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## Research/Review



### A study on assessment of patients knowledge, attitude & practice on storage, sharing and disposal of medications

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	<b>Abstract</b>
Published on: 25 Jan 2024	<b>Introduction:</b> Safe disposal of medications is of high concern as malpractice may lead to harmful consequences such as undesirable effects, prescription drug abuse, overstocking, self-medication, accidental overdose, and even death. There is a lack of uniform and nationwide guidance on how patients should safely dispose their leftover medications.
Published by: DrSriram Publications	<b>Objective:</b> To assess patients' knowledge and attitude regarding the disposal of medications.
2024  All rights reserved.  <a href="#">Creative Commons Attribution 4.0 International License.</a>	<b>Methods:</b> This was prospective observational study done for a period of six months from October 2022 to March 2023 in patients visiting Government General Hospital, Kadapa. Informed consent form was acquired from the participant. Likert scale was used for questionnaire and kruskal-Wallis test was performed to find significance between the groups. <b>Results:</b> A total of 400 patients participated in this study. The mean age of the respondents was 45.9 years (standard deviation [SD], 12.75), ranging from 18 to 64 years. The rate of medication sharing was 62.6%. The most prevalently shared medications were antipyretics, analgesics and antibiotics. The rates of improper storage and improper disposal were 25.5% and 87.25% respectively. More than half of the participants 68.25% said that they never received any information on how to dispose medicines from healthcare professionals, throwing medicines directly into dustbin is the commonly practiced disposal practice. <b>Conclusion:</b> Prescription sharing, improper storage and improper disposal were common practices among public. Awareness on proper drug storage, proper disposal, drug take back Program should be promoted more effectively through educational campaigns, healthcare providers particularly pharmacists should educate and guide them with specific action plans. <b>Keywords:</b> Prescription medicine, Sharing, Drug storage, Drug disposal, Guideline.

## INTRODUCTION

A large volume of pharmaceuticals and health care products are used annually for diagnosis, treatment or prevention of health conditions. However, not all products that go in to the hand of patients get consumed; large quantities go unused or expire.<sup>1</sup> Medications may accumulate in households for a variety of reasons: improvement

of the patient's medical condition, oversized medication packages, death of the patient and change in prescription due to side effects or lack of therapeutic effect, poor adherence as the result of patients doubting the need for medication, fear of adverse effects or forgetfulness also contribute to the medication wastage.<sup>2</sup> Improper disposal of medications poses a significant environmental risk such as on the water system. A long-term environmental exposure to pharmaceuticals could lead to hazardous effect especially on vulnerable populations, including pregnant women, newborn, and children. In addition, evidence shows that the presence of antibiotics in environment may lead to antibiotic resistance.<sup>3</sup> Furthermore, storage of unwanted or unused medication in the household provides an opportunity for misuse and abuse when one inadvertently takes them. Subsequently, the disposal practice of unused medicines has become a worldwide challenge catching the attention of policy makers, health professionals, pharmaceuticals companies and the community in general.<sup>4</sup> There is a small number of medicines that may be especially harmful and, in some cases, fatal in a single dose if they are used by someone other than the person the medicine was prescribed for. For this reason, a few medicines have specific disposal instructions that indicate they should be flushed down the sink or toilet when they are no longer needed and when they cannot be disposed of through a drug take-back program.<sup>5</sup> A Knowledge, Attitude and Practices (KAP) survey is a quantitative method (predefined questions formatted in standardized questionnaires) that provides access to quantitative and qualitative information. A KAP survey can 1) Measure the extent of a known situation; confirm or disprove a hypothesis; provide new tangents of a situation's reality. 2) Enhance the knowledge, attitude, and practices of specific themes; identify what is known and done about various health-related subjects.<sup>6,7,8</sup>

### **Aim and Objectives**

The main aim of our study is to assess the patient's knowledge, attitude & practice on different aspects of medications like storage, sharing and disposal.

