

Unused Medicines in Households

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Abstract

Background: Unused medicines in households are among the problems in many modern societies and developing nations. This issue leads to social and economical problems, and it is associated with other complications such as self-medication, poisoning, incomplete recovery, and suicide.

Objectives: The present study was carried out in Mashhad and aimed at determining the amount of unused medicines in Mashhadi households in 2013.

Patients and Methods: In a cross-sectional study in 2013, three hundred households were selected through a cluster random sampling with the help of 12 healthcare centers in Mashhad. Data were collected by applying a checklist and analyzed by SPSS 11.5. Descriptive indices, including central tendency and dispersion, and frequency distribution were applied to describe qualitative variables; and chi-2, Man-Whitney, and Kruskal-Wallis to compare quantitative variables. Level of significance was set to $P < 0.05$.

Results: This study showed that the existence of unused drugs and the number of unused drugs in household have significant difference in four zones ($P = 0.01$, $P < 0.001$). Also, health insurance coverage was statistically different in various health centers ($P = 0.002$). Also, there is a significant association between unused medication in the household and family size, father's occupation, and a family member being a health professional, respectively (P value 0.02, 0.002, 0.04)

Conclusions: The findings of this study and similar ones support that the amount of unused medicines inside houses has to be lowered by physicians prescribing a more reasonable number of drugs, giving consultation to patients, and raising public awareness. On the other hand, a mechanism needs to be applied in order to make use of the drugs kept inside houses and reduce drug wastage.

Keywords: Unused Medicines, Households, Society Health, Healthcare System

1. Background

In 1951, based on an improvement on the law of foods, drugs and cosmetics, the food and drug administration (FDA) decided which medicines required a doctor's prescription and made all the other medicines readily accessible to the public (1). FDA reviewed the law in 1962 and gave a more careful definition of the drugs without prescription. Based on the new rule, a drug could be prepared without prescription if: 1) it was poisonous to a low degree, and 2) the pertinent illness could be diagnosed (1).

Currently, people can find medication in 3 possible ways:

1) Over-the-counter medicines (OTC): these are subject to no restrictions and citizens can take them from that part of the pharmacy that they have direct access to. These drugs do not need prescription even from a pharmacist and they can also be provided outside pharmacies, in supermarkets, gas stations, or on the Internet. In some countries they are called general sale list.

2) Behind-the-counter medicines (BTC): these drugs do not need a prescription from a physician, but they can be bought under the supervision of the pharmacist. In some countries (e.g. Canada, France, Germany and Switzerland), they are called pharmacy-only drugs.

3) Prescription-only medicines (POM): these are only available via prescription from a health professional, who is legally able to prescribe. They are commonly marked RX or POM on the drug label (1).

Based on the rules and regulations of the Iranian ministry of health, drugs are assigned to either of the last two groups. It should be noted that the drugs in the first group, if not taken properly, can endanger one's health. The risks are interference with the prescribed drug(s), being exclusive to special patients, and drug abuse (2).

In this study, unused drugs are defined as every medicine which households prepare and keep at home and use without instructions from the health professionals. Numerous studies show that a measurable amount of drugs is kept inside the houses every year and then demol-

ished. Different factors play a role in the formation of this problem: recovery, not taking the full treatment course, excessive prescription by medical staff, medication side-effect, a wrong belief that the medicine does not have an effect on treating the disease, changing the treatment, self-medication, and patient death.

Unused medicines at home have imposed significant cost on health systems in many countries. The phenomenon can have several consequences, including wasting nation's resources, dependence on drug importation, incomplete treatment courses, medication side-effects left unregistered, intentional or accidental drug poisoning, self-medication and environmental pollution.

A few studies have been carried out so far. One which surveyed unused drugs in 85 households in Qazvin township by Nasiriasl et al. indicated that around 82% of the participants kept drugs at home, though they were not necessarily taking them (3). Zargarzadeh et al. reported unused household drugs comprising 53.8% of all the drugs kept at home (4). In a similar study, which included 300 households in Khorramabad, it was found that on average, 81.5 different unused drugs were kept in houses and the drugs cost 12205 Rials on average. The drugs, in descending order, included antibiotics, analgesics, gastrointestinal drugs and those for the common flu (5). Another study involved 275 households in Yasuj and found that 83% of the households kept unused medicines which included, on the average, 11.02 items each costing 13580 Rials, so it was estimated that the total quantity of unused drugs across the nation is equivalent to the country's six-month drug budget! (6). The chemists collected 19996 tons of unused drug products in the decade ending in 2004 in Alberta, Canada (7). In another study which was carried out in Texas in 2002 and aimed at economic calculation of the unused drugs, 17000 drugs cost \$26000 were reported, and a six-month period was considered for returning these drugs to Houston pharmacies. The drugs belonged to different drug groups and included both the drugs with prescription and those without a prescription (8).

