



## Assessing the Medicines Use in the Elderly: A New Approach to Promote Rational Medicine Use in this Group

Fatemeh Soleymani<sup>1\*</sup>, Nikinaz Ashrafi<sup>2</sup>, Arash Tehrani banhashemi<sup>3</sup>, Nooshin Mohammad Hosseini<sup>3</sup>, Fariba Ahmadizar<sup>4</sup>, Kheirollah Gholami<sup>5</sup>

<sup>1</sup> National Committee on Rational Drug Use, Food and Drug Organization, Ministry of Health and Medical Education AND Department of Pharmacoconomics and Pharmaceutical Management, Faculty of Pharmacy and Pharmaceutical Policy Research Center, Tehran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Department of Pharmacoconomics and Pharmaceutical Management, Faculty of Pharmacy and Pharmaceutical Policy Research Center, Tehran University of Medical Sciences, Tehran, Iran.

<sup>3</sup> National Committee on Rational Drug Use, Food and Drug Organization, Ministry of Health and Medical Education AND Department of Epidemiology, Iran University of Medical Sciences, Tehran, Iran

<sup>4</sup> National Committee on Rational Drug Use, Food and Drug Organization, Ministry of Health and Medical Education, Tehran, Iran

<sup>5</sup> Department of Clinical Pharmacy, Tehran University of Medical Sciences, Tehran, Iran.

### ABSTRACT

**Background:** Elderly are prone to many acute and chronic age-related diseases, which needed multiple medicine usage. Therefore, evaluation of medicine use pattern in this group is very important and a significant issue in public health system policy.

**Methods:** This study was a cross-sectional household survey conducted in 20 clusters of Tehran. Each cluster consists of 40 households who had at least one person over the 60 years old. Different medicine items used by the individuals over 60 years old were asked and recorded by the interviewers.

**Results:** A total of 1054 men and women over 60 years old were enrolled to the study. About 49.4% were male and 50.6% were female. About 69% of the study population used at least one medicine per day regularly, and 46.2% used to consume medicines as self-medication. Mean items per prescription were 3.57 for patients who used medicines regularly every day. The most frequent medicines used in this group were cardiovascular (68.6%) and central nervous system medicines (61.7%). Aspirin 80 mg, atenolol, and calcium-D were the most frequent medicines used regularly, but not daily. Acetaminophen 325 mg and acetaminophen codeine were the most frequent self-medications.

**Conclusion:** Since elderly people may have multiple comorbidities, which require poly-pharmacy use. Also, due to the high prevalence of drug use without prescription among this group of people, which was about 46% in our study, it is crucial that physicians and other health care providers consider the risk of adverse drug reactions and drug interactions in each visit of the patient.

**Keywords:** Medicine, elderly, drug use, poly-pharmacy

### 1. Introduction

Medication prescription and usage among elderly in our country is an issue that should be taken into particular account. It may be considered an important subject of health care in this age group.

In general, it is well accepted that all medicines have adverse effects, and the rate of drug interactions may be an increase in case of poly-pharmacy [1,2]. Elderly use many different medicines of variable categories in order to prevent and treat diseases. It often leads to multiple medicine use and thus increases potentially risk of side-effects, drug interactions and toxicities. However, these problems may be related to the number of medicines used by elderly, more medicine usage. In addition, their increased susceptibilities to adverse effects of medicines rather than their age. Here, some influencing factors such as medication errors, poor patient compliance in drug use, mental health problems and comorbidities like Alzheimer's disease can be taken into account [3].

Taking too many medicines in this age group results in a huge burden imposed on health care costs of the country. In addition, it may bring about problems such as increased risks of drug interactions and side-effects, risks of gastrointestinal bleedings and kidney diseases, high blood pressure or intraocular pressure, urinary retention, etc. Therefore, all of these factors lead to paying more attention to drug therapy of this group of patients [4].

