Brief Report

An Evaluation of Irrational Drug Consumption in Shiraz Households in 2019

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Abstract

Background and Purpose: Medical experts believe that proper use of medicine in many cases results in the treatment of the disease. This study was conducted to determine the rate of irrational drug use in households in Shiraz in 2019. The criteria for rationality of drug use were as follows: 1. Using medicine for the existing disease- 2. Preparing medicine by visiting a doctor- 3. Appropriate storage location- 4. Unexpired drug- 5. Proper drug use.

Materials and Methods: This study was a cross-sectional household survey conducted using a descriptive questionnaire based on the drug survey plan questionnaire in Oman by stratified random sampling. 156 households were surveyed. Data analysis was performed by t-test, ANOVA, Pearson Correlation Coefficients and chi-square tests using SPSS-22 software.

Results: Out of 1944 items of medicine available in households, 542 items (27.9%) were used rationally and 1402 items (72.1%) were used or stored irrationally. Among the available drug categories, drugs related to cancer (80%) and heart (75.2%) disease had the highest rational use. Skin drugs (0%) and antibiotics (8.3%) had the most irrational use. There was also found a significant relationship between the rational consumption and the region where households lived (P-value≤0/001) (municipal regions), rational consumption and drug literacy for each drug, as well as rational consumption and how the drug was prepared (P-value ≤ 0/001).

Conclusion: Based on the research findings, it was found that in most households, drugs were accumulated irrationally. The high dispersion of medicine stored in households indicated the diversity and lack of a correct and coherent culture for consuming medicine among citizens and prescribing it among the medical community in Shiraz. It was then suggested that through more detailed educational planning, the health system and corresponding officials improve the pattern of drug use as well as its prescription. Furthermore, increasing people's awareness of how to use and maintain medicines can reduce their expenses.

Keywords: Medicine; Household; Irrational Drug Use

1. Introduction

The use of drugs as a link in the chain of disease treatment is inevitable (1). Rational use of drugs occurs when a patient is prescribed the right dose and duration of the proper drugs, based on the individual's clinical condition (2). Any use of medicine outside this framework is considered irrational. According to official statistics, every Iranian takes 442 drug items per year (3). Iran is among the top twenty countries in the world in terms of drug use, ranked second in Asia, with China leading. Twenty percent of all drug use in Iran is arbitrary, without a doctor's prescription, and more than 10,000 cases of complications due to improper use of drugs are reported annually. On the other hand, drug accounts for a large share of health expenditures in many developing countries and 10 to 20 percent in developed countries (4). Inadequate public awareness of the correct use of drugs, willingness to self-medicate, inadequate interaction among physicians and other colleagues in the field of healthcare and lack of supervision on the side of related management and regulatory organizations, are the main reasons for irrational prescription and use of drugs in Iran (5, 6). Given these conditions, recognizing the level and causes of irrational drug use and drug storage in Iranian households and providing solutions to reduce it are of particular importance (7). Lack of sufficient studies in this field in Shiraz, alongside the necessity of visiting households in 10 districts of Shiraz to receive medical information were among the reasons for conducting the study in Shiraz .The results of this study had implications and provided information for university drug administrators regarding the storage of drugs in households and factors that lead to irrational drug use.

2. Materials and Methods

This research was a cross-sectional household survey. The research environment for this survey was Shiraz in Iran. According to the statistics, the population of Shiraz was about 1,604,217 in 818,827 households in 2019 (8). The total sample size was derived using the formula $n = \frac{\left(z\frac{\alpha}{2}\right)^2 \pm p(1-p)}{d^2}$ where p = .7 with an accuracy of 10% (d = .1). In this study, 156 households were studied. The volume-based stratified random sampling method was adopted proportional to the number of samples examined in each municipal district.

The collection tool for this research was a questionnaire prepared based on the pharmaceutical questionnaire survey in Oman. The questionnaire queries were approved by the advising professor after several review sessions and modifications. The questionnaire was approved in regards to content validity and appearance following the modifications requested by the examiner professors (9). This questionnaire was generally consisted of two sections. The first section included demographic information about the household and the second section referred to the information on drug use in the household. In the first section of the questionnaire, the family was studied in terms of parental literacy status, type of family insurance, having a doctor for the household, occupation of the head of household, presence of a person in the household related to the healthcare system, presence of an elderly person in the household (persons over 60 years) and the

number of family members. The second section included questions regarding the health and illnesses in the household, how the household behaved in terms of application and maintenance of medicine and the household drug information form. The criteria for rationality of drug use :1-Using medicine for the existing disease-2-Preparing medicine by visiting a doctor-3-Appropriate storage location-4-Unexpired drug-5-Proper drug use. Data analysis was performed by t-test , ANOVA, Pearson Correlation Coefficients and Chi-square tests using SPSS-22 Software. Due to the type of data, two separate SPSS files were used to enter the information. One for entering household information and the other for information about each household's medication. Initially, we considered a single code for each household to be the same in both files so that the information could be retrieved. To find out the connections between these two separate files, we transferred the information of each to the other in different ways. Research with ID IR.SUMS.REC.1395.s72 has been approved by the ethics committee of Shiraz University of Medical Sciences.

