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Cross sectional study of factors associated with home storage of medicines

Pandey Shantanu Deviprasad[1] and Chaudhari Vijaya Laxman[2*]

[1]Terna Medical College, Nerul, Navi Mumbai, Maharashtra, India
[2]Dept of Pharmacology, Terna Medical College, Nerul, Navi Mumbai, Maharashtra, India

ABSTRACT

The existence of medicines in home is a risk factor for irrational drug use. The present study aimed at exploring the prevalence and factors associated with home storage of medicines. A cross sectional survey of 114 households was performed from May-June 2015. A stratified randomized sampling method was employed to select households. A pretested structured questionnaire was administered and respondents were requested to bring out any medicines present in their households. Demographic characteristics, drug name, dosage form, quantity, expiry, source and storage condition was collected. Data was analyzed using SPSS version 24.0 at 95% level of significance. Of the total households visited, 43(38%) stored drugs. The mean number of drugs per household was 1.63. The most common classes of drugs found in households were anti-hypertensives 32(46%) and anti-diabetics 27(39%). Most of the medicines kept in households were used for ongoing treatments 64(91%) and available in solid dosage form (91%). The expiry date was untraceable for 6(9%) medications and all the medicines were in packaged form. The proportion of home storage of medicines in men (AOR = 0.22, 95% CI: 0.07-0.7) was lower than that of women. However, households having family member(s) working in health facilities (AOR = 7.23, 95% CI: 1.52-34.21) were associated with an increased home storage of medicines. Over a third of households store medicines with anti-hypertensive drugs being the most common. Woman as gender, elder age, and the presence of health professional in the households affects household drug storage.

Key words: Predictor, Multivariate logistic regression, Survey, Home drug storage

INTRODUCTION

Medicines are stored at home for several reasons such as for emergency use and treatment of acute or chronic illnesses. Easy availability of drugs at home leads to irrational drug use. Also, improper storage of drug may affect the drug stability which increases the risk of unwanted effects as well as leads to ineffective drug therapy [1-2].

Previous studies have reported that women as gender, [2-6] elderly patients, [7] higher income [2, 4] and, higher education[2,4,6,8,9] of the household informant, tend to have more medications in their homes. Several studies have found a mean of more than ten drugs per household.[10-12] Medicines kept at home are occasionally consumed by another person than the person for whom they are prescribed. A study conducted in 2006 found that 3%–12.7% of people had shared their medications with someone else.[13] This study also reported high use of over the counter medications and dietary supplements among households, and reported concurrent use of several products with the same active ingredient. Storing medications in a large quantity at home enhances the risk of impending drug related problems, such as adverse drug reactions, errors in taking medications, and accidental poisoning [14].

In India, only few studies enlighten the facts about the drug storage in households.[15-17] However, there is lack of data on factors predicting the home storage of medicines in India. Hence, this study was planned to study the prevalence and factors associated with household storage of medicines in Navi Mumbai, India.

EXPERIMENTAL SECTION

The present study was a descriptive, exploratory, cross-sectional questionnaire based study. The data collection method was a structured interview of household. The study design was based on the methods enclosed in World Health Organization (WHO) manual - How to investigate the use of medicines by consumers.[18] The study duration was two months from May 2015 to June 2015. The inclusion criteria for the study were: 1. The household informant should be literate; 2. The household informant should be willing to participate the study; 3. The age of household informant should be more than 18 years; 4. The household informant should be the permanent resident of the present address; 5. The household informant should satisfy at least three of the following criteria: a) Main health care decision maker; b) The household informant should be knowledgeable about health of household members; c) The household informant should be knowledgeable about health expenditures of the household; d) The household informant should be knowledgeable about health utilization by household members; e) The household informant should be designated care giver for sick household members. The exclusion Criteria for the study were: 1. The adjacent households of the interviewed household; 2. The household informant having age more than 60 years; 3. The household informant having some illness due to which he/she cannot recollect or remember the information or does not understand the questions.

