (79.4%) and nursing (80.4%) students chose a medication bin collected by a contractor as the most appropriate method to dispose of unused and expired medications. When asked about their opinion on proper disposal of Schedule II medications that included certain narcotic, stimulant, and depressant drugs, such as oxycodone, methylphenidate, and

dextroamphetamine, 77.7% of pharmacy students and 73.2% nursing students chose a medication bin collected by a contractor as the most appropriate method. Similarly, medications bins collected by a contractor was chosen by both pharmacy (79.1%) and Nursing students (73.2%) as the most appropriate method to dispose of Schedule III prescription drugs, such as acetaminophen with codeine and hydrocodone. Details are presented in Table 2 below.

When students were asked if they received advice on safe medication storage, almost one third of both groups reported not receiving any advice (31.4% of pharmacy students, 32.8% of nursing students). Almost half of PharmD (47%) and more than two thirds of Nursing students (68.9%) reported not receiving any advice on proper disposal of medications. Both groups of students reported pharmacists as the main provider of advice and information related to the storage of unused or expired medications. In regards to the source of advice on safe disposal of medications, nursing students reported nurses as the main provider of advice (36.8%), and pharmacy students reported pharmacists as their main provider of advice on safe drug disposal (82%). Only one student in both groups reported receiving advice on safe drug disposal from their physician. Details are presented in Table 3 below.

Nearly 40% of pharmacy and nursing students who had medications at home reported storing their medications in the kitchen, almost half of pharmacy students (46.5%) and two thirds of nursing students (63.9%) reported storing their medications in medicine cabinet. The majority of students kept their medications in the original container (95.6% pharmacy, 98.4% nursing). Surprisingly, almost 40% of pharmacy students, and 23% of nursing students reported storing their medications in an open place reachable by children. Additionally, two thirds of students in both groups reported storing unused medications with their other medications. See Table 4 below.

More than two thirds of the students in both groups (68%) reported disposing of medications as they were without diluting or crushing them. The most frequent methods used by both pharmacy and

nursing students surveyed was to dispose different forms of their unused and expired medication in a trash can or in a medication disposal product or bag. Details are provided in Table 4.

Almost all students from both groups were aware of indications of their medication (98.5% pharmacy students and 100% nursing students). The majority of the medications were tablets/capsule, and 76.5% and 76.9% of pharmacy and nursing students, respectively, reported obtaining their medications from a provider. Almost half of pharmacy students and 59% of nursing students reported collecting all their prescribed medications from the pharmacy even if they did not need some of it. Nearly 60% of pharmacy students and 43.8% of nursing students reported having unused and leftover medications at home. The most frequent reasons reported by both pharmacy and nursing students for not using all their medications were excess prescribed amount, change of treatment, health condition improved, past expiration date, side effects of the medications, and/or medication was discontinued by the prescriber.

When asked about the main reasons for keeping their unused or leftover medications, 70.6% of pharmacy students and 50% of nursing students reported keeping them in case they needed the medication later, 30.9% of pharmacy students and 34.6% of nursing students reported not wanting to waste medication, and 11.8% of pharmacy students and 34.6% of nursing students were not sure of how to dispose of them. Twenty-two percent of pharmacy students and 11.5% of nursing students who had medications at home reported sharing their medication with parents, partners or spouse, siblings, friends, or their children. See Table 5 for details.

Discussion

Most pharmacy and nursing students were knowledgeable about how to safely store their medications and dispose of them when they were finished. However, about a third of the students

did not apply their knowledge of safe medication storage and disposal into their personal practice.

Additionally, about half of the students were not provided counseling by their healthcare providers at the time of prescribing or dispensing of their medication. The main source of counseling for medication storage and disposal was from pharmacists. The number of students not provided counseling is concerning. These findings are found to be lower than the study on patients receiving health care practitioner counseling on disposal (Varisco, Fleming, Bapat, Wanat, & Thornton 2019), which showed more than half of the participants had received counseling from a professional. The results in this study also showed that general practitioners were the main provider of the counseling while about one quarter was from pharmacists. Another study also showed that healthcare students are able to acquire information on proper medication storage and disposal from many sources. With more personal exposure to medication counseling, the students personal practice after graduation can be affected by their exposure to proper counseling from healthcare professionals (Raja, Mohapatra, Kalaiselvi 2018).