3. Results

Table1. Relationship between rational and irrational drug use in terms of drug categories in 2019

Row	Medicinal Category		Rational Consumption	Irrational Consumption	Sum	
1	Painkillers	Number	82	403	485	
		Percent	16.9	83.1	100	
2	Antibiotics	Number	19	209	228	
		Percent	3.8	91.7	100	
3	Nerves	Number	44	55	99	
		Percent	44.4	55.6	100	
4	Respiratory	Number	20	60	80	
		Percent	25	75	100	
5	Antihistamine	Number	32	150	182	
		Percent	17.6	82.4	100	
6	Hormone	Number	41	76	117	
		Percent	35	65	100	
7	Vitamin	Number	90	129	219	
		Percent	41.1	58.9	100	
8	Digestive	Number	51	169	220	
		Percent	23.2	76.8	100	
9	Skin	Number	0	15	15	
		Percent	0	100	100	
10	Cancer	Number	4	1	5	
		Percent	80	20	100	
11	Disinfection	Number	0	1	1	
		Percent	0	100	100	
12	Heart	Number	97	32	129	
		Percent	75.2	24.8	100	
13	Herbal	Number	13	39	52	
		Percent	25	75	100	
14	Other	Number	49	63	112	
		Percent	56.3	43.7	100	
Sum		Number	452	1402	1944	P-value ≤ 0.001
		Percent	27.9	72.1	100	

Table 1 showed that among the available medicinal categories, drugs related to cancer at 80% and heart disease at 75.2% had the highest rational use and skin drugs at 100% and antibiotics at 91.7% had the highest irrational use. According to the official pharmacopoeia of Iran and the

pharmaceutical research consultant, studied drugs were divided into 14 categories (10). The findings showed a significant relationship between rational use and the region where households lived (municipal district).

Table 1. Relationship between rational and irrational drug consumption based on drug literacy in 2019

Rational/Irrational		Medicinal Literacy		Sum	
		Have	Not have		
Rational Consumption	Number	512	30	542	P-value ≤ 0.001
	Percent	30	12.7	27.9	
Irrational Consumption	Number	1196	206	1402	
	Percent	70	87.3	72.1	
Sum	Number	1708	236	1944	

Drugs for which there was no literacy had higher irrational use. Irrational use was observed for 70% of the drugs with

literacy and 87.3% of drugs with no literacy(Table2).

Table 2. Relationship between rational and irrational drug consumption and how medicine was received in 2020

Rational Irrational		How Medicine is Received			Sum	
		Visiting a Doctor	Referring to Pharmacy	Recommended by Others		
Rational	Number	525	16	1	542	P-value ≤ 0.001
Consumption	Percent	36.7	3.4	2.2	27.9	
Irrational	Number	906	452	44	1402	
Consumption	Percent	63.3	96.6	97.8	72.1	
Sum	Number	1431	468	45	1944	

The highest percentage of irrational use was related to drugs received due to the recommendation of others (97.8%) or the recommendation of the pharmacy (96.6%),

and the lowest percentage was related to drugs that were prescribed by a doctor (63.3%) (Table 3)

Table 3. Difference between the average irrational drug consumption based on households measures regarding the leftover medicine in 2019

Household Measures for Remaining Medicine	Number of Households	Average Irrational Consumption	Standard Deviation	
Store at Home	97	10.76	8.07	P-value ≤ 0.002
Take back to Pharmacy	4	4.25	4.34	
Discard	24	6.91	6.26	
None Leftover	31	5.61	6.04	

Table 4. Post-Hoc Test

	Household Measures for Remaining Medicine											
	Store at Home			Take back to Pharmacy			Discard			None Leftover		
P-value	Store at Home	Discard	None Leftover	Store at Home	Discard	None Leftover	Store at Home	Discard	None Leftover	Store at Home	Discard	None Leftover
	0.39	0.16	0.01	0.39	0.93	0.98	0.16	0.93	0.93	0.01	0.98	0.93

As depicted in the table, 62.17% of the households kept the remaining drug at home after use, 15.38% discarded the remaining medicine, and 2.56% tried to return the remaining drugs to the pharmacy. According to post-hoc test, this significant difference was related to households that kept the remaining drugs after treatment of an illness (p-value=0.01).

Table 5. Difference between the average numbers of medicines with irrational use based on the type of insurance in Shiraz households in 2019

Type of Household's Insurance	Number of Households	Average Irrational Consumption	Standard Deviation	
Social Security	95	9.87	7.77	**P-value ≤ 0.442**
Healthcare Insurance (Health Services)	42	7.8	7.36	
Armed Forces	8	7.75	5.47	
Other	9	7.22	10.08	
No Insurance	2	4	2.82	

Pearson correlation test (correlation) showed a direct and significant positive relationship between irrational drug use and the number of drug items in each household (value-p<0.001 and R=0.91). This relationship showed that a larger number of household drug items directly correlated with higher irrational use.

