

Prescription pattern among Iranian community dwelling older adults

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ABSTRACT

Aim To assess prescription pattern among Iranian community-dwelling older adults.

Methods This cross-sectional study employed a cluster random sampling to obtain a sample of 1591 patients aged 60 years and over referred to pharmacies in Tehran, 2017. Data were collected using a questionnaire: socio-demographic characteristics, type of pharmacy visited, the municipal district, the university covering the pharmacy, the number and names of prescribed drugs, drug category, type of insurances and physician's socio-demographic profile (age, gender, type of specialization, and work experience).

Results The mean age of the patients was 70.51±7.84. A total of 5838 drugs were prescribed, giving an average of 3.73±2.24 drugs per patient (ranging of 1-15). Polypharmacy was noticed in 32.4% patients. Cardiovascular drugs accounted for 20.8% of the prescriptions, antidiabetics 8.8%, nutritional agents and vitamins 7.6%, and analgesics, anti-inflammatory drugs and antipyretics accounted for 7.5%.

Conclusion Developing educational programs on geriatric pharmacology general practitioners and more supervision among community-dwelling older adults might have effects on prescription pattern. There is a need for prescriber training and retraining with emphasis on the geriatric population.

Key words: aged, general practitioners, medical specialists, prescription pattern

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INTRODUCTION

The elderly population is growing in our society (1). According to UN Population Division estimates, the proportion of the world's elderly population will increase from 10.5% in 2007 to 21.8% in 2050 (2). Results of the latest census of Iran in 2016 indicate that the elderly population of the country is equivalent to 7,141.91 (3). Drug use in the elderly is fraught with many problems because of the following factors: the physiologic changes of aging and potential drug–drug and drug–disease interactions (4). Polypharmacy and the inappropriate use of medicines in the elderly have been identified as major types of non-rational prescribing in the elderly leading to higher prevalence of adverse drug reactions among them (5-7). These factors have also been shown to be responsible for a disproportionately high rate of adverse drug reactions among elderly patients and its associated increased healthcare costs (8). Provision of financial resources and producing pharmaceuticals are our main priorities in the healthcare plan, but the problem of providing medication will always trouble patients due to problems in prescribing and consuming medication (9). Elderly people are prescribed four times more drugs than other age groups. (10).

There are few studies on the prescription patterns, their costs and loads in Iran (2). This study aimed to determine the patterns of medication prescription in the elderly patients (60 years and above) referred to pharmacies, to recognize the problems and deficiencies, and recommend strategies to train physicians and raise public awareness to modify medication consumption patterns so that a positive step is taken towards better provision of medication needs for this age group.

The results of this study can reveal the patterns of medication prescription in pharmacies of Tehran, which is one of the most important information sources regarding medication prescription for the elderly and its possible deficiencies. It can also draw attention of the authorities to a more efficient training of physicians regarding pharmacology of the elderly and establishing an appropriate relationship with and transfer information to them.

METHODS

Study design and population

This cross-sectional study was conducted to assess prescription pattern and their related factors on elderly patients referred to pharmacies in Tehran in 2017.

The study was approved by the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran. The purpose of the study was elucidated and verbal consent was obtained before the participants were interviewed, respecting their autonomy and anonymity. †

Methods

The questionnaire was used as a source for identifying for prescription pattern. Drug list was first matched with medications available in the Iranian Pharmacopoeia (11), which is updated through the Food and Drug Prescription website of the Ministry of Health (12) every six months. The medications that were unavailable at the Iranian Pharmacopoeia were removed from the list.

The questionnaire was then prepared containing questions on the socio-demographic characteristics of the elderly, the type of pharmacy visited, the municipal district, the university covering the pharmacy, the number of prescribed drugs, the names of drugs and drug category, type of insurances and physician's socio-demographic profile (age, gender, type of specialization, and work experience).

Attempts were made in this study to collect and investigate the prescriptions of individuals aged 60 and above who were referred to the pharmacies of the city of Tehran using random cluster sampling. To do so, the name of all pharmacies covered by Tehran University of Medical Sciences was first listed and each pharmacy was considered as a cluster, then the samples were selected using multistage proportional random sampling. Out of 2169 pharmacies covered by the University of Medical Sciences, 84 were selected randomly. Trained pharmacists and pharmaceutical technicians interviewed 1591 elderly patients aged over 60 years who were referred to pharmacies with prescriptions in their hands after obtaining their consent and then completed the questionnaire.

