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A Household Survey on Extend of Home Medication Utilization and Storage Habits –A Cross Sectional Survey

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Abstract

Medicines plays a vital role in day-to-day life. Piling up of medicines in households leads to irrational use of medicines. This study aimed to investigate household medication taking behaviour, reasons of medicines storage in household, disposal practice of unused medication and determinacy of self- medication among family members. Study was carried out in Urban areas of North Karnataka by using interviewer administered questionnaire on 433 household participants. Data from the questionnaire were analyzed using appropriate statistical tools. Among surveyed households, 412 households have at least one unused medication in household which were stored unsafe and in reach of children. Out of 433 study participants (54.5%) were males and (45.5 %) were females. The stored drugs found in household mainly belongs to five categories; Antihypertensive (25.6%), Anti-diabetic (20.6%), analgesics and antipyretics (14.1%), NSAIDs (11.5%) , Anti –biotics (10.2%) . Majority of the drugs (84.7%) were purchased on prescription .96.9% of them are throwing the unused medication in garbage. We found that a significant proportion of the medications were found in the Urban households and had stored unused medication in household for future use and none of those medicines are stored safely and the unused medications were not properly disposed too. Hence there is need to conduct a programme to create necessary awareness among the public regarding storage and safe disposal methods of unused drugs.

Keywords: Drug disposal, Drug Safety, Expired Medicine, Ecopharmacology, Household, Possession of drugs, Unused medicines.

1. INTRODUCTION

With the increasing use of prescription and over the counter medications, more drugs products are being accumulated in the household. Medications stored in the household may poses risk to vulnerable populations and environment. Accumulating medication inventories at home can harm patients and their families by increasing the risk of medication poisoning. Polypharmacy commonly known as concurrent use of five or more medications seems to be strongly associated with greater and unnecessary medication use (Lee S *et al.*, 2022).

Medicines for majority of clinical conditions are easily accessible in the market with a legal prescription. This condition may make wastage in medication and waste in economy. In many families the medications expended by the doctors are not expended totally. Some patients discontinue the prescribed drugs when the symptoms gets resolved. Such leftover drugs are stored for reuse in the future. The most common unused drugs present at home might be the discontinuation of given drugs after the recovery from illness before the prescribed duration. The leftover drugs may be used by the family which may result in side-effects or adverse drug events (Chadalavada V *et al.*, 2021).

Appropriate household storage and use of medications are essential for minimizing drug wastage and unnecessary risk, maintain the stability, endure the safety, optimum efficacy of drug products and prevent accidental injury. People may utilize any class and dose of in-home medication for treating themselves, without consultation which may lead to adverse drug reactions or drug toxicity. Some locations at home are not

suitable for medicines storage, for example keeping drugs in bathroom expose them to moisture and heat that accelerate their degredation, expiration and loss of potency and efficacy of drug (Eldalo SA *et al.,* 2020).

Household storage of medicines is a worldwide practice that leads to the irrational use of medicines. The main source of medicines found in households was private pharmacies. Patients non-adherence to the treatment was one of the reasons of presence of medicines at home. Easy availability of medicines at the private health facilities is also an adding factor for the accumulation of medicines at home. If medicines are not utilized properly it can risk the health rather than treating the disease. The proposition of holding medication in households has not been completely measured. Therefore, facts behind the practice of household storage of medicines, its sources of availability and utilization have been explored through this study (Hussain R *et al.,* 2019).

Unused medicine is defined as any pharmaceutical product that is not fully consumed whether prescription or over the counter drugs that can arise from households or healthcare activities. It leads to health problems such as ineffective therapy, drug resisitance, poor medication non-adherence, prolonged illness duration and overall increases healthcare cost spending by both patient and government. There are habits for disposing unused drugs around the world. Many consumers keep drugs in their home because they want to use those medicines for self-medication practice in the future (Kristina AS *et al.,* 2018).

