

A survey on medicine consumption in the mega cities of Iran

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Abstract

Background: Studying medicine consumption is a significant parameter in the estimation of the health care system of a country. This study evaluates the amount of medicine consumption in the mega cities of Iran and identifies individual factors that influence this consumption.

Methods: In this study, a cross-sectional survey of public medicine consumption was directed at random samples that counted 628 persons of fifteen years and older in several public places in the mega cities of Iran. The data were collected through questionnaires administered at the public vaccination department of the Pasteur Institute of Iran in Tehran, and in other public places in Esfahan. A multiple regression model was utilized to analyze individual information.

Results: Our results showed that 59.4% of the respondents were current medicine consumers. Women used medicines less frequently. The rates of medicine consumption among the surveyed population, for daily and weekly-monthly consumption, were 21.8% and 37.6% respectively. In Iran, it emerged that 52.4% of the respondents obtained their medicines, such as acetaminophen antibiotics, and pain-killers, without a prescription.

Conclusions: the study clearly showed that more than 53% of the medicine consuming persons undertake self-treatment. Three factors *gender*, *age* and *income level* are the main factors influencing medicines consumed without physicians' prescription in the mega cities of Iran.

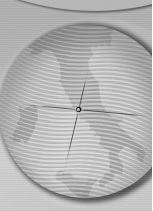
Key words: medicine consumption, Iran

Introduction

Increasing medicine consumption in the world has caused the appearance of new problems in human health. Resistance to different antibiotics [1], different known and unknown long-term side-effects of pain-killer medicines [2] and addiction to them [3] are some of the famous challenges for human health. To better understand these problems, different studies about medicine consumption have been done in the world (especially in Europe) on factors like psychotropic medication consumption patterns in the UK [4], the amount of antibiotic consumption in Russia and eastern European countries [5], the effect of individual characters on medicine consumption in Poland [6], and study effects of modernization (living close to high-ways and rail-roads) on the rate of daily medicine consumption in Austria [7].

Alternative solutions, also, have been proposed to control medicine consumption; for example regarding antibiotics, with attention to identifying a very small number of new antibiotics, physicians have to introduce policies to reduce the emergence of resistant bacteria [8], or regarding pain-killers, about which most of their consumers have no information about possible side-effects. Increasing the provision of information to people will be helpful to effectively reduce pain-killer consumption [9].

Iran is a developing country with a high consumption of pharmacological compounds (second place after China in Asia and twentieth place in the world for medicine consumption, reported by health ministry of Iran, 2007) [10]. Iranian people usually use medicine without a prescription [11,12]. Also, one should note that in



Iran, 10-20% of annual hospitalization rate results from medicine intoxication [11]. According to these reports, the best solution to solve these challenges is identifying factors that influence the rate of medicine consumption without a prescription; and finally using these data to plan a national program to improve this profile among the Iranian population [12]. Despite the importance of this subject, there is no published report about the type of consumed medicines nor the factors that effectively influence medicine consumption in Iran. In this article, we have summarized, for first time, the results of a survey on medicine consumption behaviors in Iranian mega cities (generally, about 23% of the urban population of Iran reside in Tehran and Esfahan [13]), including current medicine status and the types consumed. We also studied the effects of various factors that are associated with medicine consumption without a prescription in Iran.

Methods

The survey of public views on medicine consumption was directed at random samples among 628 persons of fifteen years and older in several public places in the mega cities of Iran. The data were collected with questionnaires administered at the public vaccination department of the Pasteur institute of Iran in Tehran, at the public bus stations and in the public restaurants in Esfahan as face to face interviews between the period of October 2006 to March 2008 (N = 628). Since it is the first general report about medicine consumption, for calculating the sample size, a primary survey was carried out according to the replication statement of STROBE (the number of responders in the primary survey was 100 persons) [14]. Questions were included which were the same as the final survey. In the primary survey, 60% of the respondents were current medicine consumers. According to this result, the amount of needed responders was calculated with confidence limits of 87.5% in distance of 3% (we needed minimum 622 persons) [15]. For designing the questionnaire, we carried out brain storming and applied the methods that were used in similar studies [6]. The respondents had to answer: (1) whether s/he was a current medicine consumer or not, and, if yes, the frequency of consumption of pharmacological compounds per month (2), monthly expenses for purchase of medicines (in Rials) and (3) whether s/he obtained them with a prescription obtained from a physician or not.