2. Objectives

Considering the significance of the subject for any nation's healthcare system, the present study was carried out in Mashhad and aimed at determining the amount of unused medicines and associated factors in Mashhadi households in 2012.

3. Patients and Methods

This cross-sectional study was undertaken in 2013 recruiting 300 families by cluster random sampling in Mash-

had. The sample size was estimated based on $P = 80\%$, $\alpha = 0.05$, and $d = 0.2 p$, and according to the previous results, it was equivalent to 25 families, but according to our cluster sampling, 75 families were included in this study. Since drug accumulation is a function of socioeconomic status of the population, sampling was carried out in healthcare centers No. 1, 2, 3, and 5 in Mashhad. In order to achieve a homogeneous sampling, 3 clusters were randomly selected from each center. Each cluster contained 25 households, making a total of 300 households. Having made arrangements with the provincial officials and the correspondent centers, each home was visited and demographic information and data regarding the unused drugs were taken by using checklists. Participation was conditional to prior voluntarily consent. This study was approved by research ethic committee of Mashhad University of Medical Sciences (MUMS).

Data were analyzed using SPSS 11.5. Descriptive indices, including central tendency and dispersion, and frequency distribution were applied to describe qualitative variables; and chi-2, Mann-Whitney, and Kruskal-Wallis to compare quantitative variables. Level of significance was set to $P < 0.05$.

4. Results

In this study 300 households covered by healthcare centers No. 1, 2, 3, and 5 in Mashhad (75 households per district) were evaluated. The family members, unused medication, number of unused drugs (number of all types of drugs) and family insurance coverage based on each four health centers are presented in Table 1. As it is seen, the existence of unused drugs and the number of unused drugs in the household has significant difference in four zones ($P = 0.01$, $P < 0.001$). Also health insurance coverage was statistically different in various healthcare centers ($P = 0.002$).

According to the family size, occupation and education of parents, insurance coverage, a family member being a health professional and the cause of not using the prescribed drug, the unused drug in the household has been demonstrated in Table 2. It was shown that there is a significant relationship between unused medication in the household and family size, father's occupation, and a family member being a health professional, respectively (P value 0.02, 0.002, 0.04).

and capsules comprised the largest drug forms (94.7% and 68.7% respectively). Injected medicines took a significant share of 24.3%. The commonest unused drugs kept in houses were analgesics (89.4%), bronchodilators and antihistamines (84%), and antibiotics (71.4%).

Table 1. Family Insurance Coverage Based on Each Four Health Centers

Variable No.5	Health Centers				P
	No.3	No.2	No.1		
Family size	4 (1-7) ^a	3 (1-7)	4 (1-9)	4 (1-8)	0.06
Existence of unused drug	43 (57.3)	33 (44)	60 (80)	54 (70.7)	< 0.001
Number of unused drugs	99 (1-964)	179 (2-860)	103 (2-583)	91 (1-510)	0.01
Insurance Coverage	49 (65.3)	65 (86.7)	45 (60)	55 (73.3)	0.002

^aMedian (min-max).

5. Discussion

This survey was undertaken in 300 households in Mashhad. The results showed that 63% of the households kept unused medicines at home. Nasiri-asl found that 82.4% of the households kept unused drugs (3). Moumen-nasab et al. ran a similar survey in Khorramabad and found that on average, 81.5 drugs were kept inside each house. About 82.4% of unused drugs were remaining of the previous treatments (5). Hashemi et al. performed a similar study on 257 households in Yasuj and concluded that 83% of the households kept drugs at home (6).

Cameron showed that pharmacies had collected 204 tons of drugs in the last ten years (7). A survey run in 1978 on 192 households in UK made it clear that 70% households kept unused drugs at home (9). Therefore, keeping unused drugs is an issue both in our country and in developed countries, and the results show that the amount is huge: a lot of households keep drugs at home. It seems inevitable to find mechanisms to reduce the amounts and make use of the budget involved.

The commonest groups of unused drugs inside homes were analgesics, respiratory drugs, antihistamines and antibiotics. Nasiri-asl found digestive medicines, analgesics, and sedative the most common, respectively (3). Moumen-nasab et al. decided the descending order as antibiotics, analgesics, and gastrointestinal (5). A study, which was run in the UK in 2007 had the list as cardiovascular (27%) and sedative (24%) (10). Cameron found antibiotics, analgesics, and cardiac drugs the commonest (7). Ostensibly, how common a group of drugs depends on a region on what diseases are contagious. Since in developed countries, according to consensuses, drugs are normally inaccessible without prescription, it seems to be necessary for physicians to prescribe carefully and for pharmacists to inform patients of the necessity of a complete treatment with antibiotics.