As per the Manual for the Household Survey to Measure Access and Use of Medicines published by WHO,[19] the questionnaire was prepared, pretested and amended as per the need by the investigators and the language expert. The final version of questionnaire was selected for the present study. The validity of this final version of questionnaire was checked by calculating Cronbach's alpha value (Cronbach's alpha coefficient = 0.82). The questionnaire comprised of socio-demographic characteristics of surveyed households (including age, gender, education, occupation, monthly income of the informant and the presence of health professional in the family), the family health condition and pattern of chronic diseases in the family members, pattern of traditional medicine use in the households, the available medicines in the households and various factors related to these medications.

Data Collection:
We selected the sample population by convenient sampling which includes the residential societies in sector 6, 8 and 10 of Nerul, Navi Mumbai, Maharashtra in India. The secretary of each society was contacted and the information about the total number, household number and the names of permanent residents was obtained. Then the desired number of households in each society was selected by stratified randomized sampling among the permanent residents. If the inclusion criteria were fulfilled the household was enrolled in the study. The principal investigator administered the structured questionnaire to the household informant and also requested to bring out any medicines present in their households.

Ethical Considerations:
The data collection was started only after the approval of the study by the Institutional Ethics Committee (TMC/IEC/2014/03). The informant was enrolled in the study only after the informed consent of the participant. The identity of all the households was kept confidentially. The study questionnaire did not produce any mental burden on the household informant. The voluntariness of the participant was respected by the principal investigator.

Statistical analysis:
The data collected were entered into Microsoft Excel spreadsheet then exported to SPSS (v 23.0). Data were coded, checked for completeness and consistency. Multivariate logistic regression analysis was performed between socio-demographic factors related to medications stored at home to recognize risk factors associated to home storage of drugs. A p value of less than 0.05 was considered significant.

RESULTS AND DISCUSSION

Socio-demographic characteristics
Overall, 114 (97%) households responded to the interview. The mean family size of the households was 4 with just above one third (34%) of the households had at least five family members. Two third (66%) of the households had no children less than six years while 25% had one child and the rest had at least two children. Less than one fifth (19%) of the household have at least one elderly person. None of the participant was illiterate; however more than half (54%) of the informants did not pursued their graduation. For more than half (52%) of the households, the monthly income was less than Rs. 15000/-. Only 12% of the surveyed households had health professional as a family member. Distribution of socio-demographic characteristics of the households with respect to the home storage of medicines was shown in Table 1.

Table 1. Socio-demographic characteristics of households based on the prevalence of home storage of medicines

Characteristics		Home storage of medicines		AOR	95% CI	p value
		Yes N (%)	No N (%)			
Total		43 (38)	71 (62)			
Gender	Man	14 (29)	35 (71)	0.22	0.07-0.70	0.01
	Woman	29 (45)	36 (55)	1		
Age	18-30 yrs	13 (35)	24 (65)	0.30	0.07-1.21	0.09
	31-40 yrs	10 (31)	22 (69)	0.24	0.06-0.89	0.03
	41-50 yrs	06 (32)	13 (68)	0.11	0.02-0.54	0.00
	51-60 yrs	14 (54)	12 (46)	1		
Family size	<5	27 (36)	48 (64)	0.92	0.32-2.62	0.87
	≥5	16 (41)	23 (59)	1		
Family with children <6 years	0	32 (42)	44 (58)	0.79	0.15-4.32	0.80
	1	07 (25)	21 (75)	1.91	0.29-12.40	0.50
	≥2	04 (40)	06 (60)	1		
Family with people >65 years	0	34 (37)	58 (63)	0.94	0.28-3.14	0.92
	≥1	09 (41)	13 (59)	1		
Education	Primary	12 (36)	21 (64)	0.33	0.04-2.54	0.29
	Secondary	08 (29)	20 (71)	0.34	0.05-2.46	0.28
	Graduate	19 (44)	24 (56)	0.65	0.11-3.86	0.63
	Post- graduate	04 (40)	06 (60)	1		
Occupation	Unemployed	21 (38)	34 (62)	1.01	0.32-3.23	0.98
	Self employed	04 (44)	05 (56)	0.32	0.05-2.24	0.25
	Government service	06 (38)	10 (62)	0.57	0.11-2.92	0.50
	Private sector	12 (35)	22 (65)	1		
Monthly income	<15000/-	24 (41)	35 (59)	0.71	0.16-3.19	0.65
	15000 to 50000/-	14 (34)	27 (66)	0.78	0.16-3.74	0.75
	>50000/-	05 (36)	09 (64)	1		
Presence of health professional in the family	Yes	09 (64)	05 (36)	7.22	1.52-34.21	0.01
	No	34 (34)	66 (66)	1		
Likelihood ratio				122.39		
Pseudo R (Cox and Snell, Nagelkerke, McFadden)				0.19, 0.26, 0.16		

