

# A Study of Antibiotics Self-Medication at Primary Health Care Centers in Shiraz, Southern Iran

Mehrdad Askarian<sup>1</sup>,  
Mohsen Hosseingholizadeh  
Mahani<sup>2</sup>,  
Mina Danaei<sup>3</sup>,  
Mohsen Momeni<sup>2</sup>

<sup>1</sup>Department of Community  
Medicine, Medicinal & Natural Products  
Chemistry Research Center,  
Shiraz University of Medical Sciences,  
Shiraz, Iran;

<sup>2</sup>Student Research Center,  
Shiraz University of Medical Sciences,  
Shiraz, Iran;

<sup>3</sup>Department of Community Medicine,  
Shiraz University of Medical Sciences,  
Shiraz, Iran

## Correspondence:

Mehrdad Askarian, M.D., M.P.H.,  
Professor of Community Medicine,  
Department of Community Medicine,  
Shiraz University of Medical Sciences,  
P. O. Box: 71345-1737, Shiraz, Iran

**Tel:** +98-917-1125577

**Fax:** +98-711-2354431

**Email:** askariam@sums.ac.ir

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## Abstract

**Background:** Nowadays, self-medication of therapeutic agents is of global concern particularly in developing and underdeveloped countries. Some studies conducted in Iran showed that the frequency of self-medication was significant.

**Objective:** This research was conducted to estimate the prevalence of arbitrary use of antibiotics in Shiraz community with special interest in its determinant factors.

**Methods:** This cross-sectional study was conducted in Shiraz, in 2009. Approximately 710 out of all patients referred to all health care centers in Shiraz were selected to fill out a questionnaire containing 23 questions divided into two parts. The frequency of self-medication according to demographic factors was described and the association between independent variables and self-medication was analyzed.

**Results:** The frequency of self-medication in this study was 44.5% and the request to prescribe antibiotics by the patients was 53.5%. Amoxicillin was the most widely used drug by the participants. There was a significant association between age and gender with self-medication. The frequent cause for self-medication was common cold. Approximately, 74.4% of the participants reported their previous experience as the main reason for self-medication.

**Conclusion:** The results of this survey demonstrated the high frequency of self-medication in Shiraz. Socio-cultural determinants are the etiologic factors for self-medication. Policy makers are recommended to provide community-wide educational programs to make people aware about the adverse effects of self-medication. There was a significant association between age, gender and education with self-medication and governments could pay more attention to these factors for designing the interventional programs.

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**Keywords:** Self-medication; Antibiotics; Prevalence; Iran

## Introduction

Nowadays, self-medication of therapeutic agents is a global concern particularly in developing and underdeveloped countries.<sup>1</sup> Self-medication with antibiotics is defined as the use of antibiotics to treat disorders without physicians' prescription and clinical indication. The reuse of prescribed drugs for

recurrent sign and symptoms and chronic disorders is also included in this definition.<sup>1,2</sup> Improper and incomplete use of drugs can affect the community as well as individuals. Adverse effects of antibiotics and allergic reactions are very common and might threaten the patient's life. Self-medication in infectious diseases can increase the antibiotic resistance and its following complications.<sup>2-4</sup>

Poverty and lack of insurance are the two main factors associated with self-medication, prominently in the low income countries. Many diagnostic and therapeutic procedures have dramatic costs and the price of many legal drugs is extremely high, leading to the patients' self-medication.<sup>5,6</sup> Physical access to health care services and the patient's residence (urban or rural) are important in both developed and developing countries.<sup>6,7</sup>

Generally, some patients administer the previously-effective and acceptable prescribed drugs for their new disease with the same sign and symptoms or their recurrent or chronic diseases. The drugs prescribed for the previous disease and left out in the household are the common source for many self-medication therapies.<sup>3, 8, 9</sup> Lack of regulation and enforcement, availability of over-the-counter antibiotics, and high prevalence of communicable and infectious diseases are noticeable in developing countries.<sup>1</sup>

Few studies have been conducted in Iran on this important issue, showing that the frequency of self-medication is significant.<sup>9-12</sup> Analgesic and antibiotic drugs were the most frequently used drugs requested by patients as over-the-counter drug in pharmacies, respectively.<sup>9, 12</sup> To the best of our knowledge, there is no study carried out in Shiraz about the frequency of self-administration of antibiotics and its determinants especially as a population-based study. This research was conducted to estimate the prevalence of arbitrary use of antibiotics in Shiraz community focusing on its determinant factors.

