

ORIGINAL ARTICLE

Prescribing pattern and Drug indicators in Patients Visited by General Practitioners and Specialists in Ardabil City of Iran

FIROUZ AMANI^{1*}, AFSHIN SHAKER², SOLTAN MOHAMAD SADEGH 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>

ABSTRACT

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

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

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

RESULTS

62 Iran; nevertheless infectious diseases are not a major¹⁰⁰ The average number of drugs prescribed for males
 63 health problem in Iran. The irrational use of drugs and¹⁰¹ was 3.57 (SD = 1.3) and females 3.58 (SD = 1.3). In all
 64 self-medication may result in many health problems for¹⁰² prescriptions, 822 (41%) and 1178 (59%) were for
 65 patients, such as increasing the risk of adverse drug¹⁰³ males and females, respectively. Mean of the patients'
 66 reactions, late diagnosis and prolongation of illness,¹⁰⁴ age was 31.6 (SD = 21.3) ranging from 1 to 91 years.
 67 patients' dissatisfaction, affecting patient-physician¹⁰⁵ The average number of drugs per prescription, separated
 68 relationship, and finally raising the cost of treatment [6-¹⁰⁶ by the insurance organization and specialty is presented
 69 8]. According to WHO statistics, Iran is among the 20¹⁰⁷ in Table 1. Number of drugs per prescription was
 70 most drug-utilizing countries with secondary rank in¹⁰⁸ ranging from 1 to 9. In Ta'min Ejtemaei organization
 71 Asia after China. Annually, each Iranian person uses¹⁰⁹ prescriptions, midwives and gynecologists had the
 72 339 drugs which is about twice the world standards,¹¹⁰ maximum and minimum number of drugs per
 73 leading to spend a large part of health resources for¹¹¹ prescription, respectively. Also, in Khadamat Darmani
 74 procurement of drugs required. Antibiotics are the 4th¹¹² organization prescriptions, internists and gynecologists
 75 or 5th most prescribed drugs in Iran. Adding non-¹¹³ had the maximum and minimum number of drugs per
 76 prescription sold antibiotics will move this position¹¹⁴ prescription, respectively. Of all 7158 prescribed drugs,
 77 higher. Official statistics published by Ministry of¹¹⁵ 894 (12.5%) drugs were injectable and the rest were
 78 Health showed that the average number of medications¹¹⁶ other drug forms. Of all prescriptions, 890 had at least
 79 per prescription was more than 3 and it is now nearly¹¹⁷ one injectable drug, indicating that 44.7% of the
 80 3.6, compared to less than two drugs per prescription of¹¹⁸ patients had received injectable drugs (Table 2). Of all
 81 world average. Drugs are the basis of nearly 75% of¹¹⁹ prescriptions, 544 (60.9%) have one injectable drug,
 82 treatments; therefore it is necessary to improve general¹²⁰ 271 (30.3%) have two injectable drugs and 79 (8.8%)
 83 information about commonly-used medications,¹²¹ have more than two injectable drugs. Between general
 84 especially the importance and indications of antibiotics,¹²² practitioners and orthopedists, injectable drugs were
 85 corticosteroids, and injectable drugs [9]. Published¹²³ more than others, with 59% and 4.9%, respectively.
 86 statistics in Iran showed that the rate of drug use growth¹²⁴ Antibiotics, CNS and immune system drugs were the
 87 is higher than world and industrial countries such as the¹²⁵ most frequently-prescribed categories in patients;
 88 U.S., U.K., Germany, France and Japan. The aim of this¹²⁶ 52.8%, 33.1% and 30.4%, respectively (Table 3).
 89 study is to determine pattern of drug utilization in
 90 patients visited by general practitioners and specialist in
 91 Ardabil, Iran.

DISCUSSION

MATERIALS AND METHODS

93 This is a retrospective cross-sectional descriptive
 94 study that has been done on 2000 prescriptions,
 95 randomly selected from all archived prescriptions. The
 96 selection is done by season in each insurance
 97 organization. Information was analyzed by descriptive
 98 statistical methods in SPSS.

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

Table 2. Top 10 prescribed injectable drugs by specialty

Specialty	Injectable Drug									
	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%)
Neurologist	2 (1%)	-	-	1 (1.3%)	-	1 (1.6%)	-	-	1 (2.1%)	-
Gynecologist	2 (1.9%)	1 (1%)	-	1 (1%)	1 (1%)	-	-	-	-	-
Orthopedist	-	1 (0.6%)	-	18 (23.1%)	-	-	-	-	-	-
Dentist	16 (7.3%)	3 (1.8%)	-	-	-	-	-	8 (14.3%)	-	-
Pediatrician	-	2 (1.2%)	2 (2.5%)	1 (1.3%)	1 (1.3%)	-	-	1 (1.8%)	-	1 (2.3%)
Internist	2 (1%)	-	-	-	-	-	-	1 (1.8%)	-	1 (2.3%)
Midwife	5 (2.3%)	-	-	-	-	8 (13%)	1 (1.7%)	-	1 (2.1%)	-
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%)
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%)

136 drugs were prescribed for 52.8% and 44.7% of patients¹⁷⁵ 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 drugs¹⁷⁷ relationship, non-perceptional drug sale, absence of a
 139 per prescription was 3.6 which is more than a study in¹⁷⁸ smart system of controlling drug sale and utilization are
 140 Tehran with 2.58 [10]. These numbers indicate the¹⁷⁹ 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
 143 organisms, this high rate of irrational use of antibiotics¹⁸¹
 144 will burden higher costs of new generations of¹⁸²
 145 antibiotics and may disarm health professionals in¹⁸³
 146 treating infectious diseases. The rational use of drugs,¹⁸⁴ authors would like to thank personnel of Drug and Food
 147 especially antibiotics, should be initiated by physicians,¹⁸⁵ Unit for their help in sampling and data gathering.
 148 as the authorized group of drug prescribers. It may need
 149 much more time to change the patients' attitude, as the
 150 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

ACKNOWLEDGEMENTS

The data used in study is the result of a registered
 research in Ardabil University of Medical Science. The
 authors would like to thank personnel of Drug and Food
 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. 212
- 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. 215
- 195 3. Paula RA, Jerry GH. Drug therapy. *Lancet* 1995; 346:32. 216
- 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]. 217
- 199 5. Sepehri GH. Study of general practitioners prescriptions in
200 Kerman. *Babol Journal* 2005; 7(4): 76-82. [in Persian] 218
- 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] 219
- 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] 220
- 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] 221
- 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] 222
- 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] 223
- 216 11. Navarro R. Drug Utilization Review Strategies. In *Managed
217 Care Pharmacy Practice*. published 2008. P. 215 – 229. 224

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
(Corresponding author) 221
- 222 Afshin Shaker, Secretary of Rational Use of Drug Committee, Food
223 and Drug Deputy, Ardabil University of Medical Science,
224 Ardabil, Iran. 225
- 226 Soltan Mohamad Sadegh MohammadzadeH, Secretary of Rational
227 Use of Drug Committee, Food and Drug Deputy, Ardabil
University of Medical Science, Ardabil, Iran. 228