Globally drug storage behavior has been widely studied in various countries both developing and developed countries with varied results. Storing drugs at home is a common behavior in community in order to alleviate minor symptoms abnd treat chronic diseases for family members. Most people have stored drugs well in special containers and understand the risks of improper self-medication with ethical drugs, especially antibiotics. Inappropriate drug storage may trigger irrational use of the drug, waste of healthcare resources and a risk on human health (Yusmaniar *et al.,* 2018).

Medicines are stored in home for emergency use and treatment of acute or chronic illness. The availability of drugs at home leads to irrational drug use. The improper storage of drugs may affect the drug stability. Medicines kept at home were consumers by another person than the person for who they are prescribed. It reported the high use of over-the- counter medications and dietary supplements. Storage of large quantity of drugs in home will leads to some drug related problems such as ADR, errors in high medications. In India only few studies were done about the drug storage in households (Teni S *et al.,* 2017).

Improper handling, storage or disposal of medicines can lead to drug abuse, accidental poisoning and environmental pollution. Keeping medication properly will also keep them in the physical condition for optimum efficacy. Medicine wastage explicitly pertains to partially or totally unused medicine as well as expired medicines. As storage and disposal of unused medicine vary in different settings there is a need for evaluation of practices within diverse area (Banwat Bs *et al.,* 2016).

There is need to conduct studies on medication storage at home and its associated consequences. Also need to assess the awareness among public regarding safe practice and disposal of unused medicines. Very few studies were conducted in India. None of the studies were conducted in North-Karnataka. So, we decided to conduct a study entitled. “A household survey on extend of home medication utilization and storage habits –a cross sectional survey” to find the usual practices with the mediations in the households and to create awareness regarding the proper usage and disposal of medications.

2. MATERIALS AND METHODS

2.1. Study Design and Sample Size

A descriptive, cross-sectional study was conducted for a period of six months from March 2022 to August 2022 in Urban areas of Raichur. The sample size was 433.Data was collected by using questionnaire followed by interviewing with the families. The patients who were aged above 18 years and capable of giving information on medicine use within the family are included in the study. Data were collected from hospital premises and public places. Subjects who were refused to give information were excluded from the study.

2.2. Ethical Approval

Permission was obtained from Institutional Ethics Committee of Navodaya Medical College Hospital and Research Centre. The study was approved by the committee by issuing Ethical Clearance Certificate.

2.3. Development of Questionnaire

A well-designed Questionnaire based interview form was developed and used for this study. The questionnaire form contains 3 sections, section A includes demographics of subjects, section B includes Knowledge about ways of procuring medicine, section C includes the practices towards unused and home hoarding medications. The provisions to enter the details such as age, sex, address, educational status, marital status, household size, ways of procuring medicine, classes of medicines stored in household, status of household medicine, sources of drug stored at home, number of unused or leftover drugs at home also included in questionnaire form.

2.4. Questionnaire Distribution, Collection and Analysis of the Data

Project team approached participants house and explained about the study purpose. Written consents were taken from the study participants. Interview was carried out by distributing questionnaire. We adopted self-administered questionnaire for educated participants and interviewer administered questionnaire for participants who are aged, illiterate etc Both open ended and close ended questions were asked for clarification or confirmation of data provided by the participants. We collected information regarding the knowledge about way of procuring medications such as class of medications stored in households, checking the expiry date of medicines before administration, for what type of disease medicines are taking, status of household medicine, ways of drug storage at home and the practice towards unused and home hoarding medications such as reasons for storing unused medication at home, number of unused or leftover drugs at home etc. We also gave study participants a small awareness regarding the safe way of storing and disposing of unused drugs. The data collected were entered into Microsoft excel spreadsheet. Data were collected checked for completeness and consistency. Multivariant regression analysis performed between socio-demographic factors to understand the relationship among variables present in datasets. Descriptive Statistics like percentage and means were used to summarize the characteristics of a data set.