It is very important to carefully adjusting the dose of medication as well as the time of taking in elderly. Thus, these individuals should not take the drug without medical supervision. Furthermore, it should be noted that their medicines must be kept in the special containers,

which indicates the type and amount of each drug and made available for them so that dosage adjustment can be done correctly [5]. This survey was conducted to identify patterns of medicine use in elderly in Tehran, so that the extend of prescribed drug use, and self-medication can be identified in this vulnerable population.

### 2. Methods

This study was a cross-sectional survey, which was conducted using inquiry approach in Tehran. In this survey, the sampling frame was houses identified by the post office census in the year 1380 and a multi-stage sampling was conducted. In the first step, Tehran was divided to eight strata in accordance with eight postal zones, and in the next step, 20 clusters were randomly selected from the post office sampling frame in proportion to the population of each zone. After choosing randomly the first household in clusters, the exact addresses of all households in the study which were 40 in each cluster were identified. To identify these households, moving in the right direction (while leaving each selected house) and upward from the first household in the clusters, 40 households were selected in which at least one person over 60 was living. For the purpose of this study, all residential units (household) in each apartment building were checked to find if a person 60 years of age or older lived in. If there was at least one person of this age group, the household was included in the study. The information was gathered using a 5-part questionnaire consisting of the individuals' demographic data, history of his or her diseases and information about medications including (I) drugs that are used

\* Corresponding author. Tel.: +98 2166963859, Fax: +98 2166963859, E-mail: fsolemani@yahoo.com, Fatemeh Soleymani

regularly every day, (II) drugs that are used regularly, but not daily, and (III) drugs that are used irregularly and on the basis of self-diagnosis (self-medication).

A comprehensive interviewers' manual was prepared for interviewers and all of them were trained in a workshop. Before starting the main study, a pilot study was conducted participating 20 households in order to identify questionnaire problems from respondents' and interviewers' points of view. Their views about each question of the questionnaire were recorded and evaluated so that some necessary modifications were made to the questionnaire and implementation method.

Supervision and monitoring was conducted along with interviewing process. About 5% of included samples were randomly selected and interviewed once again by the quality control group. Moreover, about 5% of the interviewing process of each interviewer was accessed concurrently by project supervisors and necessary guidance was offered if any trouble in questioning were determined. After data collection in the field, all collected questionnaires were evaluated by a team. If there was some information defect, they were returned to the interviewer in order to go back again to the certain household and complete the questionnaire.

The data collection was entered in "prescription analyzer" software. This software contains a drug database that allows data entry and recording. After entering the data, analysis was performed using SPSS version 16 (SPSS Inc., Chicago, IL, USA) software.

### 3. Results

A total of 1054 patients were enrolled, 49.4% males and 50.6% females. About 69% (n = 728) of adults over 60 years included in the survey were taking at least one drug regularly every day with the rate

of 71.7% in women and 57.2% in men (P < 0.0001). About 6.7% (81) of the patients were taking the drug regularly, but not daily. About 46.2% of patients were reported to take drugs irregularly (arbitrarily) as self-medication. Mean daily drug consumption were 3.57 items in patients who regularly used the medicine. About 44.5% of patients, who regularly took the drug, use more than three drugs per day. Cardiovascular and central nervous system (CNS) medicines were the most frequent drug categories were used (Table 1).

In elderly people who took medication regularly every day, frequency of vitamins consumption was 15%, and frequency of injection consumption was 3.9%.

The most frequent medicine used in patients who took medicines regularly every day were aspirin 80 mg, atenolol, and calcium-D, in patients who took medicines regularly but not daily, were digoxin and vitamin D3 and in patients who took medicines irregularly (arbitrarily) as self-medication, was acetaminophen (Figures 1-3).