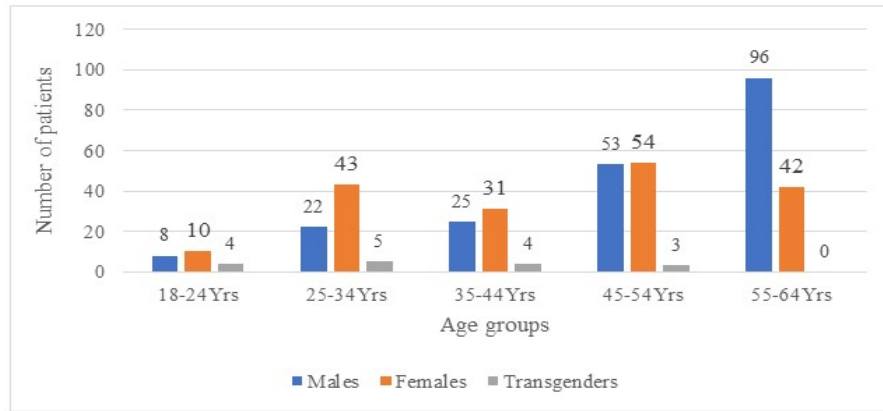
- ✓ To categorize patients based on age, gender and education.
- ✓ To evaluate the patient's knowledge, attitude & practice related to storage, sharing and disposal practices of medications.
- ✓ To find significant difference between groups.

## **MATERIALS AND METHODS**

This Prospective observational study was conducted for a period of (Oct-2022 to March-2023) 6 months. Study was conducted among patients of all genders between 18-64 years of age, Outpatients presented to General Medicine Department, Government General Hospital (Kadapa), Patients who can understand Telugu or English language. A self-prepared, structured data collection form was designed for data collection. In order to assess the knowledge, attitude & practice among the study subjects six validated questionnaire were used. In order to evaluate knowledge, attitude & practice "Likert scale" was used. Likert scale consists of open-ended questions or statements, which allow participants to give free- form answers rather than restricting them by just giving "yes or no options." Likert scale was used in this survey to measure participant's degrees of opinion or level of agreement regarding storage, sharing and disposal of medicines. Each Domain consists of 6 statements, Agreement is correct response, all the responses of the patients are recorded. knowledge, attitude and practice scores comes under test fields and categories of gender comes under groups, and then Kruskal-Wallis test was performed to find the significant difference across categories of Gender (male, female & transgender).

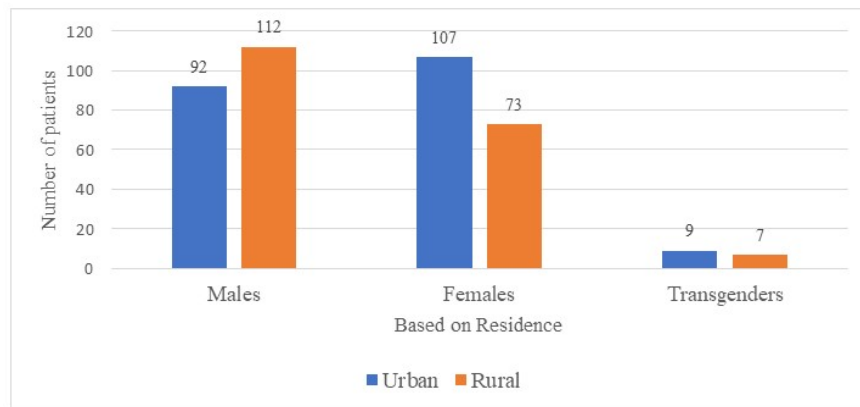
## **RESULTS**

A total of 400 patients were included in the study, out of 400 patients, number of male patients were 204 (51%), number of female patients were 180 (45%) and number of patients belonging to transgender were 16(4%). Majority of the patients were between the age groups (55-64) 138(35%) and (45-54) 110(28%) patients.



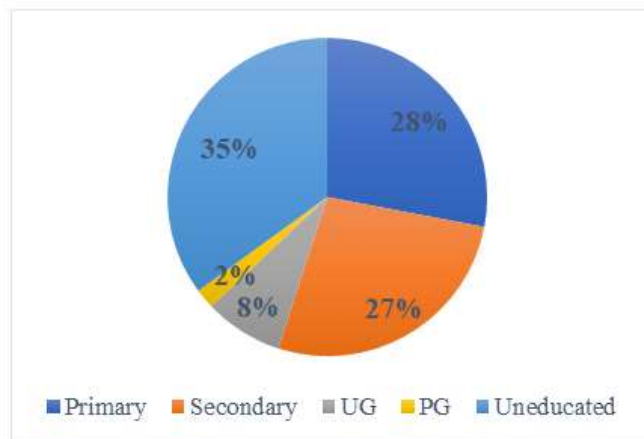
**Fig 1: Age group and Gender**

Among the patients, 208(52%) patients belong to urban residence and 192(48%) patients belong to rural residence. Majority of the male patients 112 (54.9%) belong to rural residence, while the majority of female patients 107(59.4%) and 9(56.25%) patients belonging to transgender were from Urban residence.



