

## 1 ORIGINAL ARTICLE

2 Prescribing pattern and Drug indicators in Patients  
3 Visited by General Practitioners and Specialists in  
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## 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  $31.6 \pm 21.3$  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  $3.58 \pm 1.3$ , 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.,<sup>99</sup>  
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  
93 study that has been done on 2000 prescriptions,  
94 randomly selected from all archived prescriptions. The  
95 selection is done by season in each insurance  
96 organization. Information was analyzed by descriptive  
97 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

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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

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