Both groups, pharmacy and nursing students, were storing unused medicine in their homes (59.5% and 43.8% respectively). This finding was particularly concerning since McCabe, Teter, Boyd, Wilens, and Schepis (2018) found that the most common source of prescription drug misuse among college students and graduate were obtained free from friends and relatives. Improper medication storage and disposal may have possible negative outcomes for the public in regards to untreated health conditions, growth of drug resistant bacteria, and narcotic or prescription drug misuse, as well as harm or death (Mitchell, Nolte, Turner, Hamby, & Jones, 2018; Schillie, Shehab, Thomas, & Budnitz, 2009). According to the FDA (2020), annually in the US, approximately 600,000 emergency department visits and 450,000 calls to poison control

centers occur after a child has found and ingested leftover medication. Consequences are potentially severe.

Nurses and pharmacists are a primary source of patient education regarding medication practices on safe storage and disposal, and the students surveyed depicted personal practices of improper medication storage and disposal. The inappropriate storage and disposal of medications among future well-meaning health care providers may increase the availability of prescription drugs for potential misuse, as many may be naïve to the breadth of prescription drug use. Therefore, a different educational approach may be beneficial in changing these future health care providers' personal practices and beliefs regarding proper medication storage and disposal, in order for this to be then translated in patient teaching to the future patients they encounter (Rashid, 2019).

Strengths and Limitations

This study is not without limitations. Lack of generalizability is one. Therefore, repetitive studies conducted at different universities surveying pharmacy and nursing students, in addition to addressing the issue using a global approach may be beneficial in further transferability of the study. From the current study, the researchers gained the knowledge that a different educational approach for both groups of students may increase greater understanding and awareness regarding proper medication use and disposal that can be applied in their personal medication use and disposal. Consequently, if this knowledge is perceived to have personal merit and worth, it will likely be transferred into the education of their future patients, thus perhaps impacting healthcare on a larger scale in the future. One future educational strategy would be the incorporation of simulation and role play as an interactive unfolding case study for an inter-professional educational endeavor.

Conclusion

This research study involved analysis of 210 pharmacy and nursing students at a large university located within a large city in the U.S. Approximately one third of both groups of students reported not receiving any advice on safe medication storages, and more than half of both groups received no advice on the proper disposal of medications. The study also revealed about half pharmacy students and a quarter nursing students were noted to store medications in an open place reachable by children. Additionally, a large number of participants who kept their medications stated different reasons for doing so. Participants reported different reasons for keeping their medication such as in case they needed them later, not wanting to waste medication, or because they were unsure of how to dispose of them. Participants also reported sharing their medications with parents, partners or spouse, friends, or their children.

These statistics are concerning, as participants surveyed will one day be the patient educators on safe drug storage and disposal, and students self-reported that they personally do not practice the safe implementation of drug storage and disposal. It is imperative that their understanding is enhanced to not only educate themselves regarding this health safety concern, but also so they have a personal and workable knowledge in order to one day educate their future patients, ultimately impacting the community at large. A tailored educational component that can be implemented for both pharmacy and nursing students regarding drug storage and disposal would potentially be beneficial in changing their personal practices, with a follow up survey to note whether or not it was effective.

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Table 1.1. Sample characteristics-education

Participants	Field of Education	N	%
Pharmacy students N = 139	Professional year in pharmacy school		
	P1	17	12.2
	P2	31	22.3
	P3	61	43.9
	P4	30	21.6
Nursing Students N = 71	Nursing program		
	RN to BSN	4	5.6
	Second degree BSN	62	87.3
	Traditional BSN	5	7

Table 1.2. Sample characteristics-race and ethnicity

Variable	Pharm.D		Nursing		Cumulative	
	N	%	N	%	N	%
Gender						
Female	101	73.2	63	88.7	164	78.5
Male	37	26.8	8	11.3	45	21.5
Race/ethnicity						
White/Caucasian	25	18	29	40.8	54	25.7
African American/Black	9	6.5	6	8.5	15	9
Asian	70	50.4	20	28.2	90	42.8
Hispanic	20	14.4	15	21.1	35	16.6
Middle Eastern or North African	11	7.9	0	0	11	0.5

Table 2. Opinions on disposal of unused or expired medications

Variable	Pharm.D (N = 138)		Nursing (N = 71)	
	N	%	N	%
How do you think expired or unused SOLID dosage forms (i.e. tablets, capsules, suppositories, pessaries, transdermal patches) should be disposed?*				
In the trash bin	46	33.1	14	19.7
In the sink	0	0	1	1.4
In the toilet	4	2.9	4	5.6
In a medication's bin collected by contractors (specialized companies that collects unused or expired medications, ex. Sharps)	114	82	61	85.9
Sent back to pharmaceutical distributor	59	42.4	29	40.8
Other	7	5	4	5.6
How do you think expired or unused LIQUID dosage forms (i.e.				