We used a model to consider medicine consumption with respect to five individual factors: *age, gender, education level, employment*

and income level. The amounts of *income level* and *poverty* line were maintained based on Iran's Ministry of Welfare and Social Security reports [16]. To measure the effect of individual factors on rate of respondents' medicine consumption, we applied a coding system, an example of which is indicated below:

- Whether the respondent was a current medicine consumer and the number of consumption of pharmacological compounds per month:

If Yes (code 5= daily, code 4= weekly, code 3= monthly, code 2= variable) and if No= code 1,

- Monthly expenses for purchase of medicines (amount in Rials)

(Code 1= More than 10,000,000 Rials [~USD 100], Code 2= between 500,000 to 10,000,000 Rials [~USD 5-100], Code 3= Less 500,000 Rials [~USD 5])

(Generally, based on the cost of medicine in Iran, there are three medicine classes: expensive medicines [specific medicines like hormones which are not supported by government, their cost are more than 10,000,000 Rials per month (10000 Rials= 1\$ USA)], medium-cost medicines [this group are either expensive medicines whose costs are partially paid for by Government like cancer medicines, or those which really have medium cost for a family like those used to treat diabetes, blood pressure with cost between 500,000 to 10,000,000 Rials in month], and finally cheap medicines [popular medicines which are in the low cost margin, like pain-killers, antibiotics with cost less 500,000 Rials in month]).

- Whether the people used their medicines with prescription obtained from a physician (code 1) or not (code 2 was used).

Analysis of data

Most of the analysis presented here are descriptive survey of data and were analyzed to find relationships between variables indicating their effects on rate of medicine consumption. For creating a model, the effects of age, gender, career, income level and education level were considered as influencing factors on the rate of medicine consumption without a prescription. Firstly, these factors were identified and the association between medicine consumption status and socio-demographic variables was determined as shown in Table 1. For this investigation, a regression model was applied according to the current calculation method [15]. Also, an F test was done in levels of 95% and 99% F distribution to declare whether individual parameters were related to medicine consumption or not [15].

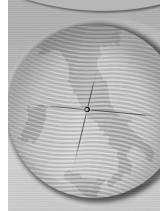


Table 1. Percentage of medicine consumption among sampled people in the mega cities of Iran.

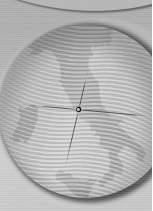
	Total Medicine Consumed (in %)	Consumption Rate (in %)		Monthly Medicine Cost (% less than 50,000 Rials)	Prescribed Medicines (in %)
		Daily	Weekly or Monthly		
Total	373 (59.4%)	137 (21.8%)	236 (37.6%)	287 (77.2%)	178 (47.6%)
Age 15-40 (411 people)	279 (68%)	111 (27%)	168 (41%)	243 (87%)	42 (15%)
Age 143 41- 80 (143 people)	107 (75%)	53 (37%)	54 (38%)	79 (74%)	36 (34%)
Gender 414 Female (414 people)	269 (65%)	108 (26%)	161 (39%)	137 (51%)	67 (25%)
Gender Male (214 people)	118 (55%)	30 (14%)	88 (41%)	58 (49%)	30 (25%)
Education level Non-college (290 people)	186 (64%)	70 (24%)	116 (40%)	132 (71%)	43 (23%)
Education level College (338 people)	196 (58%)	81 (24%)	115 (34%)	159 (81%)	76 (39%)
Employment Employed (332 people)	206 (62%)	67 (20%)	139 (42%)	138 (67%)	58 (28%)
Employment Unemployed (296 people)	189 (64%)	74 (25%)	115 (39%)	151 (80%)	75 (40%)
The rate of salary Above poverty line (347 people)	198 (57%)	73 (21%)	125 (36%)	158 (80%)	69 (35%)
The rate of salary Below poverty line (281 people)	222 (79%)	67 (24%)	155 (55%)	166 (75%)	47 (21%)

Results and discussion

The factors *gender*, *age* and *income level* strongly related to medicine consumption without a prescription among residents of mega cities in Iran.

