



Prescribing of Potentially Inappropriate Medications to Elderly People by Medical Specialists in Isfahan, Iran

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Abstract

The goal of this study is to identify the types of potentially inappropriate drugs prescribed by the medical specialists of Isfahan province to elderly patients. A number of 31,254 randomly selected prescriptions from medical specialists of Isfahan province were reviewed for elderly patients who were insured by the Social Security Organization. Three thousand and seven prescriptions were identified and Beers' Criteria was applied to figure out the type of inappropriate medications. The study concluded 49% males and 51% females. Sixty one percent of patients were 65-74 years old and 39% older than 74 years old. Of all the prescriptions reviewed, 24.4% contained inappropriate medications. The ten most common medications detected in the prescriptions were: Naproxen (18.4%), fluoxetine (8.3%), clidinium C (7.2%), indomethacin (7.2%), chlorthalidone (5.8%), doxepin (4.76%), dipyridamole (4.4%), amitriptyline (4.27%), methocarbamol (4.15%) and piroxicam (3.88%). The results are comparable to what has been reported in the literature. This is also in accordance with the national drug consumption as NSAIDs are heavily used throughout Iran. Due to the extent of inappropriateness of medicine use in the elderly population, we need to define a strategy to curtail this problem including educational classes for physicians and launching national geriatrics residency programs.

Keywords: Beers' criteria; Elderly; Inappropriate medication; Prescription.

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1. Introduction

Inappropriate medication prescription for elderly is a major concern, because of increases in the risk of adverse events and health care costs [1]. Criteria defining inappropriate medication for elderly have

been developed in order to decrease its occurrence [2, 3].

Beers' criteria [4-8] is most widely used to estimate prescription of potentially inappropriate medication for nursing home residents [4, 9], hospital inpatients [10-12] and the community-dwelling elderly [13-20] in some countries. The Beers' criteria are based on expert consensus developed through an extensive literature review with a

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bibliography and questionnaire evaluated by a variety of recognized experts in geriatric care and clinical pharmacology using modified Delphi method to reach consensus. It has been used to survey clinical medication use, analyze computerized administrative data sets and evaluate intervention studies to decrease medication problems in older adults [8].

This study assessed the prevalence of different types of inappropriate drugs using Beers' criteria (independent of disease) among some specialists' prescriptions in Isfahan.

2. Methods

This study was conducted in Social Security Organization (SSO) of Isfahan. SSO is a major insurance company in Iran. The sampling was performed by multistage stratified method. At first, we determined which specialties are more likely to see elderly patients (≥ 65 years) and following specialties were chosen: Internal medicine, infectious diseases, neurology, psychiatry, ENT, surgery, orthopedics and some of the related subspecialties. From this data, we determined the proportions of specialists who had written prescriptions for elderly and used this data to select a number of prescriptions from each category of specialties to a total of 3007 community elderly patients' prescriptions.

A data collection instrument was used to record the following: Background information, such as age and gender. It also included detailed information on the medications prescribed including the name and number of inappropriate drugs. Doses of some drugs that were mentioned in Beers' criteria were also included.

We used the 3rd version (2003) of the Beers' criteria to identify the potentially inappropriate medications. This criterion consists of 2 lists. One is a list of 49 individual medications or medication classes that are inappropriate for patients 65 years or older regardless of their disease or condition. The

Table 1. Inappropriate medication excluded from the analysis. Excluded from the criteria independent of disease, because the drugs were unavailable in Iran

Propoxyphene	Cyclandelate
Trimethobenzamide	Ketorolac
Carisoprodol	Orphenadrine
Metaxalone	Guanadrel
Cyclobenzaprine	Amitiptyline-Perphenazine
Temazepam	Chlorzoxazone
Clorazepate	Oxaprazin
Hyoscyamine	Dessicated thyroid
Cascara sagrada	
Neoloid	
Triplennamine	

other is a list of 65 medications or medication classes in 19 diseases or conditions for which they should be avoided. Our study was based on the first list and medication or medication classes were selected. Those medications in the Beer's criteria list which were not available in Iran were excluded (Table 1).

SPSS version 12 was used for data entry and analysis.

3. Results

In this study, 3007 prescriptions of elderly patients were detected from 31,254 prescriptions written by 214 specialists. The prescriptions belonged to 49% male and 51% female. Sixty one percent of patients were 65-74 years old and 39% more than 74 years old.

A number of 474 (57.8%) and 346 (42.2%) inappropriate drugs were prescribed in women and men, respectively. A number of 524 (63.9%) and 296 (36.09%) inappropriate drugs were prescribed in 65-74 and ≥ 75 years old patients, respectively.

"Naproxen" was the most common inappropriate drug (regardless of duration of use). Table 2 indicates the frequency of inappropriate drugs in our study. Table 3 indicates the frequency of inappropriate drugs in women and men.