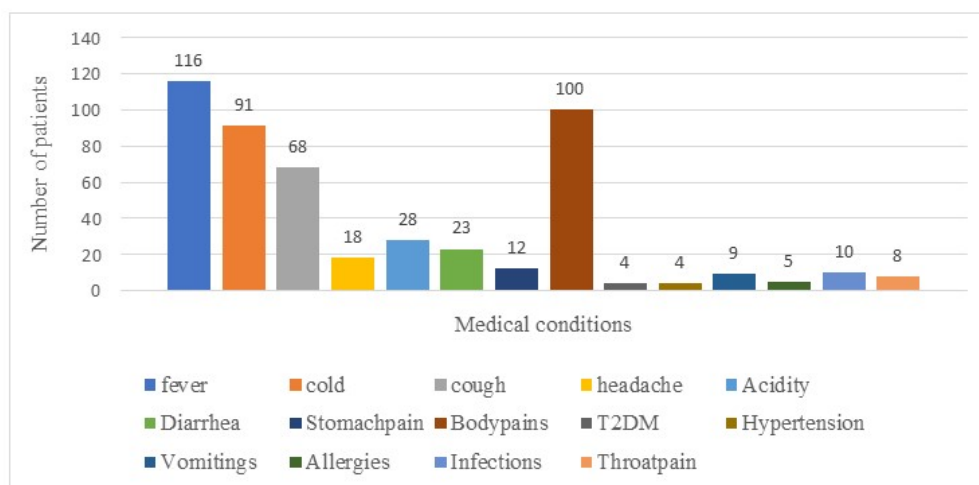
**Fig 2: Residence**

All the patients were categorized based on education, 142(35.5%) Patients were uneducated, 113(28.25%) studied less than or up to 5th standard, 106(26.5%) patients studied less than or upto12th standard, 33(8.5%) patients studied less than or up to under graduation and 6(1.5%) patients completed their post-graduation.



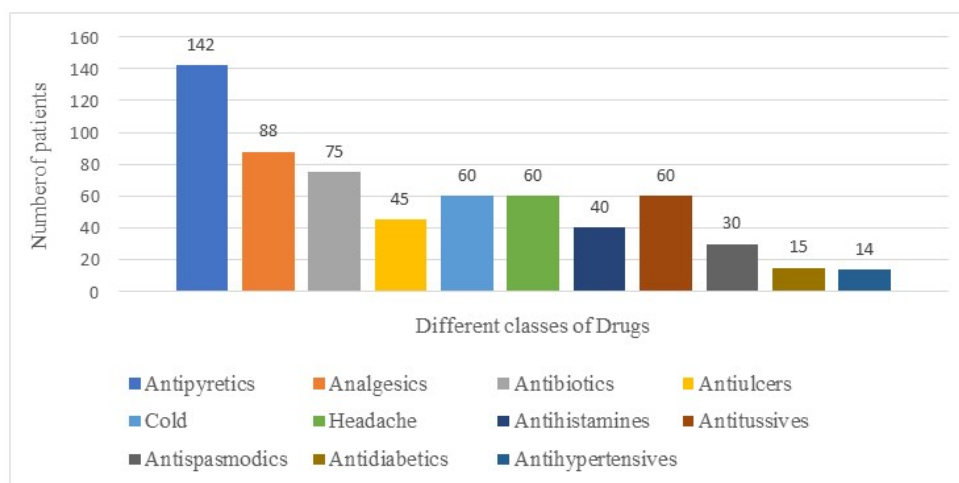
**Fig 3: Level of education**

Majority of the patients 236 (59%) accepted that they share prescription medicines with others who have similar symptoms or disease, while 164 (49%) patients said that they never share their medicines with others who have similar symptoms or diseases.