Multivariable logistic regression of the predictors of home storage of drugs

Result of multivariate logistic regression analysis was shown in Table 1. It indicated that the elder age group as informants (AOR=0.24,0.11, 95% CI: 0.06-0.89,0.02-0.54) significantly associated with home storage of drugs as compared to the middle aged informants. Woman as a household informant had high chance of storing drugs in comparison to man (AOR =0.22, 95% CI: 0.07–0.7). On the other hand, households with family member working in the health facilities (AOR = 7.22, 95% CI: 1.52-34.21) were more likely to store medicines at home. Similarly, larger family size, higher education, employment in private sector, and higher monthly income were associated with increased home storage of medicines.

Table 2. Family health condition and pattern of chronic diseases in the family members (n=58)

	Number	Percentage
Diabetes mellitus	39	67.24
Hypertension	37	63.79
Bronchial asthma	4	06.90
Cardiac disease	1	01.72
Hypothyroidism	1	01.72

Table 2 showed that there were 51% of households with members suffering from one or more chronic disease, mainly diabetes mellitus (67%) followed by hypertension (63%). 49% of households with persons using traditional medicines but not always as mentioned in Table 3. 100% of households sought healthcare from Physician only. As showed in Table 4, 99% of respondents mentioned that they check the expiry date of medicine before its use; among them 95% check the expiry always. 39% of households told they throw the unused medicines and among them 68% households throw only expired medicines and 32% throw both expired and non-expired medicines. 55% of households prefer to keep the leftover medicines for the anticipated future use.

Table 3. Pattern of traditional medicine use in the households (n=56)

		Number	Percentage
Traditional Medicine use	Ayurveda	40	71.43
	Homeopathy	16	28.57
Frequency of traditional medicine use	Always	03	05.36
	Usually	05	08.93
	Sometimes	48	85.71

Table 4. Information on expiry date and left-over medicines in the home (n=114)

		Number	Percentage
No. of households checking the expiry date		113	99.12
Frequency of checking expiry date	Always	108	94.74
	Sometimes	5	04.39
Dealing leftover medicines	Keep them	63	55.26
	Return to pharmacy	06	05.26
	Throw them	45	39.47
Disposing which medicines	Expired medicines only	77	67.54
	Both expired and non-expired	37	32.46
Having medicines at home		43	37.72

Prevalence of home storage of medicines

Of the total households visited, 43 (38%) stored drugs. The mean number of drugs found per household was 1.62. Distribution of medicines kept in households was depicted in Figure 1. The most common classes of drugs found in the households were anti-hypertensives (46%) and anti-diabetics (39%). Generally, most of the medications (91%) were used for ongoing treatment. 91% of medicines were with adequate labels. Respondents had correct knowledge of use of 66% of the medicines at homes. Dosage form of medicines kept in households was shown in Figure 2, most (91%) of the medicines were available in the form of tablets. Status of medicines and their source, labeling, storage condition, physical condition, their current user, situation of expiry date, and consumer's knowledge about the use, duration, side effects, and cost of medications kept at home were indicated in Table 5.

