



Practice of storage, reuse and disposal of unused medications among semi-urban households of Northern Tamil Nadu – A community based cross-sectional study

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ABSTRACT

Medicine is a science of uncertainty and an art of probability. Inappropriate disposal of medicines may be harmful to the environment as well as mankind, at the same time, improper storage is detrimental. Hence assessment of the ways of Storage, reuse and disposal of unused medications plays a key role. The objective of the study is to investigate the storage and reuse practices of unused medications and to gain insight on knowledge and attitude of proper disposal practices of unused medicines among semi-urban households in urban field practice area of Tertiary medical college hospital of northern Tamil Nadu. This study is a community based cross sectional study. A total of 243 study participants were enrolled using multistage random sampling method. Pretested semi-structured questionnaire is used for conducting face to face interviews. Procurement of medicines is mainly through pharmacy without prescriptions (40.32%), most of the families (42.8%) stored used and unused medications together. On inspection of drugs, 29.6% of expired medicines and 22.23% of medicines without labels were found. The predominant way of disposing medicines is disposal through garbage (51.4%). Addiction level is not much noted and negligible amount of people are aware of drug take back program (0.82%). Awareness must be created about wrongful procurement of drugs, and improper storage of drugs. Drug take back program must be initiated to reduce the improper disposal of drugs.



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being integral part of health care system, each and every day there are many people taking medications for different purpose, pharmaceuticals are produced and used in an increasingly large volume every year (Derksen *et al.*, 2004). Some of the medications are not used any more but still manufactured, which finally comes under medical waste. Improper storage and disposal of pharmaceutical waste is quite dangerous. Unsafe storage of unused medications provides an increased risk of accidental poisoning (Kiyangi and Lauwo, 1993), while improper disposal will worsen the conditions of the environment (Oliver *et al.*, 2003).

INTRODUCTION

The problem of medication wastage is common in many countries (Derksen *et al.*, 2004). Medicines

Also, the medicines obtained by the consumers are predominantly not the rightful way. For example, National survey on drug use and health (NSDUH)

found that over 70% of people who abused prescription pain relievers got them from friends or relatives, while approximately 5% of them got it from pharmacists (Wondimu *et al.*, 2015). This leads to prescription abuse. As there is easy accessibility to the drugs in our country, it is not a surprise to find any expired or unused medications which are obtained as a result of excessive storage of drugs or disuse of drugs (Swaroop *et al.*, 2015). With excess availability of drugs, comes increased disposal of drugs. Usual methods used by common people to dispose these medications are by throwing in dustbin, burning, flushing into the sink or toilet (Abahusain and Ball, 2007).

Though the most environmentally sound way of disposing of pharmaceutical waste is incineration (Smith, 2019), this is possible only if the drugs are returned to the pharmacy. Effective way to solve this problem is having a drug take back program. In a drug take back program red disposal bags must be provided to the consumers for disposing the unused medications, these drugs are to be reached or collected by nearest pharmacies and this service must be free of cost. Unfortunately, because of financial issues this is not yet started or effective in major parts of the world. This program is started and as effective in United States as reported in 'Secure and Responsible Drug Disposal Act (Counseling Organization, 2019).

Therefore, assessing the ways of storage, reuse and disposal of unused medications plays a key role. There are not many studies in our country to elicit improper ways of storage and disposal of unused medications. With this background, we have attempted to investigate the storage and reuse practices of unused medications and to gain insight on knowledge and attitude of proper disposal practices of unused medicines among semi-urban households of northern Tamil Nadu.

MATERIALS AND METHODS

This is a community based cross-sectional study, which was conducted in urban field practice area of Tertiary medical college hospital of northern Tamil Nadu from January 2019 to June 2019, after obtaining ethical clearance from the institutional ethical clearance board. The study population comprised of medicine handlers in the households of semi-urban area. The sample size required in estimating proportion (prevalence) was calculated with anticipated population proportion (p) as 67% (Maharana *et al.*, 2017) with 95% confidence interval and at 5% significance level including 10% non-responsive cases, sample size was derived to be 256. Multi stage

sampling (2stages) method was used to enroll the study subjects.