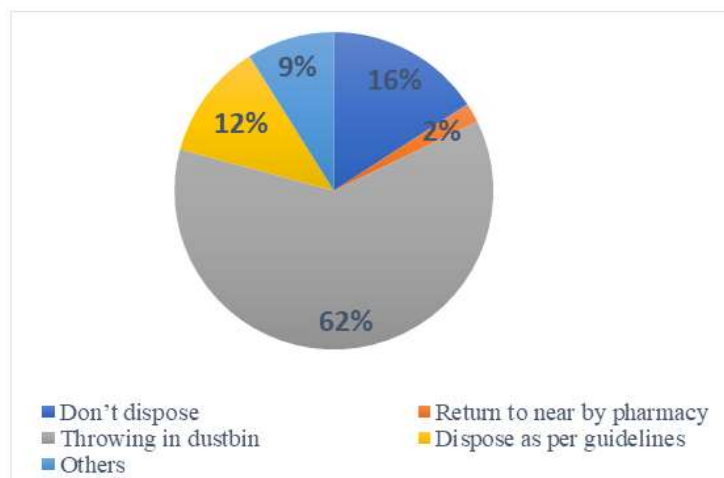
**Fig 4: Medical conditions for which medicines were shared**

Among the study patients 236(59%) patients accepted that they have shared prescription medicines with others and 164(41%) patients said that they never shared prescribed medicines with others. Commonly shared class of medicine includes antipyretics, analgesics, antibiotics, anti-ulcers, antitussives, and antihistamines. Some of the patients, admitted sharing anti-diabetic medicines 15(6.3%) and anti-hypertensives 14(5.9%) as a form of social or moral support, when they or other person were away from their home.



**Fig 5: Commonly shared class of drugs**

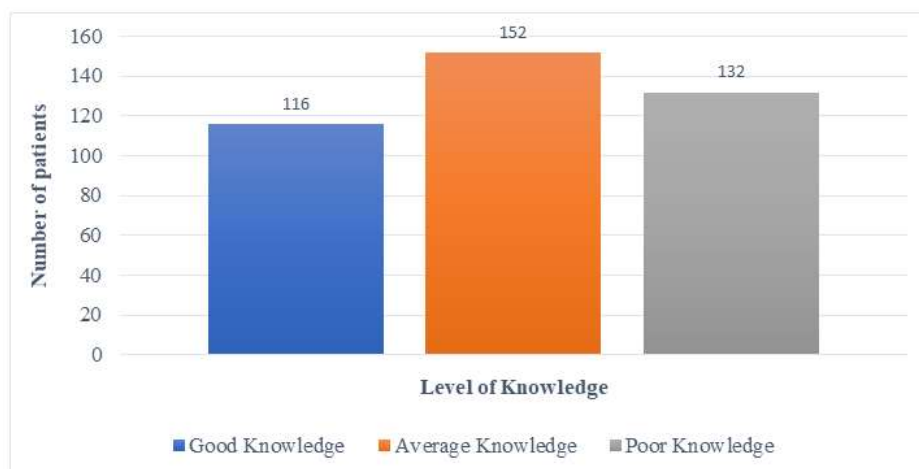
The majority of the participants (62.4%, n=248) reported that they usually dispose of leftover or expired medications by throwing them directly in the dustbin.



**Fig 6: Type of disposal procedure followed by patients**

#### Knowledge-related responses regarding storage, sharing, and disposal of medicine

The Likert scale is used to record responses from patients. Out of 400 patients, 116(29%) patients were observed to have good knowledge related to medicine storage, sharing and disposal. Followed by 152(38%) patients having average knowledge and 132(33%) patients having poor knowledge.



**Fig 7: Participants based on level of Knowledge**

**Table 1: Distribution of patients based on their responses to knowledge related statements**

S.no	Statement		Strongly agree n(%)	Agree n(%)	Not sure n(%)	Disagree n(%)	Strongly disagree n(%)	P value
1	It is important to check the Expiry date before buying medicines	Male	51(25%)	120(58.8%)	11(5.4%)	14(6.9%)	8(3.9%)	
		Female	53(29.4%)	82(45.5%)	20(11.1%)	14(7.7%)	11(6.1%)	
		Trans gender	3(18.75%)	11(68.75%)	2(12.5%)	0(0)	0(0)	
2	Medication should be stored in the recommended place	Male	19(9.3%)	100(49%)	37(18.13%)	36(17.6%)	12(5.8%)	
		Female	3(1.6%)	85(47.2%)	39(21.6%)	25(13.8%)	28(15.5%)	
		Trans gender	0(0)	6(37.5%)	9(56.25%)	1(6.25%)	0(0)	
3	Sharing	Male	26(12.7%)	87(42.6%)	42(20.6%)	38(18.6%)	11(5.4%)	