3. RESULTS AND DISCUSSION

A total of 433 participants who met the inclusion criteria were recruited into the study by calculating the sample. Out of the 433 participants who were willing to participate in the study most of them were in the age group of >29-39 i.e. 36.48% of the total participants followed by 23.09% of the participants in the age group 40-50. This depicted in table 1. Most of the respondents 158(36.48%) were aged between 29-39years followed by those aged between 40-50(23.09%), followed by those aged between 18-28 years (13.08%). The mean age responsible for the medication storage and acquisition was 43.6 years.

Table 1: Age distribution of participants

Sl. No	Age	No of participants	Percentage (%)
1	18-28	60	13.85
2	29-39	158	36.48
3	40-50	100	23.09
4	51-61	50	11.54
5	62-72	40	9.23
6	Above 72	25	5.77
Mean Age =43.6			
Total		**433**	**100**

There were very few studies conducted in India that focuses on the usual practices with the mediations in the households. The present study clearly provide the baseline knowledge regarding the usual practices with the mediations in the households. A total of 433 participants were involved in the study. Out of 433 participants, all the respondents have given the responses. Most of the respondents were men as they are the source of earning, main decision maker and responsible for well-being of household as depicted in table 2.

Table 2: Gender Distribution (n=433)

S. No	Gender	No. of participants	Percentage (%)
1	Male	197	45.5
2	Female	236	54.5
	Total	**433**	**100**

In our study among 433 study participants observed, the major classes of medicines stored in households are antihypertensive (25.6%), antidiabetic (20.6%), this is because majority of the study participants are elderly patients associated with chronic diseases followed by analgesics and antipyretics (14.1%), NSAIDs (11.5%) and antibiotics (10.2%). This was depicted in figure 1. The major classes of medicines stored in households are antihypertensive (25.6%), antidiabetic (20.6%), this is because majority of the study participants are elderly patients associated with chronic diseases followed by analgesics and antipyretics (14.1%), NSAIDs (11.5%) and antibiotics (10.2%). Use of analgesics and antipyretics in pain and fever was considered as first line treatment and are easy available over the counter. Similarly NSAIDs are also available over the counter. Inappropriate use and non-compliance with antibiotics regimen is the reason for piling up of antibiotic drugs in households.

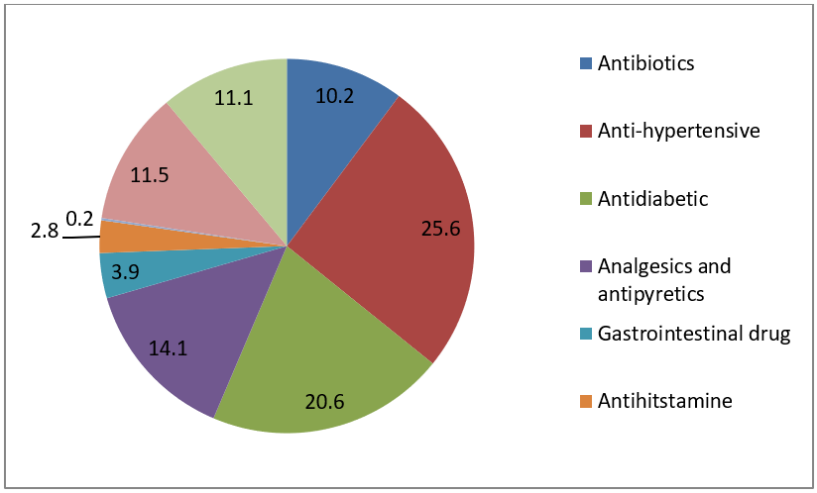

Fig. 1: Distribution of according to class of medicines stored in household

Tablets were the maximum leftover medicines (86.8%) as they are easy available with or without prescription in case of acute as well as chronic diseases followed by syrups (5.1%) as shown in table 3. The major reason behind this could be due to the effortlessness usage by community people as self-Tablets were the maximum leftover medicines (86.8%) as they are easy available with or without prescription in case of acute as well as chronic diseases which was comparable with study conducted by Hussain R *et al.,*