Stage 1

Selection of wards

According to Census of India, Thiruvallur town Panchayat is divided into 15 wards (Chennai City Census, 2011). It covers a total population of around 20,000. Out of these, 3 wards were chosen by using simple random sampling using lottery method

Stage 2

Selection of study population from wards

Medicine handlers in the household was from the selected 3 wards, 90 households were chosen from each ward from family household survey register maintained in the urban health care centre of tertiary care medical college hospital, were selected from each ward by using simple random sampling techniques using computer generated random numbers.

A pretested semi-structured questionnaire was used as the tool to conduct face to face interviews. This questionnaire consisted of 5 parts. The first part of the questionnaire was related to socio-demographic data such as age, education, occupation etc., second part consisted of ways of procurement of medicines. Third part is related to storage of medicines. Fourth part is about reuse of medicines. Fifth part is regarding disposal of medicines. Total questionnaire comprised of 20 questions.

The data obtained were entered in MS office excel sheet and analysis was done using SPSS 21 version software. The descriptive statistics were expressed as frequencies, percentages. Chi-square test was used to ascertain the association of socio-demographic variables and improper ways of storage and reuse of unused medicines. p value of <0.05 was considered statistically significant.

RESULTS AND DISCUSSION

The study group consisted of 243 household medicine handlers. As per age, (51.02%) 124 participants were less than 40 years of age. Female preponderance 146 (60.082%) was present in the current study. Most of the medicine handlers were homemakers 110 (45.26%). Almost half of them 84 (57.19%) had schooling for less than 5 years but 64 (26.3%) participants were graduates. According to socio-economic status, 106 (43.62%) belonged to below poverty line category.

Only 70 (28.8%) of the participants procured medicines in right mode prescribed through registered medical practitioner. The most common way