### 4. Discussion

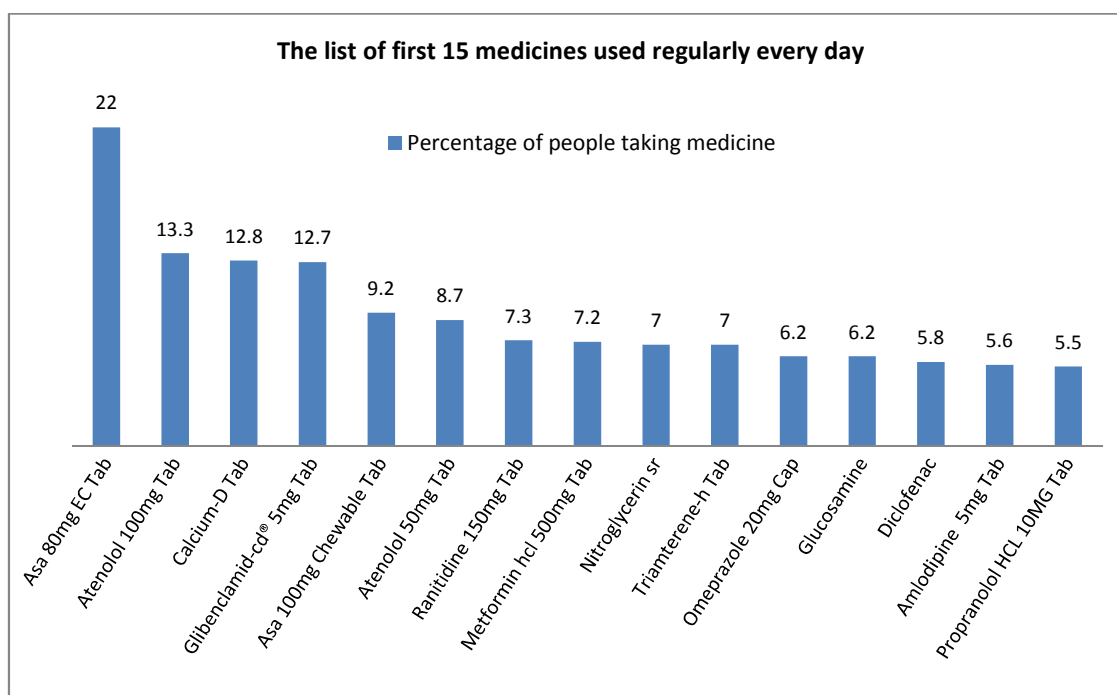
According to the results of various studies for medicine use in elderly, which have been conducted in different time periods, it can be expressed that drug therapy in this age group is one of the most important issues of public health, globally [6].

The results of this study have indicated that although the average daily consumption of drugs in this age group has corresponded closely with the average daily consumption of drugs throughout population [7,8], the percentage of elderly people who are at least one medication regularly and on a daily basis is 69%. With regard to the percentage of elderly who use drug irregularly as self-medication (46.2%), we can conclusively assert that drug therapy needs special attention in this age group considering the high rate of drug use.

**Table 1.** Frequency of different medicines category consumption in elderly (medicines used regularly)

Drug name	Female	Male	Both	P value
Percentage of elderly taking antimicrobials	4.4	5.8	5.2	0.41
Percentage of elderly taking painkillers	42.1	46.5	44.0	0.26
Percentage of elderly taking corticosteroids	3.7	2.4	3.1	0.32
Percentage of elderly taking gastrointestinal drugs	21.5	15.8	19.0	0.06
Percentage of elderly taking cardiovascular drugs	70.2	66.7	68.6	0.33
Percentage of elderly taking CNS drugs	60.2	63.6	61.7	0.36