	prescription medication with others is not a good idea	Female	26(14.4%)	52(28.8%)	50(27.7%)	42(23.3%)	10(5.5%)	0.099
		Trans gender	0(0)	4(25%)	9(56.25%)	2(12.5%)	1(6.25%)	
4	Sharing medications can increase The risk of adverse reactions	Male	24(11.7%)	78(38.3%)	67(32.3%)	28(13.7%)	7(3.43%)	
		Female	22(12.2%)	43(23.8%)	93(51.6%)	21(11.6%)	1(0.5%)	
		Trans gender	0(0)	6(37.5%)	5(31.25%)	4(25%)	1(6.25%)	
5	Poor drug disposal results in damage to the environment	Male	24(11.7%)	72(35.3%)	70(34.3%)	33(16.17%)	5(2.45%)	
		Female	27(15%)	44(24.4%)	82(45.5%)	23(12.7%)	4(2.2%)	
		Trans gender	1(6.25%)	5(31.25%)	5(31.25%)	4(25%)	1(6.25%)	
6	Improper drug storage practices can result accidental poisoning of children	Male	73(35.9%)	72(35.4%)	32(15.7%)	22(10.8%)	4(1.97%)	
		Female	90(50%)	43(23.8%)	35(19.4%)	8(4.4%)	4(2.2%)	
		Trans gender	2(12.5%)	5(31.25%)	6(37.5%)	1(6.25%)	2(12.5%)	

#### Attitude- related responses regarding storage, sharing and disposal of medicine

Likert scale was used to record the responses the study revealed that only 6 patients were having a more concerned attitude towards storing, sharing and disposal of medicines, followed by 78 patients who were quite concerned and 316 patients who were little concerned.

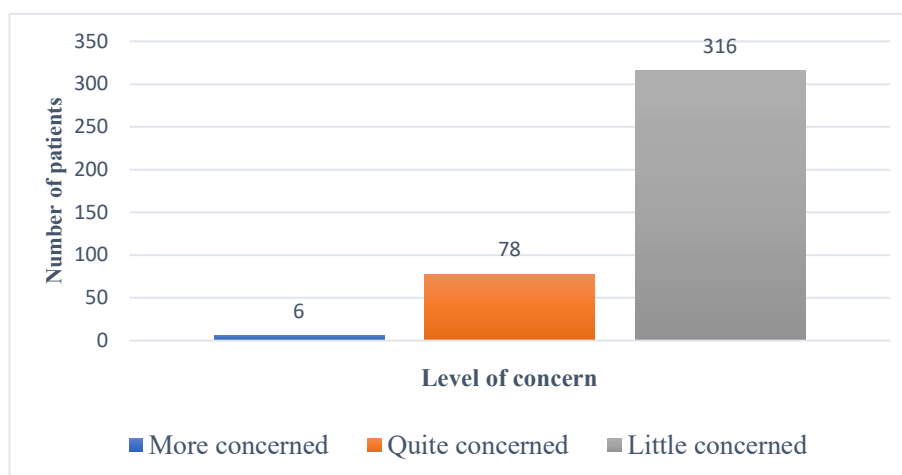


Fig 8: Patients based on concern

Table 2: Distribution of patients based on their responses to Attitude related statements

S.no	Statement		Strongly agree n(%)	Agree n(%)	Not sur e n(%)	Disagree n(%)	Strongly disagree n (%)	P Value
1	I am familiar with storage conditions for different medications	Male	6(2.94%)	58(28.4%)	32(15.6%)	63(30.8%)	45(22.05%)	
		Female	3(1.6%)	21(11.6%)	35(19.4%)	53(29.4%)	68(37.7%)	
		Trans gender	0(0)	2(12.5%)	3(18.75%)	8(50%)	3(18.75%)	
2	I think that medication storage has no effect on its efficacy	Male	3(1.47%)	46(22.5%)	68(33.3%)	82(40.19%)	5(2.45%)	
		Female	4(2.2%)	24(13.3%)	95(52.8%)	53(29.4%)	4(2.2%)	
		Trans gender	1(6.25%)	7(43.75%)	3(18.75%)	5(31.25%)	0(0)	
3	I believe	Male	23(11.27%)	77(37.74%)	61(29.9%)	39(19.11%)	4(1.96%)	