suspensions, elixirs, topical lotions, injections) should be disposed?*				
In the trash bin	36	25.9	10	14.1
In the sink	16	11.5	14	19.7
In the toilet	9	6.5	9	12.7
In a medication's bin collected by contractors (specialized companies that collects unused or expired medications, ex. Sharps)	112	80.6	55	77.5
Sent back to pharmaceutical distributor	58	41.7	26	36.6
Other	5	3.6	4	5.6
How do you think expired or unused SEMI-SOLID preparations (i.e. creams, ointments) should be disposed?*				
In the trash bin	50	36	20	28.2
In the sink	3	2.2	1	1.4
In the toilet	4	2.9	4	5.6
In a medication's bin collected by contractors (specialized companies that collects unused or expired medications, ex. Sharps)	105	75.5	55	77.5
Sent back to pharmaceutical distributor	59	42.4	26	36.6
Other	3	2.2	2	2.8
How do you think expired or unused Class/Schedule II controlled drugs (i.e. morphine, methylphenidate) of any dosage form should be disposed?*				
In the trash bin	7	5	1	1.4
In the sink	0	0	3	4.2
In the toilet	4	2.9	7	9.9
In a medication's bin collected by contractors (specialized companies that collects unused or expired medications, ex. Sharps)	108	77.7	52	73.2
Sent back to pharmaceutical distributor	64	46	35	49.3
Other	11	7.9	6	8.5
How do you think expired or unused Class/Schedule III controlled drugs (i.e. codeine, diazepam) of any dosage form should be disposed?*				
In the trash bin	10	7.2	0	0
In the sink	0	0	3	4.2
In the toilet	3	2.2	6	8.5
In a medication's bin collected by contractors (specialized companies that collects unused or expired medications, ex. Sharps)	110	79.1	52	73
Sent back to pharmaceutical distributor	63	45.3	37	52
Other	10	7.2	3	4.2

*: participants were able to choose multiple answers, which is why the % adds up to a number greater than 100%.

Table 3. Source of knowledge related to medication storage and disposal

Variable	Pharm.D (N = 118)		Nursing (N = 61)	
	N	%	N	%
Did you receive advice on safe medication storage?				
Yes	81	68.6	41	67.3
No	37	31.4	20	32.8
Where did you receive the most info about safe medication storage?**	80		41	
Doctor	2	2.5	5	12.2
Pharmacist	58	72.5	18	43.9
Nurse	4	2.9	11	26.8
Journals, Television, Radio	1	1.3	0	0
Relatives	2	2.5	0	0
Information leaflets	15	18.8	6	14.6
Others	2	2.5	1	2.4
Did you receive advice on safe medication disposal?				
Yes	62	53	19	31.1
No	55	47	42	68.9
Where did you receive the most info about safe medication disposal?**	61		19	
Doctor	0	0	1	5.3
Pharmacist	50	82	6	31.6
Nurse	0	0	7	36.8
Journals, Television, Radio	0	0	1	5.3
Relatives	1	1.6	0	0
Information leaflets	7	11.5	3	15.8
Others	3	4.9	1	5.3

**: Only participants who answered "Yes" to the previous question were able to answer this question.

Table 4. Practice on storage and disposal of medication

Variable	Pharm.D (N = 115)		Nursing (N = 61)	
	N	%	N	%
Where do you store your medications?				
Bathroom	16	13.9	23	37.7
Bedroom	38	33	12	19.7
Kitchen	47	40.9	24	39.3
Other	14	12.2	2	3.3