## Materials and Methods

This cross-sectional study was conducted in Shiraz, 2009 where there are 71 government and private healthcare centers. Based on the sample size formula, 710 out of all patients referred to all health care centers in Shiraz were selected during one month. The first ten patients in each center were selected using convenience sampling to answer the questionnaires. Oral informed consent was obtained from the participants. If the patient did not accept to participate in this study, we selected the next patient until our sample size was completed. Patients older than 18 years old who were able to visit the physician independently and use the drugs were included in this study. Disabled or dependent patients were excluded. The authors helped the participants with low literacy to fill out the questionnaire.

The self-reported questionnaire was designed by authors. The validity of the questionnaire was checked by expert opinion. Some expert professors in medical field and some expert

professors in pharmacotherapy were consulted to improve the validity of the questionnaire. The reliability analysis ( $\alpha$ -Cronbach= 0.8) showed that the questionnaire was reliable. The questionnaire contained 23 questions divided into two parts. Firstly, the participants were asked about their demographic characteristics (age, gender, marital status, job, family number, family income, and their level of education). The participants' educational level considering the number of years that they spent in education (<12 year, 12 year, 13-16 year,  $\geq$ 17 year) was categorized. Moreover, if the participants', their family members' or their near friends' jobs were health-related (health care workers, nurses, etc.), they were asked in three separate questions. The status of the patient's insurance was asked. If the participants answered yes to the questions about self-medication or requested the doctors to prescribe antibiotics for them, the second part of the questionnaire was filled out.

The kind of illness (diarrhea, common cold, urinary tract infection, toothache, etc.), the person suggesting the participants to administer antibiotics (family members, friends, pharmacists, etc.), the resource of drug provision (drugstore, family members, friends, storage drugs at home, etc.), the cause of self-medication (distant location, lack of willingness to pay, inability to pay, crowded clinics, etc.), the name of antibiotics used, the source of the information about the method of antibiotic consumption (family members, friends, pharmacists, the brochure of the drug, etc.), the type of antibiotics (pill, capsule, syrup, injection, etc.), and the period that the participants continued their self-medication (until the cure of illness and recovery) were all included in the second part of the questionnaire. The patients' request from physicians to prescribe a specific antibiotic and its determinants were studied in this survey.

The participants that did not answer more than two questions were excluded from the study. The frequency of self-medication according to demographic factors was described and the association between independent variables and self-medication was analyzed using Chi-squared test. To determine the predictors of self-medication, multivariable logistic regression analyses were performed using SPSS, version 15. The statistical significance level was considered as less than 0.05.

## Results

Seven hundred and ten patients participated in this study. Of self-completed questionnaires, 667 had eligible criteria for analyzing the data (response rate: 93.9%). The frequency of self-medication in

the previous year of the study was 44.5% (297 subjects) among the participants and the request to prescribe antibiotics by the patients was 53.5% (349 cases).

Table 1 shows the association between demographic factors and other independent variables in this study and the self-medication behavior. Among different independent variables, there was only a significant association between age and gender with self-medication. Age was significantly related to the patients' request for antibiotics to be prescribed by the physician but other variables did not reveal any significant correlation.

The frequent causes for self-medication were common cold (62.8%), sore throat (45.1%), toothache (22.9%), rhinorrhea (16.5%), urinary tract infection (14.5%), otitis media (7.4%), diarrhea (4.7%) and other disorders (10.1%), respectively.

Participants who reported their previous experience as the main reason for self-medication comprised 74.4% of all. Some of the participants (11.7%) consulted with their family members or friends and 8% of them with pharmacies suggesting them to administer antibiotics. Overall, 213 (71.7%) of the participants prepared their drug from drugstores. Approximately, 107 cases (36%) took the medication from the storage of drugs at home and 10 (3.3%) patients prepared drugs from their family and friends. The participants

explained that their self-medication behavior was due to previous experience on the efficacy of treatment (41%), inability to access the physician (30.9%), inability to pay for the expenses (21.8%), and lack of willingness to pay (16%).

216 participants (72.5%) reported taking antibiotics until recovery and 81(27.5%) cases reported continuous treatment until the completion of antibiotics therapy. Amoxicillin was the most widely used drug by the participants (63.7%). Ampicillin (19.9%), cephalexin (19%), penicillin (16.7%), cotrimoxazole (6.9%), and ciprofloxacin (5.2%) were the most frequently used drugs by the participants, respectively.

The results from logistic regression analysis did not show any statistically significant association between independent variables and self-medication of antibiotics.