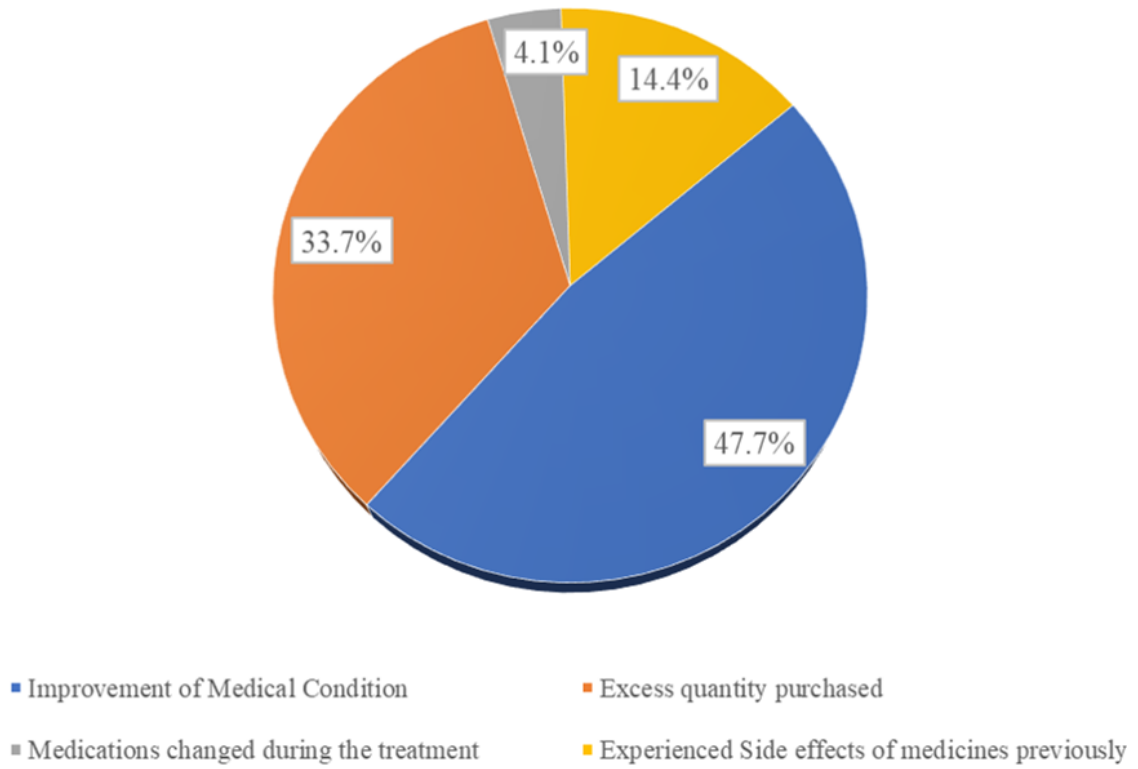


Figure 1: Various reasons behind medications left unused in households

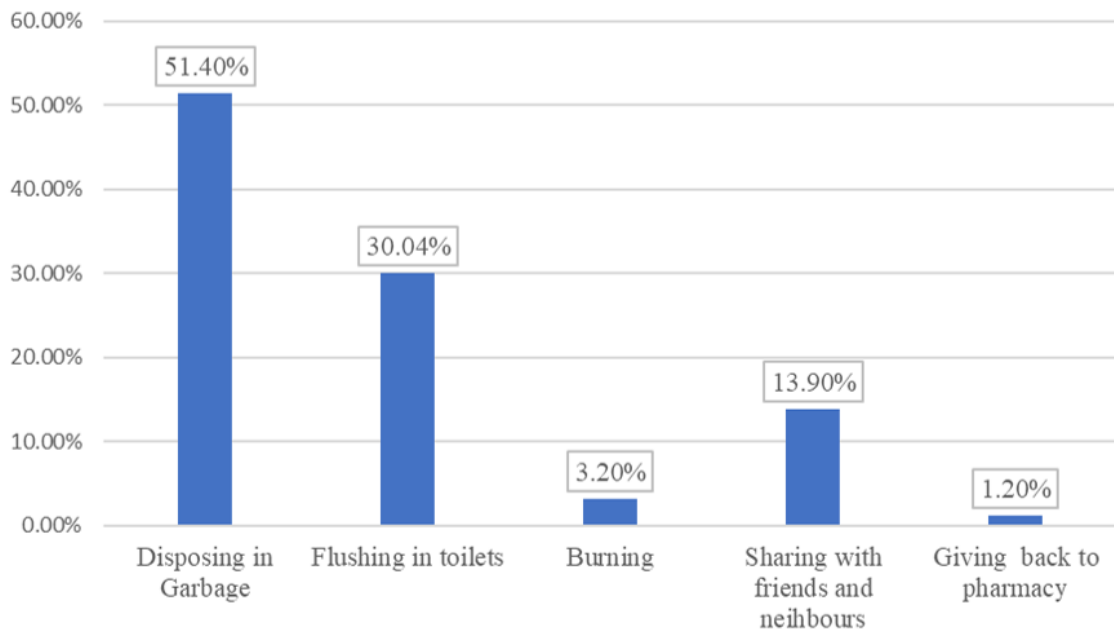


Figure 2: Various methods of disposal of unused medicines

Table 1: Association of socio-demographic variables with unsafe storage practices of medicine handlers

