

1 ORIGINAL ARTICLE

2 Prescribing pattern and Drug indicators in Patients
3 Visited by General Practitioners and Specialists in
4 Ardabil City of Iran5 FIROUZ AMANI^{1*}, AFSHIN SHAKER², SOLTAN MOHAMAD SADEGH
6 MOHAMMADZADEH³

7 For author affiliations, see end of text.

8 Received May 27, 2012; Revised September 4, 2012; Accepted October 25, 2012

9 This paper is available online at <http://ijpt.tums.ac.ir>

10 ABSTRACT

11 Drug is an important and strategic commodity and a basic need of the people in all countries. The aim of
12 this study is to determine the drug use patterns and descriptive analysis of prescriptions of doctors in
13 Ardabil city of Iran. A retrospective study was carried out on 2000 randomly-selected prescriptions. Data
14 were obtained on demographics, prescribing indexes and analyzed by descriptive statistical methods by
15 SPSS software. Of the 2000 prescriptions, 822 (41%) and 1178 (59%) were for men and women,
16 respectively, by a female to male ratio of 1:0.69. The mean age of the patients was 31.6 ± 21.3 years,
17 ranging from one to 91. 1306 (65.3%) of all prescriptions were for general practitioners and the rest for
18 specialists. The average number of drugs per prescription was 3.58 ± 1.3 , ranging from 1 to 9 drugs.
19 Dexamethasone (219, 24.7%) was the most frequently-prescribed medicine. Results demonstrated that
20 the average number of drugs per prescription and the rate of prescribing injectable drugs were more than
21 world standards and it is necessary to reduce these indexes and irrational use of drugs through
22 interfering with patients' belief and physicians' attitudes.

23 **Keywords:** *Medicine, Utilization, Pattern, Ardabil, Iran*

24 Drug utilization research was defined by WHO in 25 1977 as “the marketing, distribution, prescription, and
26 use of drugs in a society, with special emphasis on the 27 resulting medical, social and economic Consequences”.
28 Epidemiology is defined as “the study of the 29 distribution and determinants of health-related states
30 and events in the population, and the application of this 31 study to control of health problems”. Drug utilization
32 research may also be divided into descriptive and 33 analytical studies. Drug utilization research is thus an
34 essential part of pharmaco-epidemiology as it describes 35 the extent, Nature and determinants of drug exposure.
36 Drug utilization research and pharmaco-epidemiology 37 may provide insights into the following aspects of drug
38 use and drug prescribing [1]. Medicine is an important 39 and strategic commodity and a basic need of the people
40 in all countries. Drug prescribing for older patients is 41 one of the main challenges because they are three times
42 more medications [2-3]. Medical and pharmaceutical
43 services are one the main and expensive needs of
44 people. These two specifications make them be so
45 significant that creation of a rational pattern in utilizing
46 medical and pharmaceutical resources is a national
47 necessity. According to current estimations, more than
48 300 million prescriptions are annually dispensed in Iran.
49 The average number of drugs per prescription, as
50 obtained from statistical analysis, was 3.26 in 2010,
51 showing a significant difference with world average
52 (near 1.5) [4-6]. Of these prescriptions, antibiotics,
53 injectable drugs, and corticosteroids, as the three most
54 important drug categories, are ordered for 54%, 44%,
55 and 32% of patients, respectively. Drug utilization
56 pattern is an important factor determining the
57 effectiveness of a health providing system. In Iran, most
58 of prescribed drugs are antibiotics, analgesics, and anti-
59 inflammatory drugs. Antibiotics are prescribed for 25%

Table 1. Indexes of drugs by the insurance organization and specialty

Specialty	Mean		SD		No. of prescriptions	
	Ta'min Ejtemaei	Khadamat Darmani	Ta'min Ejtemaei	Khadamat Darmani	Ta'min Ejtemaei	Khadamat Darmani
G.P	3.75	3.8	1.2	1.3	652	654
Neurologist	2.88	3.5	0.8	1.6	16	16
Gynecologist	2.61	2.6	1.1	1	56	47
Orthopedist	3.85	3.66	0.9	1.6	41	29
Internist	3.65	4.1	1.3	1.1	17	19
Pediatrician	2.78	3.11	0.9	1	41	38
Ophthalmologist	2.82	2.8	0.9	1	11	21
Psychiatrist	3.8	3.83	1.4	1.2	15	23
Dentist	2.86	2.68	1.2	1	35	23
Midwife	4.24	3.62	1.6	1.5	25	16
Others	3.2	3.19	1.5	1.7	91	114
Total	3.55	3.6	1.3	1.4	1000	1000