The results of t-test also showed that there was no significant difference between the average use of irrational drugs based on variables, such as having or not having a family doctor, occupation of the head of household, the presence or absence of a family member in the healthcare system, old age, and the presence or absence of a person with chronic illness in the family.

4. Discussion

The findings showed that in Shiraz, an average of 12.45 drug items were kept in each household. Pharmaceutical literacy defined as the knowledge of individuals regarding the used cases of medicine in the households was 87.38%. Households received 71.80% of their drugs visiting a physician, and 89.21% of the drugs were stored in proper conditions. 73.9% of the drugs stored by the households were not expired. Research showed that 1944 drug items were available in the households, 542 items (27.9%) were rationally used, and 1402 items (72.1%) were irrationally used or stored.

As the study results indicated, 72.1% of the drugs available in households were used or stored irrationally. A study in India in 2016 showed that 38% of households stored drugs at home (11) and the result of a same study in Turkey (2015) showed it to be 72% (12). Two studies in Pakistan in (2019) and Turkey in (2020) showed drug stocking in 100% of households (13, 14). A mean of 2.94 medicines per household were observed in 900 households visited with 2,648 of total medicines found (15, 16).

The results of this study were consistent with the findings of research conducted by Ershadpour (2019) and Moses Ocan (2014)(7, 15) in Uganda, where (76%) of the respondents used drugs without medical consultation. The 'leftover' medicines were disposed by giving to other sick members (33%), thrown away (10.8%), and returned to the health facility (0.8%) (15).

The findings also showed that among the available medicinal categories, drugs related to cancer at 80% and heart disease at 75.2% had the highest rational use, and skin drugs at 100% and antibiotics at 91.7% had the highest irrational use. In the study by Hussain (2019), painkillers had the highest irrational use with antibiotics following (14). The study of Tomas (2017) showed that over-the-counter antibiotics were a major issue (18). According to a contrasting study in Romania (2019), 82.3% of the respondents believed that irrational use of antibiotics had a negative effect on them (19). As shown in the study of Nias et al. (2018) in Shiraz, approximately 27% of people when faced with simple diseases, such as colds, self-medicate and buy medicine without a prescription (20). The highest percentage of irrational use was related to drugs received due to the recommendation of others (97.8%) and through direct referral to the pharmacy (96.6%), and the lowest amount referred to the drugs prescribed by the doctor. The study in Qatar showed that it was less common for participants to use other people's recommendations to use drugs and they sought more information from doctors (21). Evidence showed that even in the case of drugs prescribed by a doctor, irrational use was still present. Significant differences were observed between irrational drug use and household measures regarding remaining drugs, including storing at home (77.6%), taking them back to the drugstore (3.2%), discarding (19.2%) and using all the medication (none remaining). Constantino's article (2020) showed that 66.7% of medicine at home ended up in the trash (13). The Akici (2017) study showed that 70.5% of patients discontinued medication earlier than scheduled (16). Our results showed that the existence of a larger number of drugs at home significantly increased their irrational use.

Illiterate people have a higher rate of irrational use. 70% of people who are drug literate and 87.3% of people who are not drug literate have used drugs irrationally. Akici's study (2017) showed that 70.5% of patients do not have enough knowledge and awareness about the use of drugs (16). A study in Romania (2019) showed the opposite, indicating that irrational drug use was less common (19).

The presence or absence of a healthcare system member in the household did not affect the average number of irrational household medications. Contrasting this study, Wondimu et al. found that families with a member working in health centers had more medicine stored at home;

therefore, irrational consumption was more probable (22).

Findings indicated that there was no significant difference between the average numbers of drugs with irrational use based on the level of literacy of parents. In contrast, Akici has shown that gender, age, literacy level and social class affect people's medicinal information and beliefs. In other words, it stated that a person's literacy and occupation had an impact on a person's medicinal information. Patients' knowledge and attitudes about drugs were far from rational (16).

4. Conclusion

Based on the findings of the research, it was indicated that in most households, drugs have been stored irrationally. Naturally, in families with chronic disease, it is necessary to keep a small amount of the drugs in favorable conditions for the disease. Most households are aware of the uses of the drugs and know what each drug can be used for. This can be one of the reasons why households attempt to store and use drugs irrationally. One of the available solutions to prevent the storage of drugs in households is to fully use prescribed drugs and not receive over-the-counter drugs from pharmacies. The diversity of drugs stored in households indicates the lack of a proper and coherent culture for the use and prescription of drugs among the citizens of Shiraz and the medical community. We suggest that the healthcare system and relevant authorities improve the pattern of drug use as well as its prescription through more detailed educational planning. Considering the importance of having a family doctor to enhance the culture of drug use in the community, the adoption of appropriate and more effective solutions and policies

by the authorities is necessary. Education with a focus on correct prescription of drugs, principles of prescription and attention to medical indication, as well as changing the attitude towards correct use of drugs in individuals and improving the performance of the healthcare system, management and supervision in drug budget is essential. More oversight and the application of more strict rules for pharmacies and the ban on over-the-counter medications can go a long way toward resolving the issue of self-medication. Increasing public awareness on how to use and maintain drugs can prevent further loss.

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