CNS: Central nervous system



**Figure 1.** The list of first 15 medicines used regularly every day in elderly

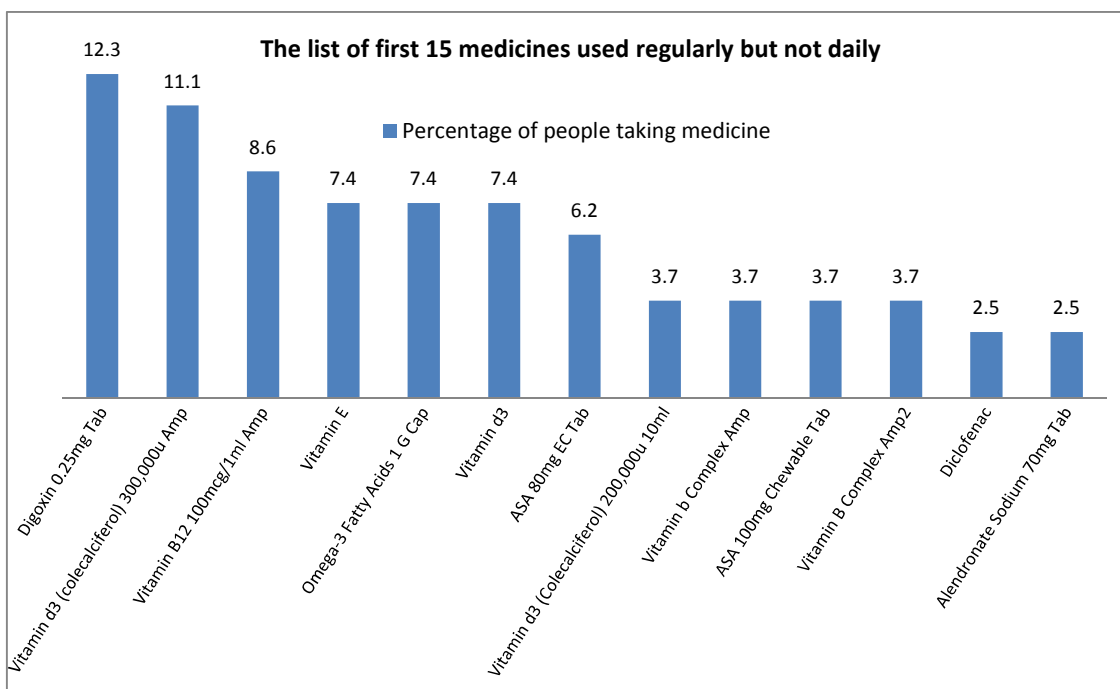


Figure 2. The list of first 15 medicines used *regularly but not daily* in elderly