## Discussion

The results of this survey demonstrated the high frequency (45.5%) of self-medication in Shiraz. The results of the studies in Iran and other developing countries including southern and eastern Mediterranean countries are consistent with those of this study.<sup>10-14</sup> Compared to other countries, the frequency of self-medication in this country is high and noticeable. In European countries, it was lower than that in Iran and the prevalence range was

**Table 1:** The association between independent variables and self-medication and request of antibiotics from physicians

	Self-medication			Request of antibiotics from physician		
	Yes N (%)	No N (%)	P value	Yes N (%)	No N (%)	P value
Age (years)			0.033			0.007
18-23	43(45.7)	51(54.3)		41(45.1)	50(54.9)	
24-29	92(52.3)	84(47.7)		101(59.1)	70(40.9)	
30-35	49(38.9)	77(61.1)		66(53.2)	58(46.8)	
36-41	38(51.4)	36(48.6)		50(67.6)	24(32.4)	
>41	63(37.7)	104(62.3)		75(46.3)	87(53.7)	
Gender			0.025			0.135
Female	138(40.1)	206(59.9)		187(56.3)	145(43.7)	
Male	156(48.8)	164(51.2)		160(50.5)	157(49.5)	
Marital status			0.343			0.862
Married	206(43.7)	265(56.3)		253(54.4)		
Single	83(45.9)	98(54.1)		88(51.2)	84(48.8)	
Divorced	2(100)	0(0.0)		1(50)	1(50)	
Widow	2(66.7)	1(33.3)		2(66.7)	1(33.3)	
Job			0.8			0.422
Related to medicine	21(45.7)	25(54.3)		22(48.9)	23(51.1)	
Unrelated to medicine	237(47.4)	263(52.6)		269(55.1)	219(44.9)	
Education (years)			0.074			0.887
<12	52(40.3)	77(59.7)		67(53.6)	58(46.4)	
12	111(41.1)	159(58.9)		138(52.3)	126(47.7)	
13-16	110(52.6)	99(47.4)		114(55.3)	92(44.7)	
≥44	11(36.7)	19(63.3)		17(56.7)	13(43.3)	
Health Insurance			0.605			0.887
Yes	259(44.3)	326(55.7)		310(53.9)	265(46.1)	
No	38(46.3)	44(53.7)		39(50.6)	38(49.4)	

0.1-37% in Cyprus and Lebanon, respectively.<sup>13</sup>

According to this study, more than two thirds of the participants provided their drug from drugstores. Lack of strict rules and regulations on drug distribution and insufficient monitoring and evaluation can account for the existing status. The strong regulatory systems with penalties are needed to reduce this problem. Pharmacists should be prevented from delivering non-prescribed drugs to the clients. Previously prescribed antibiotics stored at homes were the other main resource. These results were in the same line as other studies in European, American and Asian countries.<sup>3, 8</sup> Other studies in Iran showed that drug storage was frequent among Iranians.<sup>12</sup> Perhaps, the dose of antibiotics prescribed by physicians was more than that actually needed. The patients did not complete their treatment course, or the patients referred to more than one physician for their symptoms. Therefore, the drugs are stored in their homes. But in some European countries with convenient access to antibiotics, self-medication is less frequent than in Iran. Socio-cultural determinants are the etiologic factors for self-medication.<sup>3</sup>

In this study, approximately half of the participants prescribed antibiotics for themselves according to their diagnosis. These data showed that the patients did not have enough knowledge about the adverse effects of antibiotics and the indication for antibiotic therapies. Governments take measures to hold training programs to change the patient's knowledge, attitude, belief and practice. Access to the physician was the other important factor associated with self-medication. Some studies showed the relationship between the distance from health care center and self-medication.<sup>6, 7</sup>

Upper respiratory tract symptoms including common cold, sore throat, and rhinorrhea were the most frequent reasons for self-medication in this study and amoxicillin and ampicillin were the most frequently prescribed drugs. Other studies demonstrated similar results and respiratory symptoms were the most frequent reasons for antibiotic administration.<sup>13</sup> Researchers should take action to improve the patients' knowledge about viral respiratory symptoms and signs, the proper use of antibiotics, and the antibiotic side-effects.

There was a significant association between age, gender and education with self-medication. These findings are similar to those of other studies conducted in European countries and Jordan, indicating that the high level of education and younger ages were associated with self-medication.<sup>8, 13</sup> Probably, the educated patients had a higher level of self-esteem and elder people were more cautious. Other studies demonstrated

consistent and inconsistent information.<sup>15-18</sup>

The results of the regression analysis in this study did not show any significant relationship between these factors and self-medication. There is a need to conduct further studies with more independent variables to assess self-medication determinants. Policy makers should hold community-wide educational programs to make people aware about the adverse effects of self-medication. This study was self-reported; so many factors including social desirability bias or recall bias might have confounded the results. Further observational studies are suggested to solve this problem.

## Conclusion

This study dealt with non-recommended use of antibiotics through self-medication in Shiraz. This situation may reflect the trends in Iran. The results of this study highlight the importance of community-wide and professional education programs to improve the misuse of antibiotics. Policymakers should make more stringent laws and have more control over the supply of drugs in pharmacies.

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**Conflict of Interest:** None declared

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