Table 3: Common leftover dosage form at home

Sl. No	Dosage form	No of participants	Percentage (%)
1	Syrups	22	5.1
2	Capsules	18	4.2
3	Injectable formulae	4	0.9
4	Eyedrops	5	1.2
5	Inhalers	2	0.5
6	Tablets	376	86.8
7	Others	6	1.4
Total		**433**	**100**

In this study among the 433 study participants, the main reason for possession of drugs at household are Physicians changed the treatment (52.7%) followed by self-discontinuation (35.1). This is depicted in Fig 2. The main reason for possession of drugs at household are Physicians changed the treatment (52.7%) followed by self-discontinuation (35.1%). Hence it is necessary to ensure that required quality of drug will only be prescribed by doctors and the patient should adhere to the treatment regimen.

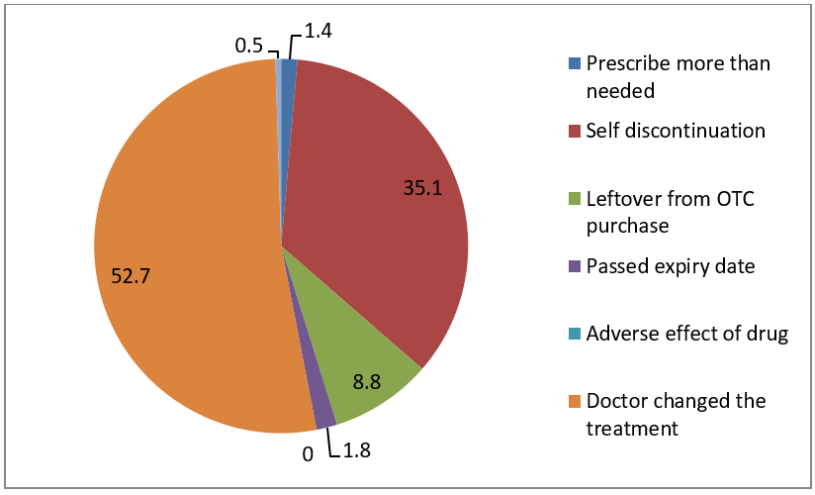

Fig. 2: Distribution based on reason for possession of drugs at household

As indicated in Table 4, the findings reveal that 92.1% of the study subjects regularly checked the expiration date before administration. As a result, it can be projected that there is little chance of an adverse medication reaction associated to an expired pharmaceutical in the research population. This shows that the fundamental knowledge about the expiry was well present.

Table 4: Checking of Expiry Date Before Administration by Study Participants (n=433)

S. No	Checking of expiry date before administration	No. of participants	Percentage (%)
1	Yes	399	92.1
2	No	34	7.9
	Total	**433**	**100**

Regarding the study participants' knowledge of methods for obtaining medications, it can be seen that 86.6% of the participants obtained their medications in accordance with a prescription, 12.2% study participants were responded that they purchase the medicines over the counter.0.9% participants were responded that they purchase upon advice of friends or relatives and only 0.2% participants responded that they purchase medicines from friends or colleague as shown in table 5.

Table 5: Ways of procuring medicines by study participants(n=433)

Sl. No	Ways of procuring medicines	No. of participants	Percentage (%)
1	Purchase over the counter	53	12.2
2	Purchase upon advice of friend or relative	4	0.9
3	Received from friends or colleague	1	0.2
4	Purchase on prescription	375	86.6
	Total	**433**	**100**

We found that 63.5% of the study participants stop taking the drugs once symptoms gets resolved and 36.5% study participant were responded that they do not stop taking medicines when the symptoms get resolved as shown in Table 6. This is the main reason for piling up of drug at home and treatment incompliance.

Table 6: Respondent habit of stop taking drugs when symptoms get resolve(n=433)

S. No	Stop taking drugs when symptoms get resolved	No. of participants	Percentage
1	Yes	275	63.5
2	No	158	36.5
	Total	**433**	**100**

he results depicted that 49.7% of drugs were used for chronic diseases.27% study participants were responded that they use drugs for seasonal diseases and 23.3% were responded that they use drugs for acute conditions. All these results were shown in table 7. Because majority of the participants are elderly patients and are associated with diseases like Hypertension, Diabetes mellitus etc.