This survey made it clear that the commonest drug types are tablets (for 94.7% households), capsules (68.7), syrups and suspensions (41.2%), injected (24.3%). Nasiri-asl

found tablets, capsules, ampules and ointments the commonest (3).

According to the findings of the present survey, recovery (96.3%) and side-effects (3.7%) were the reasons for not taking drugs in unused drug in household group. In Nasiri-asl's survey, 51% households kept drugs for future use, 21% for self-medication, and 5% just because they had recovered (3). James et al. surveyed the drugs taken back to 24 pharmacies within 6 months over a region inhabited by 37000 households: patient death counted for 22% of drug returning, excessive prescription 17%, expiry date having passed 8%, treatment change 11%, lessened dose 3%, and unknown reasons 39% (11). It would appear that keeping unused drugs inside houses is quite normal: a lot of drugs are prescribed for transient symptoms and will not be taken when the patient feels well.

This survey showed a meaningful association between residence area, father's profession and the presence of a family member in health professions and the presence of unused drugs inside the house. Also, there was a meaningful association between unused drug in household and insurance coverage. Nasiri-asl did not find a meaningful relationship between the parents' level of education or the size of the family and the average number of unused drugs (3). A study carried out in Tehran in 1996 identified the bachelor's degree (or higher) a factor contributing to self-medication (2). As different studies have produced inconsistent results in other countries (12-17) and even in different cities or population in Iran (18, 19) with regard to the possible effects of the aforementioned social factors on keeping unused drugs at home, even the need is felt for more researches.

Keeping unused drugs at home and their consequent wastage are a concerning issue in modern countries as well as in Iran. It needs attention both because of the financial burden it places on the society and because of the potential risks it creates like self-medication, poisoning, suicide, incomplete treatment, and resistance to treatment. It seems like the world's health systems have to plan, activate, and

Table 2. The Unused Drug in the Household Has Been Demonstrated

Variable	Unused Drug in Household N = 189	Not Unused Drug in Household N = 111	P
Family size^a	4 (3 - 5)	3 (2 - 4)	0.04
Father's job^b			
Jobless	1 (.6)	7 (6.1)	NA
Worker	48 (25.4)	36 (32.7)	0.002
Employee	27 (14.1)	23 (20.4)	NA
Freelancer	113 (59.9)	45 (40.8)	NA
Mother's job			
Housewife	181 (95.8)	111 (100)	NA
Worker	1 (.5)	0 (0)	NA ^c
Employee	6 (3.2)	0 (0)	NA
Freelancer	1 (.5)	0 (0)	NA
Father's level of education			
Illiterate	16 (8.5)	18 (16.3)	NA
Elementary	76 (40.3)	37 (33.7)	NA
High school diploma	83 (43.8)	45 (40.8)	0.57
College diploma	6 (3.4)	4 (3.1)	NA
License and higher degree	8 (4)	7 (6.1)	NA
Mother's level of education	31 (16.4)	26 (22.7)	
Illiterate	69 (36.5)	41 (37.3)	0.19
Elementary	81 (42.9)	41 (37.3)	NA
High school diploma	3 (1.6)	2 (1.8)	NA
College diploma	5 (2.6)	1 (.9)	NA
License and higher degree	135 (71.4)	79 (71.2)	0.96
Being health professional in family	8 (4.2)	0 (0)	0.02
Cause of not using the drug			
Recovery	182 (96.3)	111 (100)	0.78
Side effects	7 (3.7)	0 (0)	NA

Abbreviation: NA, not available.

^a Median (min-max).^b Values are expressed as No. (%).^c The assumption for test was not satisfied.

evaluate strategies to exploit the usable drugs that people keep at home.

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Footnotes

Authors Contribution: Maliheh Dadgarmoghaddam was responsible for interpretation of data, drafting of the manuscript, and critical revision of the manuscript for important intellectual content. Mohsen Imenshahidi was responsible for study concept and design, critical revision of the manuscript for important intellectual content. Amin Aliabadi was responsible for study concept and design, critical revision of the manuscript for important intellectual content. Hakimeh Baseri was responsible for drafting the manuscript and critical revision of the manuscript for important intellectual content. Mohammad khajedaluae was responsible for study concept and design, analysis and interpretation of data and critical revision of the manuscript for important intellectual content.

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