4. Discussion

Among the drugs prescribed by specialists, the most common drugs in our study in the

Table 2. Frequency of inappropriate drugs.

Drug	Frequency(%)	Drug	Frequency(%)
Naproxen*	18.4	Amiodarone	1.71
Fluoxetine	8.3	Cyproheptadine	1.4
Clidinium-C	7.2	Diphenhydramine	1.34
Indomethacin	7.2	Hydroxyzine	1.2
Chlordiazepoxide	5.8	Nifedipin	0.9
Doxepin	4.76	Cimetidine	0.9
Dipyridamole	4.4	Flurazepam	0.6
Amitriptyline	4.27	Propantheline	0.36
Methocarbamol	4.15	Belladonna	0.36
Chlorpheniramine	4.12	Methyldopa	0.36
Piroxicam*	3.88	Clonidine	0.24
Oxybutynin	3.66	Thioridazine	0.24
Dicyclomine	2.93	Nitrofurantoin	0.12
Ticlopidine	2.93	Estrogens	0.12
Digoxin	2.56		
Diazepam	2.56		
Bisacodyl	2.4		

*The length of usage could not be determined.

descending order were naproxen, fluoxetine, clidinium-C and indomethacin.

In another study conducted among general practitioners of Isfahan, the most common inappropriate drugs among general practitioners were diphenhydramine, clidinium C, indomethacin, methocarbamol, methyldopa and chlordiazepoxide [21].

This difference between specialists and general practitioners is probably due to the fact that elderly people seek medical advice in general disorders such as cold and musculoskeletal and gastrointestinal from general physicians and in more serious conditions from specialists.

In other studies, long acting benzodiazepines, dipyridamole, propoxyphene and amitriptyline were found among the most frequently prescribed inappropriate drugs [22, 23].

In our study, the frequency of prescribing long acting benzodiazepines is 8.96% indicating that long acting benzodiazepines are among the most frequently used drugs. Since the duration of naproxen use was not examined in this study, long acting benzodiazepines could very well top our list.

The prevalence of prescribing dipyridamole and ticlopidin in our study was 4.40% and 2.93%, respectively, specially in

the prescriptions of internists and neurologists. In other studies, similar results are found [15, 23, 24]. Clopidogrel is a good alternative and it is available in Iran.

One of the benefits of this study is the random selection of specialists' prescriptions from urban and rural centers in large numbers that may represent the current status of prescribing in different areas of the country.

One of the limitations of this study was that we could not follow the duration of use of some drugs. Another drawback may be the limited list of medications in Iran, since the pharmaceutical system is a generic one.

We believe that the interventions to raise awareness of this list along with other approaches to change the prescribing behavior of physicians and other health care team members are essential in Iran. We also propose to perform another study by utilizing the insurance booklets of patients in which you can get a more complete picture of medications they are using in a period of few months to a year.

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Table 3. Frequency of inappropriate drugs in women and men.

Women		Men	
Drug	Frequency(%)	Drug	Frequency(%)
Naproxen	20.20	Naproxen	15.80
Fluoxetine	8.86	Indomethacin	7.59
Clidinium-C	8.60	Fluoxetine	7.50
Indomethacin	7.59	Clidinium -C	5.20
Chlordiazepoxide	6.54	Chlorpheniramine	5.18
Doxepin	5.27	Chlordiazepoxide	4.90
Amitriptyline	4.85	Doxepin	4.04
Methocarbamol	4.85	Diazepam	4.04
Chlorpheniramine	4.84	Oxybutynin	4.04
Piroxicam	4.00	Ticlopidin	3.75
Oxybutynin	3.37	Amytriptyline	3.46
Dicyclomine	2.37	Piroxicam	3.46
Dipyridamol	2.74	Digoxin	3.17
Ticlopidine	2.32	Methocarbamol	3.17
Diphenhydramine	2.70	Bisacodyl	3.17
Digoxin	2.70	Dicyclomine	3.17
Bisacodyl	1.89	Amiodarone	2.30
Diazepam	1.89	Cyproheptadine	2.30
Methyl dopa	1.44	Nifedipin	1.44
Amiodarone	1.26	Flurazepam	1.15
Cimetidine	1.26	Hydroxyzine	1.15
Hydroxyzine	1.26	Propanthelyne	0.86
Cyproheptadine	0.84	Belladonna	0.57
Nifedipine	0.63	Cimetidine	0.57
Estrogens	0.20	Diphenhydramine	0.28
Clonidine	0.20	Thioridazine	0.28
Thioridazine	0.20	Lorazepam	0.28
Belladonna	0.20	Antihistamine/decongestant	0.28
Flurazepam	0.20	Nitrofurantoin	0.28
		Clonidine	0.28

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