Medicines are usually chemical components used for treating diseases, by slowing their progression or preventing their appearance as well as relieve symptoms. That's why specialist and physicians prescribe medicine to patients. Actually some of medicines have improved the

therapeutic approach to several diseases, for example antiulcer agents have changed a hard disease in to a normal disease requiring only the consumption of a few pills per day. Although they have intrinsic benefits for treating diseases, medicines have caused a new variety of negative impacts on human life. Among these problems, the increasing medicine consumption in the world has impacted negatively not only on human health but also on the environment [17]. The



main aim of this study was to evaluate the rate of medicine consumption in the mega cities of Iran and to establish which parameters affect its non-prescribed consumption in Iran.

The results from the survey showed that while more than 59% surveyed persons used medicine, only 46.7% of these consumed prescribed medicines. Among users, only 15% of persons aged between 15 to 40 had a physicians' prescription to use medicine, while this rate was 34% among respondents aged between 41 to 80 (Table 1). The results showed that in comparison to the respondents aged between 15 to 40 and 40-81 years old, those over 40 years old consulted physicians about their health problems significantly more than those below 40 (Table 1). This may indicate that the older age group is more cautious and reasonable about medicine consumption in contrast to younger individuals. A regression analysis was applied to determine whether age is an individual parameter effecting the rate of medicine consumption without prescription in the mega cities of Iran or not (Table 2). In fact, the result showed that age is an effective parameter for estimating medicine consumption without prescription in Iran. It means that the older individuals in Iran are more careful than youth regarding medicine consumption. Not only in Iran, but also in Europe age is an important parameter for estimating medicine consumption. One study was performed in Austria to investigate whether living near the roads or railways was associated with medical prescriptions or not. The results of the survey clearly demonstrated the affect of road or rail exposure in increasing medicine consumption in some age groups [7].

Regarding *gender*, medicine consumption rate of women was the same as for men interestingly; only 25% of them got a prescription for medicine consumption. But women also had a different pattern of medicine consumption in comparison to men; they used medicine daily, two times more than men (Table 1). The result of the regression analysis also showed that *gender* is an effective individual factor for medicine consumption without prescription among residents of mega cities in Iran (Table 2).

Among persons with a college degree, the amount of consumption of administered medicines was 39%, while only 23% of persons without a college degree had a physicians' prescription (Table 1). It means that educated people rely less on self-treatment and are more careful about their health. One study, about the rate of the prevalence of gastrointestinal (GI) symptoms in province of Tehran, Iran, clearly demonstrated

that, when comparing college and non-college degree people, those with a college degree had less GI symptoms because they cared more about their health [18]. However, the regression analysis did not demonstrate any effect of education level on medicine consumption without a prescription in the mega cities of Iran (Table 2).

Surprisingly, the rate of medicine consumption with a physicians' prescription among employed persons was 28%, while this rate among unemployed individuals was 40%. But the regression analysis showed that there was no relationship between medicine consumption rate and employment in Iran.

Finally, 35% of respondents with a salary above poverty line obtained a physicians' prescription to consume their medicines, while only 21% of persons with a salary below poverty line had a physicians' prescription. The regression analysis also showed that the rate of prescribed consumed medicine is affected by the income level of individuals in Iran (Table 2). It means that persons with an income level above the poverty line are more careful about their health, in comparison to persons with an income level below the poverty line (Table 1). This result could also be a reflection of the high costs of physician prescriptions in Iran.