60 and 30% of patients in Europe and the U.S.,⁹⁹
61 respectively, but this number is always more than 50 in
62 Iran; nevertheless infectious diseases are not a major
63 health problem in Iran. The irrational use of drugs and
64 self-medication may result in many health problems for
65 patients, such as increasing the risk of adverse drug
66 reactions, late diagnosis and prolongation of illness,
67 patients' dissatisfaction, affecting patient-physician
68 relationship, and finally raising the cost of treatment [6-
69 8]. According to WHO statistics, Iran is among the 20
70 most drug-utilizing countries with secondary rank in
71 Asia after China. Annually, each Iranian person uses
72 339 drugs which is about twice the world standards,
73 leading to spend a large part of health resources for
74 procurement of drugs required. Antibiotics are the 4th
75 or 5th most prescribed drugs in Iran. Adding non-
76 prescription sold antibiotics will move this position
77 higher. Official statistics published by Ministry of
78 Health showed that the average number of medications
79 per prescription was more than 3 and it is now nearly
80 3.6, compared to less than two drugs per prescription of
81 world average. Drugs are the basis of nearly 75% of
82 treatments; therefore it is necessary to improve general
83 information about commonly-used medications,
84 especially the importance and indications of antibiotics,
85 corticosteroids, and injectable drugs [9]. Published
86 statistics in Iran showed that the rate of drug use growth
87 is higher than world and industrial countries such as the
88 U.S., U.K., Germany, France and Japan. The aim of this
89 study is to determine pattern of drug utilization in
90 patients visited by general practitioners and specialist in
91 Ardabil, Iran.

RESULTS

The average number of drugs prescribed for males
100 was 3.57 (SD = 1.3) and females 3.58 (SD = 1.3). In all
101 prescriptions, 822 (41%) and 1178 (59%) were for
102 males and females, respectively. Mean of the patients'
103 age was 31.6 (SD = 21.3) ranging from 1 to 91 years.
104 The average number of drugs per prescription, separated
105 by the insurance organization and specialty is presented
106 in Table 1. Number of drugs per prescription was
107 ranging from 1 to 9. In Ta'min Ejtemaei organization
108 prescriptions, midwives and gynecologists had the
109 maximum and minimum number of drugs per
110 prescription, respectively. Also, in Khadamat Darmani
111 prescriptions, internists and gynecologists
112 had the maximum and minimum number of drugs per
113 prescription, respectively. Of all 7158 prescribed drugs,
114 894 (12.5%) drugs were injectable and the rest were
115 other drug forms. Of all prescriptions, 890 had at least
116 one injectable drug, indicating that 44.7% of the
117 patients had received injectable drugs (Table 2). Of all
118 prescriptions, 544 (60.9%) have one injectable drug,
119 271 (30.3%) have two injectable drugs and 79 (8.8%)
120 have more than two injectable drugs. Between general
121 practitioners and orthopedists, injectable drugs were
122 more than others, with 59% and 4.9%, respectively.
123 Antibiotics, CNS and immune system drugs were the
124 most frequently-prescribed categories in patients;
125 52.8%, 33.1% and 30.4%, respectively (Table 3).

DISCUSSION

Studying Iran's drug utilization in recent ten years
128 showed that the mean growth of drug costs is annually
129 more than 25%. Ninety percent of subsidization of
130 drugs is allocated for imported drugs. In other words,
131 the mean growth of drug costs for the imported drugs is
132 more than 70%. In Iran, the cost of prescribed
133 antibiotics is more than 41% of first thirty commonly-
134 prescribed drugs. In this study, antibiotics and injectable

MATERIALS AND METHODS

This is a retrospective cross-sectional descriptive
135 study that has been done on 2000 prescriptions,
136 randomly selected from all archived prescriptions. The
137 selection is done by season in each insurance
138 organization. Information was analyzed by descriptive
139 statistical methods in SPSS.