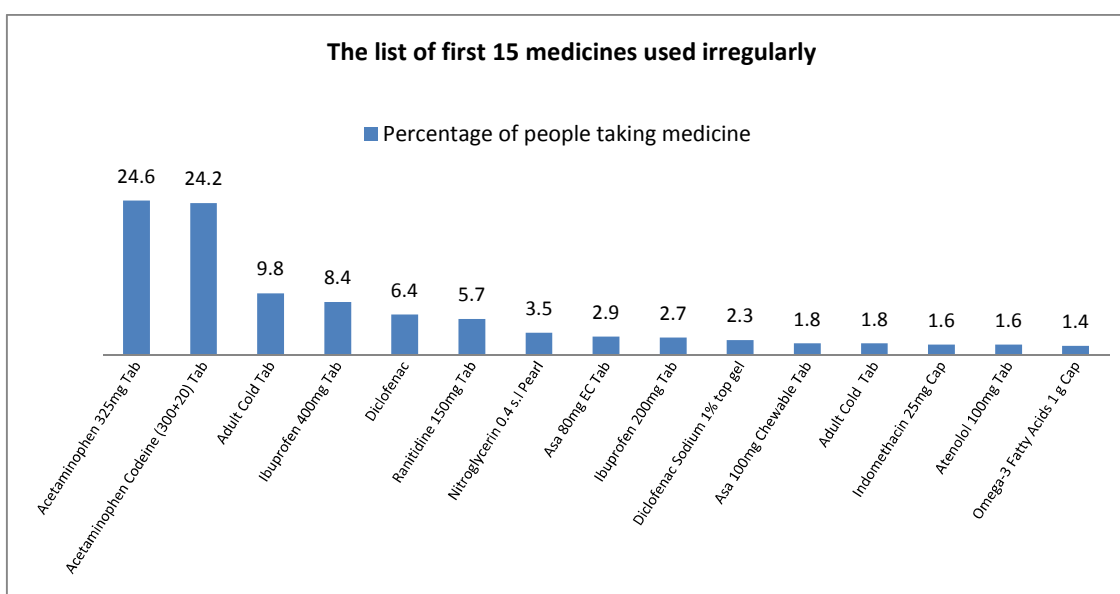


Figure 3. The list of first 15 medicines used *irregularly* in elderly

The results also have indicated that daily drug consumption in elderly women is considerably higher than elderly men. In a study conducted in UK in 1996 to determine the amount and type of drugs used in 5000 elderly at the age of 65-90. Moreover, it has been shown that women have consumed more drugs than men. Approximately 80% of these elderly have been visited at least once a year by a general practitioner. Periodic health care services have been mostly used by women while more men have received hospital care services [9].

According to the results of the frequency table, poly-pharmacy (taking multiple medicines concurrently) can be seen in elderly who take medications regularly and daily. Also, in a study 1544 elderly to evaluate the prevalence of poly-pharmacy in a long period of more than 240 days of a year, taking multiple medicines have been reported in 42% of elderly. Taking more than five medications have been found in only 4% of the elderly. In this 4-year period, the average number of drugs with a prolonged period of consumption has been ranged from 1.3 to 1.8. Improper treatment, age, diabetes mellitus, ischemic heart disease, and treatment for no indication could be the causes of poly-pharmacy. In this study, the average number of diseases had been increased, especially in elderly who were long-term drug consumers [10].

It is of the highest value to consider adverse drug reaction (ADR) in this age group because concomitant use of medications in elderly can expose them to more risk particularly ADR. In another study, 2185 elderly people over 64 years old, information was gathered about their diseases and medication therapy in a 2-year period. The results have showed that drug consumption was associated with high risk of ADRs. In addition, the prevalence of ADR reported in elderly people was 5.7%. In this study, it has been shown that the elderly who are more susceptible to ADR are those taking multiple drugs concomitantly. Furthermore, the adverse effects were greater in those who had taken several long-acting oral medications. Antibiotics, antihypertensive, and non-steroidal anti-inflammatory drugs were responsible for gastrointestinal complications such as nausea, diarrhea, abdominal pain, and skin rashes. Most of the reported ADRs were in case of urinary tract infection treatments and sleep disorders. However, low levels of ADR were reported in heart and respiratory diseases, as well [11].

According to the results of our survey, cardiovascular drugs were the major drugs that were used by elderly (68.6%). The drug's effects on the CNS (61.7%) have the second place. These findings are similar to

the result of two studies have been conducted in the elderly living in Greece and Turkey [12,13].

Assessing the list of the first 15 drugs used irregularly and arbitrarily among elderly has shown that the first five drugs belong to antipyretics and pain killers. Drugs such as nitroglycerin sublingual tablets, atenolol 100 mg tablets, and ranitidine tablets have appeared in this list, as well. Therefore, considering various risk factors in the population, this is a warning for training this age group in order to correct and timely use of medication under medical supervision.

In another study from 1995 to 1997, a number of 89 elderly people 65 years of age or older (40 men and 49 women) were selected and compared with a control group of 171 elderly 65 years of age or older (81 men and 90 women). Social backgrounds of these two groups showed that the majority of them were poor, and about 38% were unemployed. The results showed that according to DDD measurement both drug consumption and prevalence of high blood pressure were much higher in the case group have compared with the control. There was a significant difference between study group and control about drug indications knowledge and how to use them, paying attention to pharmacist recommendations and compliance with diet. Therefore, the results have showed that there is a serious need to train elderly and provide them with information about drugs [12].

The results of another study have showed that both poly-pharmacy and aging processes are major risk factors results in inappropriate treatment of the elderly [13].

## 5. Conclusion

The result of this study has indicated a high prevalence of poly-pharmacy in elderly in Tehran and in comparison with similar studies in other country. The prevalence of medicine use in this study is higher. This finding has important value for priority setting in designing and implementing interventions in improving and promoting rational medicine use in elderly.

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