How accessible are your medications?				
In secured/locked place not reachable to children	67	58.8	45	73.8
In open place reachable to children	45	39.5	14	23
No answer	2	1.8	2	3.3
What is your medication usually contained in?				
Separate medication box/first aid box	29	25.4	9	14.8
Refrigerator	0	0	1	1.6
Hand bag/purse	2	1.8	1	1.6
Medicine cabinet	53	46.5	39	63.9
Kitchen drawer	9	7.9	4	6.6
Other	21	18.4	7	11.5
What container is your medication in?				
Original medication container	108	95.6	60	98.4
Shift to a convenient container	5	4.4	1	1.6
Is your unused medication stored with your other medication?				
Yes	73	64.6	38	62.3
No	40	35.4	23	37.7
How do you dispose of your unused LIQUID medication?				
Trash can	31	29	19	31.7
In the sink	11	10.3	8	13.3
In the toilet	3	2.8	6	10
Return to pharmacy	13	12.1	3	5
Medication disposal product/bag	28	26.2	10	16.7
Burn	0	0	0	0
Give to family	2	1.9	0	0
Give to friend/another person	1	0.9	0	0
N/A, always use till the end	14	13.1	13	21.7
No answer	4	3.7	1	1.7
How do you dispose of your unused TABLET/CAPSULES medication?				
Trash can	41	38.3	32	53.3
In the sink	0	0	0	0
In the toilet	3	2.8	4	6.7
Return to pharmacy	12	11.2	6	10
Medication disposal product/bag	30	28	11	18.3
Burn	0	0	0	0
Give to family	1	0.9	0	0
Give to friend/another person	0	0	0	0
N/A, always use till the end	17	15.9	6	10
No answer	3	2.8	1	1.7
How do you dispose of your unused OINTMENT/CREAMS medication?				
Trash can	55	51.4	37	61.7

In the sink	0	0	0	0
In the toilet	1	0.9	0	0
Return to pharmacy	7	6.5	1	1.7
Medication disposal product/bag	20	18.7	8	13.3
Burn	0	0	0	0
Give to family	1	0.9	0	0
Give to friend/another person	0	0	0	0
N/A, always use till the end	20	18.7	11	18.3
No answer	3	2.8	3	5
How are your medications prepared before being discarded?				
Crushed	7	6.5	4	6.7
Diluted	7	6.5	2	3.3
As they are	73	68.2	41	68.3
Do not know	13	12.1	12	20
Other	7	6.5	1	1.7

Table 5. Practice of unused medication

Variable	**Pharm.D. students**		**Nursing students**	
	N	%	N	%
Do you have leftover/unused medication at home? **	126		64	
Yes	75	59.5	28	43.8
No	47	37.3	35	54.7
Do not know	4	3.2	1	1.6
Where did you obtain your medication?	68		26	
Prescribed by provider	52	76.5	20	76.9
Purchased as OTC	13	19.1	6	23.1
A friend/family gave unused medication	3	4.4	0	0
Do you know what your medication(s) is/are for?				
Yes	67	98.5	26	100
No	1	1.5	0	0
What are the dosage form(s) of your medication? *				
Tablets/capsules	60	88.2	24	92.3
Drops/syrups	2	2.9	1	3.8
Topical preparations	11	16.2	2	7.7
Inhalers	2	2.9	2	7.7

Injections	0	0	0	0
Others	1	1.5	0	0
Reasons for not using all of your medication *	68		26	
Change to another treatment	15	22.1	7	26.9
Discontinued by provider	8	11.8	5	19.2
Excess quantity supplied	27	39.7	11	42.3
Inconvenience/difficult instructions	2	2.9	1	3.8
Condition improved/resolved	30	44.1	6	23.1
Patient deceased	0	0	1	3.8
Past expiration date	9	13.2	7	26.9
Forgetfulness	3	4.4	2	7.7
Side effects	8	11.8	7	26.9
Medication labels unclear	0	0	0	0
Other	9	13.2	4	15.4
Reasons for keeping your unused medication *	68		26	
Does not want to waste medication	21	30.9	9	34.6
In case medication is needed later	48	70.6	13	50
Not sure how to dispose	8	11.8	9	34.6
To give away to others	4	5.9	0	0
To keep a stockpile in case of shortage	10	14.7	2	7.7
Other	12	17.6	7	27
Do you collect all prescribed medication even if you decide that you do not need some of it?	115		61	
Yes	57	49.6	36	59
No	58	50.4	25	41
Do you collect all refills even if you decide that you do not need them?				
Yes	25	21.7	10	16.4
No	88	76.5	51	83.6
Prefer not to answer	2	1.7	0	0
Do you share your medication with others? ***				
Yes	15	22.4	3	11.5
No	52	77.6	23	88.5
Share medication with **	15		3	
Parents	10	66.7	2	66.7
Husband/wife/partner	3	20	1	33.3
Siblings	7	46.7	3	100
Friend	4	26.7	0	0
Child	0	0	1	33.3
Other	0	0	0	0

*: participants were able to choose multiple answers, which is why the % adds up to a number greater than 1oo%.

**: Only participants who answered “Yes” to the previous question were able to answer this question.

***: Only participants who answered “Yes” to “Do you have leftover/unused medication at home” were able to answer this question

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