	unused medications can cause potential risk at home	Female	33(18.3%)	49(27.2%)	69(38.3%)	28(15.5%)	1(0.5%)
		Trans gender	1(6.25%)	4(25%)	6(37.5%)	3(18.75%)	2(12.5%)
							0.026
4	I think there is no harm in sharing medications with others	Male	22(10.78%)	26(12.73%)	42(20.6%)	98(48%)	16(7.9%)
		Female	22(12.22%)	26(14.4%)	44(24.4%)	74(41.1%)	14(7.7%)
		Trans gender	1(6.25%)	3(18.75%)	6(37.5%)	5(31.25%)	1(6.25%)
5	I am familiar with the disposal procedure of unused medication	Male	5(2.46%)	49(24.13%)	47(23.15%)	42(20.68%)	60(29.5%)
		Female	3(1.6%)	22(12.2%)	43(23.8%)	32(17.7%)	80(44.4%)
		Trans gender	1(6.25%)	4(25%)	3(18.78%)	7(43.75%)	1(6.25%)
6	Doctors and health care professionals do provide advice on the safe disposal of medicine	Male	13(6.37%)	23(11.47%)	25(12.25%)	65(31.9%)	78(38.3%)
		Female	15(8.3%)	24(13.3%)	22(12.2%)	44(24.4%)	75(41.6%)
		Trans gender	3(18.75%)	2(12.5%)	0(0)	6(37.5%)	5(31.25%)

#### Practice- related responses regarding storage, sharing and disposal of medicine

Likert scale was used to record the responses for practice related statements. Among the study participants majority of the participants are following poor practice 281 (70.25%) related to storage, sharing and disposal of medicines, which is followed by average practice 115 (28.75%) and good practice 4 (1%).

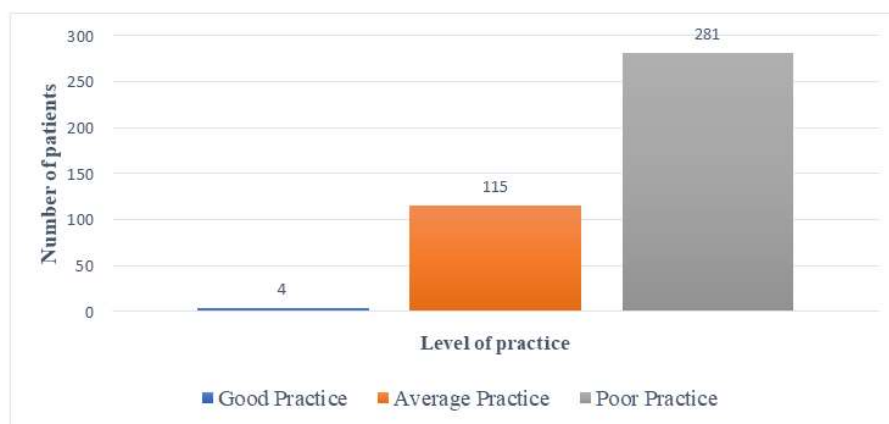


Fig 9: Patients based on practice

Table 3: Distribution of patients based on their responses to Practice related statements

S.no	Statement		Strongly agree n(%)	Agree n(%)	Not sure n(%)	Disagree n(%)	Strongly disagree n(%)	P value
1	I frequently take medication without checking the expiry date	Male	56(27.45%)	56(27.45%)	0(0)	76(37.25%)	16(7.84%)	
		Female	55(30.5%)	41(22.7%)	5(2.7%)	50(27.7%)	29(16.11%)	
		Trans gender	6(37.5%)	4(25%)	2(12.5%)	3(18.75%)	1(6.25%)	
2	I use specific boxes	Male	20(9.8%)	82(40.1%)	3(1.47%)	64(31.3%)	35(17.15%)	
		Female	14(7.82%)	66(36.48%)	1(0.56%)	66(36.8%)	32(17.8%)	