Pain-killers and antibiotics are consumed popularly among Iranian mega-cities residents

Based on our data obtained in the survey, it appeared that about 33.4% of total medicine consumption was related to pain killers (analgesics) and anti-headache drugs (antipyretics) like acetaminophen, while the consumption of antibiotics was 13.5%, blood pressure medications 5.4% and multivitamins 3.9%. It means that consuming pain-killers and antibiotics was very popular among the respondents, estimated at about one in every three individuals. Since about 47% of the consumed medicines were antibiotics and pain-killers, these have a cost of less than 50000 Rials (USD 5.5) per month for the users (Table 1), and perhaps their low cost is one of the influencing factors for a high rate of consumed non-prescribed medicines. This hypothesis could be similar to the results of a study in Europe (Hungary), confirming the relationship between price and amount of non-prescription antibiotic use [19]. According to the achieved results, the type of medicine consumed by respondents showed that the consumption of pain killers (analgesics) and anti-headache drugs (antipyretics) in Iran is two times more than their consumption in a developed country like

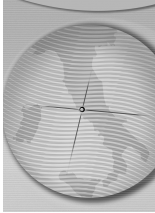


Table 2. The multiple regression model of medicine consumption for people's mega cities of Iran.

<i>Iran mega cities model</i>	<i>Unstandardized coefficients</i>		<i>95% Confidence</i>		<i>standardized coefficients B</i>	<i>Significant</i>
	<i>B</i>	<i>Standard error</i>	<i>Interval</i>	<i>t</i>		
<i>Equation Constant</i>	1.819	0.3083		5.901		< 0.0001**
<i>Gender</i>	-0.3350	0.09721	-0.5523 to -0.1176	3.021	0.2325	0.0026**
<i>Education level</i>	-0.006013	0.09721	-0.1966 to 0.1845	0.06186	0.0860	0.9507
<i>Employment</i>	0.05343	0.07730	-0.09808 to 0.2049	0.6912	0.2307	n.s.
<i>Age</i>	0.5704	0.1137	0.3476 to 0.7932	5.018	0.0414	< 0.0001**
<i>Income</i>	-0.3923	0.1195	-0.6265 to -0.1581	3.283	0.0413	0.0011**

F (6, 628) = 9.5545, p < 0.0001**

n.s.= it means that this parameter in 95% confidence does not show any effect on medicine consumption
 *= it means that this parameter in 95% confidence shows effect on medicine consumption
 **= it means that this parameter in 95% confidence does have effect on medicine consumption

Australia (33.4% in Iran, 15.4% in Australia) [20]. This is alarming for the health care system in Iran as this supports an ever increasing medicine consumption rate, it appears.

Conclusions

In conclusion, the results from this survey of individuals demonstrated that more than 53% of the persons consumed medicine through self-treatment. This non prescribed consumption rate among the older population, those highly educated and above the poverty line is less than in youths, those without college degrees and below the poverty line, respectively. Pain-killers and antibiotics are consumed popularly among Iranian mega-city residents and three factors *gender*, *age* and *income level* are principally linked to the consumption of these medicines without a physicians' prescription (Table 2).

Of course there are some limitations to our study such as interviewing individuals from small

cities and villages, the neglect of the diversity of careers and also of individuals' problems which all increase medicine consumption among the respondents.

According to some research performed in developed countries, and the suggestions proposed to decrease amount of medicine consumption, the alternative social solutions are proposed below:

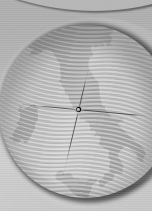
1. Increasing the price of antibiotics and pain killers in non-prescription sales and also strict law enforcement for reducing the sale of non-prescribed medicine (especially antibiotics) [19]
2. Increasing knowledge in the younger generations of Iran about the intractable side-effects of the consumption of medicines on their health [9, 21]
3. Encouraging employees to visit physicians monthly, making facilities for doing so and increasing the information made available about the risks and side-effects of self-treatment.

References

1) Japoni A, Alborzi A, Kalani M, Nasiri J, Hayati M, Farshad S. Susceptibility patterns and cross-resistance of antibiotics against *Pseudomonas aeruginosa* isolated from burn patients in the South of Iran. *Burns* 2000; 32(3): 343-7.