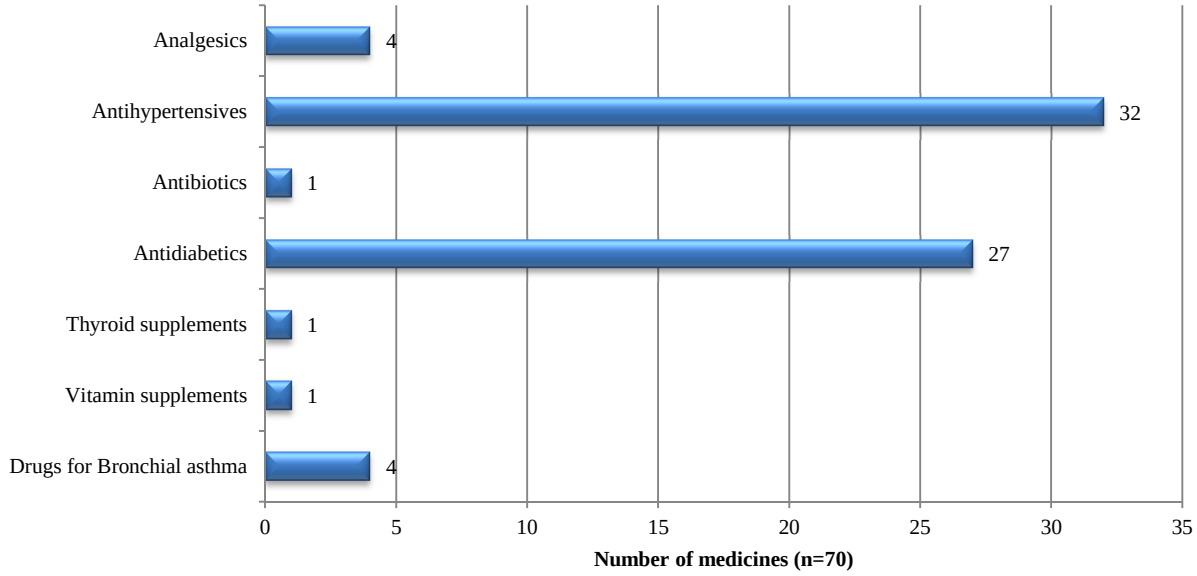

Figure 1. Distribution of medicines found in households

Table 5. Factors related to medications kept at home

		Number	Percentage
Status of medicines at home	Ongoing treatment	64	91
	Leftover drug	6	9
	Anticipated future use	0	0
Source of medicines	Doctor	70	100
	Pharmacist	0	0
	Others	0	0
Labeling	Adequately labeled	64	91
	Not adequately labeled	6	9
Storage condition	In package	70	100
	Loose	0	0
Physical condition	Solid	68	97
	Liquid	2	3
Current user of the medicines	For whom the drug is prescribed	70	100
	For whom the drug is not prescribed	0	0
Having knowledge about the drug	Use of drug	46	66
	Frequency of administration	70	100
	Duration	27	39
	Side effects	16	23
	Cost	51	73
Situation of expiry date	Not expired	64	91
	Expired	0	0
	Not known	6	9

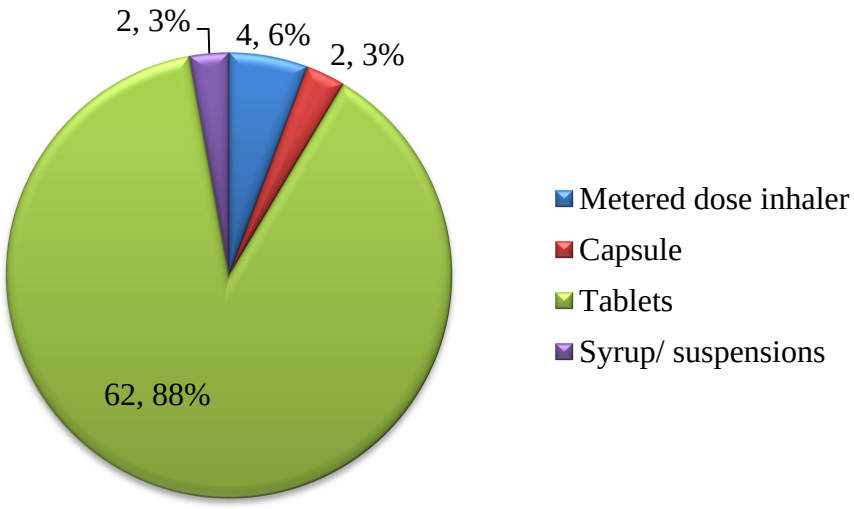

Figure 2. Dosage forms of medicines found in households (n=70)