	Storing within reach of children	Not storing in specific place	Storing both used and unused together	Did not preserve prescriptions	Expired drugs found on inspection	Labels not found on medicines
			Age N (%)			
<40 years	17(7.0%)	64(26.3%)	28(11.52%)	86(35.59%)	32(13.16%)	15(6.17%)
>40 years	12(4.93%)	41(16.87%)	30(12.34%)	51(20.98%)	40(16.46%)	19(7.81%)
p value	0.250	0.248	0.794	0.007*	0.000*	0.449
			Sex N (%)			
Male	18(7.40%)	46(18.93%)	24(16.04%)	68(27.98%)	41(16.87%)	20(8.23%)
Female	11(4.52%)	59(23.27%)	34(8.64%)	65(26.74%)	31(12.75%)	14(5.76%)
p value	0.330	0.512	0.893	0.359	0.679	0.029*
			Educational Status N (%)			
Illiterate &< 5 yrs. of schooling	16(6.58%)	62(25.51%)	39(16.04%)	83(34.15%)	45(18.51%)	19(7.81%)
>5 yrs. of schooling	13(5.34%)	43(17.69%)	21(8.64%)	50(20.57%)	27(11.11%)	15(6.17%)
p value	0.073	0.359	0.305	0.991	0.974	0.402
			Occupation N (%)			
unemployed	15(7%)	57(24.69%)	32(13.16%)	63(25.92%)	32(13.16%)	12(4.93%)
employed	14(4.93%)	48(18.51%)	28(11.52%)	70(28.80%)	40(16.46%)	22(7.81%)
p value	0.765	0.104	0.677	0.157	0.502	0.021*
			Socio-economic status N (%)			
Above poverty line	17(7.0%)	60(24.69%)	6(2.46%)	34(14%)	17(7.0%)	15(6.17%)
Below poverty line	12(4.93%)	45(18.51%)	43(17.69%)	99(40.74%)	56(23.04%)	19(7.81%)
p value	0.298	0.824	0.657	0.476	0.828	0.892

of procurement of medicines was by pharmacy without a prescription was 98(40.32%). All the other ways of procurement of medicines are shown in [Figure 1].

Table 1 shows the association of socio-demographic variables with unsafe storage practices of medicine handlers. This comparison was made based on age, sex, educational status, occupation and socio-economic class. Age factor had significant association with mishandling of prescription and expired drugs found on inspection and all other associations are tabulated.

Unused medications are found in all households, the most common reason for presence of unused medication were 'improved medical condition' (47.73%),

followed by excess quantity of medication purchased (33.74%) shown [Figure 1]. Various methods of disposal of unused medicines are all shown [Figure 2], 51.4% households were disposing unused medicines in garbage. Drug addiction is found among 3.29% of the members i.e., old age persons were using medications for sleep and few children were addicted to taste of the syrup and a negligible figure of 0.82% of them are aware of drug take back programme.

Medicine waste management and disposal is most discussed topic in the current scenario, it has grabbed attention due to 'environmental pollution' as disposing improperly will contaminate natural food chain including water, air, livestock etc., ulti-

mately harming the 'ecology balance'. Therefore, many studies have been carried out worldwide to find policy solutions (Kusturica et al., 2015). To best of our knowledge, this is the first study from south India.

In the current study, main way of procuring medicines is 'over the counter', i.e., obtained through pharmacy without prescription, which is wrongful way to obtain medicines. Unfortunately, it has been universally practised throughout the country which may be to minimise double cost for paying both medical practitioner and pharmacy. Other reason may be that accessibility or doctor patient ratio is very meagre in developing country.

In the present study, 42.8% of the families stored the medicines which are being used and unused together. Also expired medicines were found in 29.6% of houses and medicines were found without labels in 22.33% of households, having expired medicines, medicines without labels and storing all medicines together may lead for the consumption of the expired drugs or wrong drugs. Such practices may terminate with severe adverse effects. Hence, appropriate storage of medicines is vital and awareness must be created. Similarly, a study conducted among Iraninan households also had same wrongful practices (Zargarzadeh et al., 2005).

According to the current study, medicine handlers with >5 years of schooling and graduates had appropriate storage practices compared to those who were illiterate or having only primary education. Also, participants with above the poverty line income level had better appropriate storage practices compared to those who were under the poverty line.