Table 7: Categorization of disease conditions for which medicines are used(n=433)

S. No	Type of disease	No of participants	Percentage (%)
1	Seasonal	117	27
2	Chronic	215	49.7
3	Acute	101	23.3
	Total	**433**	**100**

As shown in table 8, we found that that 52.4% of the study participants responded that they throw away the unused medicines in garbage followed by 43.6% of them kept drugs at home until the expiry date passed. Less than 10% of the participants return the unused medicines back to the pharmacy. Hence there is need to educate the general public about the correct disposal option for the left or unused medicine and hazardous of keeping left over medicines at home such as risk to children causing drug poisoning

Table 8: Usual Practices with Unused medicine (n=433)

S. No	Action towards unused medicine	No of study participants	Percentage (%)
1	Donate to hospital	0	0
2	Give to friends or relatives	13	3
3	Return to medical stores	4	0.9

4	Kept home until expiry date is passed	148	43.6
5	Flush unused medicine in toilet	0	0
6	Throw away in garbage	227	52.4
	Total	**433**	**100**

Table 9 shows results of multivariate logistic regression analysis. It indicated that the participants of age group 29-39 as informants (AOR=1.145, CI=0.452,11.578, P=0.775) significantly associated with home storage of drugs as compared to other informants. Men as a household informant had high chance of storing drugs in comparison women (AOR=2.218, CI=0.452,11.578, P=0.433). Similarly large family size, higher education status, self–employed and employees in private sector with average monthly income are associated with increased home storage of medicines.

Table 9: Multivariable logistic regression of the predictors of home storage of drugs

Characteristics		**Home Storage ofMedicines N=433**		**AOR**	**95% CI**	**p value**
		Yes (N)	**No(N)**			
Total		**412**	**21**			
Gender	Men	224	12	1	---------	-------
	Women	188	9	1.051	(0.508,2.176)	0.893>0.05
Age	18-28	55	5	1	--------	------
	29-39	150	7	1.145	(0.452,2.900)	0.775>0.05
	40-50	50	0	1.058	(1.033,1.084)	0.090<0.05
	51-61	110	3	2.185	(0.631,7.564)	0.206>0.05
	62-72	25	2	0.614	(0.135,2.784)	0.523>0.05
	Above 7 2	22	4	0.240	(0.074,0.0773)	0.010<0.05
Family size	Small	249	14	1	-----	-----
	Middle	96	7	0.764	(0.302,1.933)	0.569>0.05
	Large	67	0	1.061	(1.034,1.088)	0.44<0.05
Education	High	182	15	1	----------	--------
	Middle	96	4	0.728	(0.274,1.935)	0.523>0.05
	Low	4	2	0.137	(0.024,0.794)	0.010<0.05
Occupation	Unemployed	11	96	1	-------	--------
	Self employed	3	129	2.735	(0.792,9.450)	0.098>0.05
	Govt. employ	5	97	0.985	(0.352,2.759)	0.978>0.05
	ate	2	90	2.655	(0.607,11.614)	0.178>0.05
Monthlyincome	<15000	226	8	1	---------	----------
	15000-50000	90	2	2.655	(0.607,11.614)	0.718
	>50000	96	11	0.278	(0.114,0.670)	0.003<0.001

4. CONCLUSION

Majority of the patients stop taking medicines once symptoms gets resolved and many of them stored the drugs in their household for future use. The unused medications are not properly disposed, majority of them are throwing out in garbage which can lead to serious environmental side effects. The results of our study demonstrate that the majority of patients quit taking their medications once their symptoms have subsided, and a large number of them have kept the medications in their homes for potential future use. The majority of unneeded prescriptions are disposed of improperly by being thrown in the trash, which can have detrimental impacts on the environment. As a result, it's important to educate the family members about correct pharmaceutical storage, disposal, and self-medication practises. Hence it in necessary to provide awareness among the household members regarding the proper storage of the medication and disposal practices and practices of self-medication.

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