Statistical analysis

The study used mainly descriptive analysis. For comparison purposes, ANOVA and t-test were applied for categorical and continuous dependent variables of interest, respectively. A p<0.05 was considered statistically significant.

RESULTS

A total of 1591 elderly patients were analysed. The mean ±SD of the elderly's age was 70.51± 8.74 years. The age groups of 60-74, 75-84 and older than 85 years-old made 72.7%, 21.4 % and 5.9%, respectively. Female and male participants made up 54.1% and 45.9% of the total subjects, respectively. The majority of the elderly had lower education than a primary degree, 36.6%. In addition, a total of 1214 (76.3%) of the elderly were married.

A total of 1568 (98.6%) and 23 (1.4%) of the elderly were insured, and not by the Social Security Organization. The mean± SD of physicians' age and their average work experience was 53.25±11.01 and 25.5± 10.5 years, respectively. There was a total of 415 (26.1%) female and 1176 (73.9%) male physicians. Of the total number of physicians, 402 (25.3%) were general practitioners and 1189 (74.7%) were specialists (Table 1).

Table 1. Demographic characteristic of patients

Variables	Category	No (%) of patients				Mean	SD
		Females	Males	Total			
Age (years)					70.51	7.84	
Age group	60-74	653 (57)	503 (44)	1156 (73)			
	75-84	163 (48)	178 (52)	341 (21)			
	+85	45 (48)	49 (52)	94 (5.9)			
Gender		861 (54)	730 (46)	1591 (100)			
	No formal education	317	79	86	21	403	25
Level of education	Primary	327	56	256	46	583	37
	Secondary	155	36	272	64	427	27
	Tertiary education	62	35	116	65	178	11
Marital status	Married	558	46	656	54	1214	76
	Single	20	51	19	49	39	2.4
	Divorced	11	78	3	22	14	0.9
Medical Insurance	Yes	272	84	52	16	324	20
	No	848	99	721	99	1569	99
The age of the doctor							53.25±11.00
Number of doctors		415	26	1176	74		
Work experience							25.50 10.50
Specialist physician	General	415	26	1176	74	402	25
	Expert					1189	75

The mean number of prescribed medication was 3.73±2.24 32.4% used more than 5 medications, ranging from 1 to 15 (Table 2).

Table 2. Number of drugs per prescription

Number of drugs per prescription	Frequency	Percentage	Mean	SD
1	277	17.4		
2	265	16.7		
3	282	17.7		
4	251	15.8		
5	198	12.4		
6	136	8.5		
7	87	5.5		
8	44	2.8	3.73	2.24
9	30	1.9		
10	11	0.7		
11	4	0.3		
14	2	0.1		
15	4	0.3		
Total	1591	100		

Cardiovascular drugs accounted for 20.8 % of the prescriptions, antidiabetics 8.8%, nutritional agents and vitamins 7.6%, and analgesics, anti-inflammatory drugs and antipyretics 7.5% (Table 3). The most commonly used medications were insulin, 0.4%, atorvastatin, 2.5%, and aspirin, 2.4%.

Table 3. Frequency distribution of medication groups in the sample

Medication group	Frequency (%)
Cardiovascular drugs	1562 (20.8)
Antidiabetics	664 (8.8)
Nutritional agents and vitamins	574 (7.6)
Analgesics anti-inflammatory drugs and antipyretics	560 (7.5)
Gastrointestinal drugs	394 (5.2)
Antibacterial	323 (4.3)
Bronchodilators and anti-asthma drugs	211(2.8)
Anxiolytic sedatives hypnotics and antipsychotics	194 (2.6)
Antiepileptics	159(2.1)
Antidepressants	149 (2.0)
Urological drugs	133 (1.8)
Others	915 (36.3)
Total	5838 (100)

T-test showed that there was a meaningful relationship between having a chronic disease and polypharmacy with the number of prescription drugs) p<0.001).

More frequently drugs were prescribed for people who were insured than others who are not insured. The mean number of prescribed medication was 3.68 ±2.21 in males and 3.77 ±2.26 in females with no statistical significance (p=0.411).

Prescribing medication among female doctors was 3.77±2.35 and among male doctors 3.72±2.19 with no significant difference (p=0.664). In addition,

tion, the number of prescribed drugs among general practitioners was significantly higher than that of specialist doctors ($p=0.021$) (Table 4).