The household surveys are comparatively difficult to carry out. In the present study, there were six withdrawals; all of them were voluntarily withdrawn from the study. Most of the health informants were woman and it was difficult for male data collectors to enter a house in the absence of a male in the house, particularly in India. The same problem was addressed by Kumar et al.[15] In the present study, the mean family size was 4 and 80% of the households were do not have elderly person, indicating that most of the families were nuclear. The mean age of informant was 36-40 years suggesting middle aged family member takes an important role in healthrelated decisions in our study population. Similarly, gender wise there were more women as health informant, indicating that women play a vital role in health care of family. Most of the household informants had at least completed their primary education. Hence, it was considered that they can understand the purpose of study and their responsibility as participant in the present study. Similarly, most of the informants being housewives; they were unemployed and belonged to lower economic state. These findings were supported by several previous studies conducted across the world [2-3, 5, 8, 12, 14, 20]

Diabetes mellitus and hypertension were the most prevalent chronic diseases found among the study population, which justified the higher availability of antidiabetic and antihypertensive drugs at the home. These findings were echoed in various studies.[15,20-22] About the traditional medicines, approximately fifty percent households used it and most of household informants voluntarily notified to the data collector, that the traditional medicines have less

side effects as compared to the allopathic drugs and thus they opted the traditional medicines. Similar findings were stated in a report of household survey conducted by Ministry of Health, Oman.[22] None of the household were used the Unani and Siddha or Acupuncture methods, since most of them were not aware about the availability of such traditional medicinal methods and even never heard about it. This indicates that very few or none of the physician practicing these methodsin the study area.

About 95% of participated households were always checking the expiry date ofthe medicines while purchasing it and two third of the households disposed the expired medicines periodically. This signifies that the basic knowledge about the expiry date was well present and it can be predicted that there is least possibility of expired medicine related adverse drug reaction in the study population. Comparable study findings were reported in previous studies.[15,22,23] Approximately, half of the households usually keep the left over medicines at home. This indicates that people are reluctant to throw the left over medicines since they have purchased it or spent money on it. Only below 10% households returned the left over medicines it to pharmacy. Hence, there is a need to educate the general public about the correct disposal option for the left over or unused medicines and the hazards of keeping left over medicines athome such as risk to children causing drug poisoning. These findings were matching with that of other studies.[17,22,24,25] Thirty eight percent households stored medicines at home in our study with a mean of 1.62 drugs/house which was comparable to that of a study conducted in Uganda.[2] However, the studies conducted in Iraq, UAE, and Saudi Arabia, reported higher mean which probably due to larger family size and inclusion of herbal products as drugs.[10,11,23] Although the prevalence of diabetes was higher as compared to hypertension in the study population, more antihypertensive drugs (32 vs 27) were found in the survey. This is probably due to the diabetic patients mostly require monotherapy (either sulfonylurea or biguanide or insulin), whereas the hypertensive patients require multidrug therapy (Angiotensin converting enzyme inhibitor ± angiotensin receptor blocker + beta blocker + diuretics + calcium channel blockers) if it is a case of moderate or severe hypertension. The prevalence of diabetes mellitus (39 cases) and hypertension (37 cases) was higher in the study population but we found only 32 antihypertensive and 27 antidiabetic drugs. This might be due to many of the patients did not consume their medication regularly.

About the factors related to medications kept at home, 91% drugs were used for ongoing therapy, were adequately labeled and not expired. All the drugs were in package, prescribed by physician and used by the person for whom they were prescribed. These findings indicate that the participants were using the medicines appropriately. Similar findings were reported by various studies .[15,22,26] Most of the drugs were in tablet form which was matching to that of several previous studies [1-3,7,9].

On the factors predicting the home storage of medicines, our findings were supporting to that of many studies in past for example woman as gender[2-6] elderly age group,[7] presence of health professional in the family,[1] informants with higher education[2,4,6,8,9] and informants with higher monthly income[2,4] were associated with an increased home storage of medicines. The first three factors were found statistically significant, thus they were the strong predictors of the home storage of medicines in the study population.

Lastly, less sample size was one of the limitations of our study but it was not feasible to increase our sample size due to time constraint (study duration as 2 months only). The study area was also restricted to a part of city; hence there is need to extend this research to a larger area to confirm our findings.

CONCLUSION

To conclude, over a third of households store medicines with antihypertensive drugs being themost common. Most of the participants were using their medications appropriately. Woman as gender, elder age, and the presence of health professional in the households were the predictors of household drug storage.

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