Table 2. Top 10 prescribed injectable drugs by specialty

Specialty	Injectable Drug										Total
	Dexamethasone	Penicillin 6.3.3	Dexamethasone	Betamethasone	Metoclopramide	Hyoscine	Ceftriaxone	Penicillin 800,000 IU	Combination	Normal Saline	
G.P.	187 (85.4%)	157 (94%)	79 (98%)	51 (65.4%)	75 (96.2%)	46 (74.2%)	55 (95%)	44 (78.6%)	44 (93.6%)	39 (91%)	777 (87.3%)
Neurologist	2 (1%)	-	-	1 (1.3%)	-	1 (1.6%)	-	-	1 (2.1%)	-	6 (0.7%)
Gynecologist	2 (1.9%)	1 (1%)	-	1 (1%)	1 (1%)	-	-	-	-	-	5 (0.6%)
Orthopedist	-	1 (0.6%)	-	18 (23.1%)	-	-	-	-	-	-	19 (2.1%)
Dentist	16 (7.3%)	3 (1.8%)	-	-	-	-	-	8 (14.3%)	-	-	27 (3%)
Pediatrician	-	2 (1.2%)	2 (2.5%)	1 (1.3%)	1 (1.3%)	-	-	1 (1.8%)	-	1 (2.3%)	8 (0.9%)
Internist	2 (1%)	-	-	-	-	-	-	1 (1.8%)	-	1 (2.3%)	4 (0.5%)
Midwife	5 (2.3%)	-	-	-	-	8 (13%)	1 (1.7%)	-	1 (2.1%)	-	15 (1.7%)
Others	5 (2.3%)	3 (1.8%)	-	6 (7.7%)	-	7 (11.3%)	2 (3.3%)	2 (3.6%)	1 (2.1%)	2 (4.6%)	28 (3.1%)
Total	219 (24.7%)	167 (18.8%)	81 (9%)	78 (8.8%)	78 (8.8%)	62 (7%)	58 (6.5%)	56 (6.3%)	47 (5.3%)	43 (4.8%)	888 (100%)

136 drugs were prescribed for 52.8% and 44.7% of patients 175 only by a physician, the incorrect cycle of irrational 137 which are more than a study in Tehran (1999) with 43% 176 drug use will not cease. Patient-physician monetary 138 and 39%, respectively. The average number of drugs 177 relationship, non-perceptual drug sale, absence of a 139 per prescription was 3.6 which is more than a study in 178 smart system of controlling drug sale and utilization are 140 Tehran with 2.58 [10]. These numbers indicate the 179 secondary effective factors in irrational drug utilization 141 irrational pattern of drug use for outpatients. 180 in Iran.

142 Considering the increasing number of drug-resistant 181 organisms, this high rate of irrational use of antibiotics 143 will burden higher costs of new generations of 182 antibiotics and may disarm health professionals in 144 treating infectious diseases. The rational use of drugs, 183 especially antibiotics, should be initiated by physicians, 145 as the authorized group of drug prescribers. It may need 146 much more time to change the patients' attitude, as the 147 drug consumers [11].

151 Lack of the community awareness about the effects 152 and side effects of medications can be the cause of 153 many health problems for patients and also high health 154 care costs for families and society. There are many 155 medical conditions which basically are not considered 156 as disorder and do not need any drug. Expecting a drug 157 prescription is one of the patients' most important 158 problems, especially when the patient is a child. Health 159 recommendations are hardly accepted by patients and 160 parents. Some patients believe that pain and/or fever 161 always are the symptoms of an infection and always 162 misuse antibiotics to relieve these symptoms. They may 163 obtain the antibiotics directly from pharmacies (self 164 medication) or insist on their physicians to prescribe it. 165 There is not an exact estimation of what percent of the 166 requests are accepted by physicians.