Table 4. The relationship between demographic characteristics of the sample and prescribed number by T- test

Variables	Category	Mean	SD	t	df	p
Chronic disease	Yes	3.89	2.29	-6.05	605.602	<0.001
	No	3.14	1.92			
Polypharmacy	Yes	6.35	1.64	-48.565	747.610	<0.001
	No	2.47	1.11			
Insurance	Yes	3.74	2.23	1.770	21.55	0.091
	No	2.86	2.31			
Patients' gender	Female	3.77	2.26	0.824	1557.389	0.411
	Male	3.68	2.21			
Physicians' gender	Female	3.77	2.35	0.435	683.433	0.664
	Male	3.72	2.19			
Specialist physician	General	3.94	2.08	2.306	755.777	0.021
	Expert	3.66	2.28			

SD, standard deviation, t, T- test; df, degrees of freedom

Mean number of prescribed medication in different age groups was 3.64 ± 2.19 for 60-74 year-old group, 3.93 ± 2.23 for 75-84 and 4.17 ± 2.64 for more than 85 years-old group ($p=0.015$).

Mean number of prescribed medication in different education levels was 4.02 ± 2.37 for respondents with no formal education, 3.60 ± 2.09 for primary education, 3.62 ± 2.28 for secondary (diploma) and 3.78 ± 2.22 for tertiary level ($p=0.018$) (Table 5).

Table 5. The relationship between demographic characteristics of the sample and prescribed N by ANOVA Test

Variables	Category	Mean	SD	F/W	p
Education	No formal Education	4.02	2.370	3.00	0.018
	Primary	3.60	2.099		
	Secondary (diploma)	3.62	2.287		
	Tertiary (university)	3.78	2.221		
Age group (years)	60-74	3.64	2.198	4.19	0.015
	75-84	3.93	2.236		
	+85	4.17	2.646		

SD, standard deviation; F/W, F ratio/Welch's F

DISCUSSION

With the improvement of health care and control of diseases, life expectancy has increased and the elderly population is on the rise. This increase accompanied with complications of several chronic diseases and increased medication consumption per capita, which consumes a major part of Iran's healthcare resources.

The average number of drugs prescribed in this study (3.73 ± 2.24) is in the same range as results from other general prescription studies done in

Iran, India, and Nigeria (8, 13-15). Studies carried out among geriatric patients in Turkey, USA, India, Brazil, and Poland found an average of 2.9, 8.1, 4.3, 3.2, and 6.6 drugs per prescription, respectively (16-20).

The preponderance of female patients (54.1%) in this study is similar to the results from similar studies in the USA and Europe (16, 17).

High prevalence of antidiabetics in this study could be due to the high prevalence of diabetes in Iran. Elderly people are referred to physicians more than other age groups due to pain associated with connective tissue and joint problems and they receive analgesics. In most studies, cardiovascular, central nervous system (CNS) and analgesic medications are most common (21-23).

A study from Saboor (2014) showed that CNS medications were the most prevalent (68.2%), followed by vitamins and minerals (66.5%), and cardiovascular (64.7%) (9). Several studies from Malaysia, Denmark and Sweden reported cardiovascular, CNS and neuromuscular medications as most common, respectively (10, 24-26).

In a study by Shah et al. multivitamins and analgesics constituted 10.8% and 9.7% of prescriptions, respectively (27), which is higher than in our study. The study by No Kohan Ahvazi et al. showed that cardiovascular and antibacterial medications are the most commonly prescribed (28).

Although this study showed that the prevalence of drugs prescribed in the individuals with health insurance was higher than those without it, it was not statistically significant. The results of a study in Mexico showed that having Medicare insurance increases the odds of having potentially inappropriate medications (PIMs) differences (29).

This study showed that the number of prescribed drugs is significantly related to at least having one chronic disease, which is similar with results reported in other studies (22, 29-31). Our study showed that the number of drug prescriptions was significantly more common among general practitioners. This can be attributed to the fact that the elderly refer to general practitioners more frequently due to their financial problems and often suffer from various diseases for which the physician has to prescribe many medications.

In conclusion, the results of this study indicate that although the average of prescribed drugs is similar

to those of other countries where similar research has been carried out, it does not diminish the importance of the fact that the high levels of drug use by the elderly could cause many problems in the system. The frequency of prescribing anti-diabetes medication compared with the results of other studies needs to be further investigated. Also, modifying and reviewing the content of pharmacy education in the elderly's healthcare programs may be a good way to reduce the number of prescriptive drugs prescribed by doctors. Increasing the monitoring of how medication is administered by health insurance organizations and the Ministry of Health as a community health custodian can be

a positive step to optimize the administration of the drug in the elderly population.

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TRANSPARENCY DECLARATION

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