The best way to dispose medicines is by incineration, since there is no drug take back program initiated in India (Maharana et al., 2017), the better available option for the disposal of drugs is 'disposal through garbage' (Srikanth et al., 2015) which is evident from the current study, as 51.45% of medicines were disposed in garbage, which is environmentally sound way among the available options in India. But relating to environmental significance and human health risk, the true risks may not be known for years (Daughton, 2003).

Drug addiction is found among minimal members, the reasons are listed like taste addiction of cough syrup among children, pain killers among the working men and women and usage of sedative drugs like sleeping pills among the elderly aged people. Only 0.82% of the study population are aware about drug take back program, which is not yet functional in India. The results are similar to the study conducted

in India (Maharana et al., 2017).

CONCLUSION

Almost half of the participants were practising improper storage and disposal techniques in this study. Vigorous and economical methods of handling pharmaceutical wastes are needed. Proper storage techniques also play an important role in regulation of health of an individual; this requires the helping hand of health care practitioners as well as the pharmacists. Ways of inappropriate disposal of medications can be drastically reduced by implementing drug take back program, which need a large-scale support from both the public and private health services.

REFERENCES

- Abahussain, E. A., Ball, D. E. 2007. Disposal of unwanted medicines from households in Kuwait. *Pharmacy World & Science*, 29(4):368-373.
- Chennai City Census 2011. Chennai City Census data.
- Counseling Organization 2019. Counseling Organization.
- Daughton, C. G. 2003. Cradle-to-cradle stewardship of drugs for minimizing their environmental disposition while promoting human health. II. Drug disposal, waste reduction, and future directions. *Environmental Health Perspectives*, 111(5):775-785.
- Derksen, J. G. M., Rijs, G. B. J., Jongbloed, R. H. 2004. Diffuse pollution of surface water by pharmaceutical products. *Water Science and Technology*, 49(3):213-221.
- Kiyangi, K. S., Lauwo, J. A. 1993. Drugs in the home: danger and waste. *World Health Forum*, 14(4):381-385.
- Kusturica, M. P., Tomas, A., Horvat, O., Tomić, Z., Sabo, A. 2015. Storage and Disposal of Unused Medications: Knowledge, Behavior, and Attitudes Among Serbian People. *Clinical Therapeutics*, 37(8):e27-e28.
- Maharana, S., Paul, B., Dasgupta, A., Garg, S. 2017. Storage, reuse, and disposal of unused medications: A cross-sectional study among rural households of Singur, West Bengal. *International Journal of Medical Science and Public Health*, 1:1-1.
- Oliver, A., Jones, N., Voulvoulis, J. N. L. 2003. Potential impact of pharmaceuticals on environmental health. *Bull World Health Organ*, 81(10):768-769.
- Smith, C. 2019. Managing pharmaceutical wastes - what pharmacists should know. *J Pharm Soc. Wis-*

consin.

- Srikanth, M. S., Adepu, R., Patel, H., Parthasarathi, G. 2015. A Study of Knowledge, Attitude And Practice of Community Pharmacists Towards Adverse Drug Reaction Reporting & Monitoring. *Value in Health*, 18(7):A541-A542.
- Swaroop, H., Chakraborty, D., Virupakshaiah, A. 2015. Knowledge, Attitude and Practice of Medical Professionals Towards The Safe Disposal of Unused Medications In South India. *World Journal Of Pharmacy And Pharmaceutical Sciences*, 4:1-16.
- Wondimu, A., Molla, F., Demeke, B., Eticha, T., Assen, A., Abrha, S., Melkam, W. 2015. Household Storage of Medicines and Associated Factors in Tigray Region, Northern Ethiopia. *PLOS ONE*, 10(8):e0135650-e0135650.
- Zargarzadeh, A. H., Tavakoli, N., Hassanzadeh, A. 2005. A survey on the extent of medication storage and wastage in urban Iranian households. *Clinical Therapeutics*, 27(6):970-978.