167 The results represent the irrational use of drugs 168 among patients in Ardabil. There are many factors 169 which directly or indirectly have an effect on drug 170 utilization. Lack of the community awareness is the 171 basis of the problem. As a matter of fact, until the 172 patients' knowledge of drugs are not improved and 173 drugs are not considered as potentially-harmful 174 substances which always need a careful prescription

Published online: January 31, 2013

ACKNOWLEDGEMENTS

182 The data used in study is the result of a registered 183 research in Ardabil University of Medical Science. The 184 authors would like to thank personnel of Drug and Food 185 Unit for their help in sampling and data gathering.

Table 3. Distribution category of prescribed drugs

Category	Number	Percent
Antibiotics	1055	52.8
CNS Drugs	662	33.1
Immune System Drugs	609	30.4
Herbal Drugs	559	28
Corticosteroids	529	26.4
GI Drugs	411	20.6
Respiratory Drugs	401	20
Antihistamines	381	19
Topical Drugs (eye/ear)	219	11
CVS Drugs	128	6.4
Dermatology Drugs	112	5.6
Genitourinary Drugs	86	4.3
Modifiers	83	4.2
Food Supplements	33	1.6
NSAIDs	17	0.8
Others	219	11

186 REFERENCES

- 187 1. Folke S, Donald B. Drug Utilization. This chapter are extracted
188 from the WHO booklet "Introduction to Drug Utilization
189 Research" 2003, ISBN 92 4 156234X, with the permission of the
190 WHO Office of Publications. Available from
191 http://www.iuphar.org/pdf/hum_76.pdf.
- 192 2. Ramesh KT, Shahina S, Shobha JC, Naidu MUR, Usha Rani,
193 Vijay T. Drug utilization in geriatric population in a tertiary care
194 center. *JK science* 1999; 3:118-20.
- 195 3. Paula RA, Jerry GH. Drug therapy. *Lancet* 1995; 346:32.
- 196 4. Cheraghali A, Panahi Y. Assessment of prescriptions referred to
197 pharmacies of Tehran's hospitals. *J Teb-o-Tazkiyeh* 2002; 44:30-
198 6 [in Persian].
- 199 5. Sepehri GH. Study of general practitioners prescriptions in
200 Kerman. *Babol Journal* 2005; 7(4): 76-82. [in Persian]
- 201 6. Khaksari M. Study of prescriptions of Rafsanjan physicians in
202 years 1995 to 2000. *Rafsanjan Med J* 1382; 1(3): 163-9. [in
203 Persian]
- 204 7. Mosleh A. Condition of drug prescriptions according to WHO
205 indexes in health centers without pharmacies. *J Tehran Facult*
206 *Med* 2007; 65(2): 12-15. [in persian]
- 207 8. Shayan Z. Pattern of drug prescriptions in departments of
208 Jahrom's hospitals. *J Jahrom Facult Med* 2006; 5(5): 44-50. [in
209 Persian]
- 210 9. Ahmadi B, Alimohammadian M, Mahmoudi M. Pattern of drug
211 utilization in patients older than 55 years in Tehran. *Salmand J*
212 *2007; 2(6): 421-6. [in Persian]*
- 213 10. Dinarvand R, Nikmorad A. Condition of prescription and drug
214 utilization in Tehran in 1998. *Hakim J* 2000; 3(3): 223-30. [in
215 Persian]
- 216 11. Navarro R. Drug Utilization Review Strategies. In *Managed
217 Care Pharmacy Practice*. published 2008. P. 215 – 229.

218 CURRENT AUTHOR ADDRESSES

- 219 Firouz Amani, Department of Biostatistics, Ardabil University of
220 Medical Science, Ardabil, Iran. E-mail: f.amani@arums.ac.ir
221 (Corresponding author)
- 222 Afshin Shaker, Secretary of Rational Use of Drug Committee, Food
223 and Drug Deputy, Ardabil University of Medical Science,
224 Ardabil, Iran.
- 225 Soltan Mohamad Sadegh MohammadzadeH, Secretary of Rational
226 Use of Drug Committee, Food and Drug Deputy, Ardabil
227 University of Medical Science, Ardabil, Iran.

228