2) News-medical.net. Nitric oxide in blood and side-effects of painkillers. Available from: www.news-medical.net. [Accessed 13 September 2006].

3) DuPont RL. Addiction in Medicine. *Trans Am Clin Climatol Assoc* 2008;119(1):227-41.



- 4) Ohayon M. Psychotropic Medication Consumption Patterns in the UK General Population. *J Clin Epidemiol* 1998;51(3):273-83.
- 5) Strachounski L, Bedenkov A, Hryniewicz W, Krcmery V, Ludwig E, Semenov V. The usage of antibiotics in Russia and some countries in Eastern Europe. *Int J Antimicrob Agents* 2001; 18(3): 283-6.
- 6) Stelmach W, Kaczmarczyk-Chałas K, Mianowany M, Drygas W. The impact of income and education on medicine consumption in a representative sample of Lodz inhabitants between the ages of 18-64 years. *Przegląd lekarsk* 2004;61(5):498-502.
- 7) Rudisser J, Lercher P, Heller A. Traffic exposure and medication- a GIS based study on prescription of medicines in the Tyrolean Wipptal. *Ital J Public Health* 2008; 5(4): 261-7.
- 8) Naaber P. Antibiotic usage and resistance — trends in Estonian University Hospitals. *Int J Antimicrob Agents* 2000;16(3): 309-15.
- 9) Wilcox CM, Cryer B, Triadafilopoulos G. Patterns of use and public perception of over-the-counter pain relievers: focus on nonsteroidal antiinflammatory drugs. *J Rheumatol* 2005; 32(11):2218-24.
- 10) Mehrnews.com. Iranian association of saints. Critical situation of medicine consumption as intractably in Iran. Available from: www.mehrnews.com. [Accessed: 16 November 2007].
- 11) Salamatnews.com. Iranian association of pharmacists. Antibiotics and its consumption in Iran. Available from: www.salamatnews.com. [Accessed: 14 July 2007].
- 12) Mehrnews.com. Iranian association of liver surgeons. Consuming acetaminophens as intractably in Iran. Available from: www.mehrnews.com. [Accessed: 6 November 2007].
- 13) Aftabnews.com. Statistics national center of Iran. Report of enumeration of Iranian people in 2006. Available from: www.aftabnews.com. [Accessed: 6 November 2007].
- 14) Little J, Higgins PT, Ioannidis J, Moher D, Gagnon F, et al. Strengthening the Reporting of Genetic Association Studies (STREGA)— An Extension of the STROBE Statement. *Ital J Public Health* 2009; 6(3):238-54.
- 15) Alder HL, Rossler EB. Introduction to probability and statistics. New York: Publisher W H Freeman & Co, 1972.
- 16) SNA.com. Iran's Ministry of Welfare and Social Security, Iran's Ministry of Welfare and Social Security policies still based on charity: Social welfare researcher announcing the increasing subsidy escaping rate. Available from: <http://isna.ir/ISNA/>. [Accessed: 4 March 2008].
- 17) Folino-Gallo P, Ricciardi W. Why utilization of medicines is a public health interest. *Ital J Public Health* 2006; 3(1):5-6.
- 18) Pourhoseingholi A, Safaee A, Pourhoseingholi M, Moghimi-dehkordi B, Habibi M, Vahdei M, Zali M. prevalence and demographic risk factors of gastrointestinal symptoms in Tehran province. *Ital J Public Health* 2010; 7(1):42-6.
- 19) Matuz M, Benko R, Doro P, Hajd E, Soos G. Non-prescription antibiotic use in Hungary. *Pharmacy World & Science* 2007;29(6): 695-8.
- 20) Aihw.gov.au. Australian Institute of Health and Welfare. 2007 National Medicine Strategy Household Survey. Available from: www.aihw.gov.au/. [Accessed: April 2008].
- 21) Hustad TP, Courtney A, Heeler MR. An Emerging Model for Purchase and Consumption of Non-Prescription Drugs. *J of Consumer Affairs* 2004;13(1):86-98.