	to store different kind of medications	Trans gender	1(6.25%)	2(12.5%)	2(12.5%)	10(62.5%)	1(6.25%)	
3	I share my prescription with other people who have the similar symptoms	Male	26(12.75%)	29(14.2%)	17(8.3%)	107(52.45%)	25(12.25%)	0.08
		Female	29(16.11%)	18(10%)	18(10%)	80(44.4%)	35(19.4%)	
		Trans gender	2(12.5%)	4(25%)	6(37.5%)	4(25%)	0(0)	
4	I advise caution to the person with whom I share my medications	Male	20(9.8%)	82(40.19%)	27(13.23%)	47(23.03%)	28(13.75%)	
		Female	15(8.3%)	72(40%)	20(11.1%)	47(26.1%)	26(14.4%)	
		Trans gender	2(12.5%)	3(18.75%)	4(25%)	5(31.25%)	2(12.5%)	
5	I practice safe disposal procedure for unused medications	Male	7(3.43%)	50(24.5%)	43(21.07%)	60(29.4%)	44(21.5%)	
		Female	3(1.66%)	29(16.11%)	29(16.11%)	46(25.55%)	74(41.1%)	
		Trans gender	1(6.25%)	2(12.5%)	5(31.25%)	6(37.5%)	2(12.5%)	
6	I return the unused medications to nearby pharmacy	Male	3(1.47%)	12(5.88%)	0(0)	51(25%)	138(67.46%)	
		Female	3(1.66%)	3(1.66%)	4(2.22%)	24(13.3%)	146(81.1)	
		Trans gender	1(6.25%)	2(12.5%)	2(12.5%)	6(37.5%)	5(31.25%)	

## DISCUSSION

Majority of the participants accepted that it is important to check expiry date before procuring medicines, and around half of the participants stated that they check expiry date before procuring medicines. Majority of the study participants were not familiar with storage recommendations for different medicines. Boxes, Cupboards and Living room are the places where medicines were stored. Prescription sharing is a common practice among the participants, majority of the patients accepted that they share prescription medicines with others. Around half of the participants were in a thought that there is no harm in sharing medicines with others and said that they advise caution to the person with whom they share their medicine. Fever, Body pains, Cold and Cough are the common medical conditions for which medicines were shared. Antipyretics, Analgesics and Antibiotics were the common class of drugs that were shared. Among all the study participants half of the participants accepted that poor drug disposal can cause damage to the environment. Majority of the participants said that health care professionals didn't provide any advice on safe disposal of medicines, they were not aware about the safe disposal procedure, throwing medicines directly into dustbin is the most common disposal procedure followed, only few participants return medicines to nearby pharmacy. None of the participants from the study were familiar with disposal of benzodiazepines. The mean age of the participants was 45.9 (SD=12.75), 51% (n=204) were males. Boxes, Cupboards and Living room are the three common storage places for medicines in contrary to Nasser et al<sup>9</sup> Majority of the participants agreed that it is important to check expiry date before procuring medicines More than half of the participants agreed that medicines should be stored at recommended places similar to the study conducted by El walid El Hassan et al<sup>10</sup>. Around half of the participants accepted that they share medicines and advise cautions for the medicines they share which is similar to the study seulki song et al<sup>11</sup>. According to our study discarding medicines in dustbin is the most commonly followed disposal procedure, Very few participants (n=7) return medicines to pharmacy and this results are opposite to that of study conducted in Netherlands where 72% of the participants return unused and expired medicines to pharmacies A.T.G Bloom et, al.<sup>12</sup> Majority of the participants admitted that they never returned the unused medicines to the pharmacy which is similar to the study conducted by Ghufuran M. Rawas et, al.<sup>13</sup> Around half of the participants agreed that there is no harm in sharing medicines with others which is contrary to the study conducted by Abebe Dilie et, al.<sup>14</sup> Majority of the participants were Uneducated and those studied upto 5<sup>th</sup> standard, their knowledge, attitude & practice is poor regarding to disposal of unused and expired medicines which is similar to the study conducted by Raja et, al.<sup>15</sup> Many participants said that they lend or borrow medicines as form of social and economical support or when they are away from their homes which is similar to the study conducted by kebede beyene et al.<sup>16</sup>



## CONCLUSION

Our study concludes that lack of knowledge and awareness are the major reasons for improper storage, sharing and disposal of medicines. For optimal use of medications and better outcomes, development of standard operating procedures (SOP) can be helpful at different levels from physician, pharmacist and patient regarding storage, sharing and disposal of medications. In India, we do not have an established drug take-back program. Development and implementation of standard guidelines related to safe disposal of medications can be achieved through training programs to health care professionals and public, which can prevent environment pollution and hazardous consequences to human & animal health.

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