Assessment of Comorbidity and Use of Prescription and Nonprescription Drugs in Patients Above 65 Years Attending Family Medicine Outpatient Clinics

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Abstract

Background and aim: Aging is often accompanied by chronic diseases, comorbidity, and polypharmacy. Use of prescription/nonprescription drugs, and over-the-counter (OTC) drugs seen frequently in the elderly. The aim of this study was to assess the comorbidity and multimorbidity status and to evaluate the use of prescription and nonprescription drugs in patients aged 65 years. **Materials and Methods:** In this cross-sectional and descriptive study, statistical analyses were performed using SPSS Version 22.0. Kolmogorov–Smirnov tests were applied based on meeting the assumption of a normal distribution of the data. Other statistical tests used were one-way analysis of variance tests, t tests, Pearson correlation analysis, Chi-square tests, Mann–Whitney U tests, and Spearman correlation analysis. **Results:** A total of 244 people participated in the study. The multimorbidity rate was 85%. Participants used an average of 4.26 drugs daily. The polypharmacy ratio was 42%. The nonprescription drug usage rate was 20%. Participants used nonprescription drugs most often with the pharmacist's advice. **Conclusion:** Multimorbidity, comorbidity, prescription, and nonprescription drug use were very high among elderly patients. Because older people are more susceptible to adverse drug reactions and drug interactions, physicians who provide care to older people should take a comprehensive drug history.

Keywords

aged, multimorbidity, polypharmacy, prescription drug, nonprescription drug

Introduction

Elderly people are the most rapidly growing portion of the patient population worldwide. According to the World Health Organization (WHO; 2018), the proportion of the world's population above 60 years was 12% worldwide in 2015 and is expected to be 22% in 2050. The aging population is the most important demographic change facing many countries around the world. The population of older persons is also increasing rapidly in Turkey. According to 2017 data from the Turkey Statistical Institute (TUIK; 2017), the ratio of people above 65 years to the total population in Turkey was 8.5%.

Aging is often accompanied by chronic diseases, comorbidity, and polypharmacy. Multimorbidity is defined as the co-occurrence of at least two chronic conditions. Multimorbidity in elderly people has been estimated to range from 55% to 98% depending on data

sources (Violan et al., 2014), Multimorbidity inevitably leads to the use of multiple drugs. Because chronic diseases affect different organ systems, more than one drug is prescribed to elderly people who receive health services from different specialization areas for different diseases (Aykın Nadir, 2013; Whitson et al., 2016). The use of several different medications at the same time is defined as polypharmacy (Buffel du Vaure et al., 2016). In studies, the use of five or more drugs is generally accepted as polypharmacy (Buffel du Vaure et al., 2016;

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The Gerontological Society of America [GSA], 2013; Hines & Murphy, 2011).

Polypharmacy may lead to an increased risk of inappropriate drug use, drug–drug and drug–disease interactions, and adverse drug reactions to which older adults are more susceptible. Older people are more vulnerable to morbidity and mortality secondary to drug-related harms because of age-related physiological changes and comorbidity of chronic conditions, such as cardiovascular diseases and mental disorders (Buffel du Vaure et al., 2016; GSA, 2013; Hines & Murphy, 2011). It was reported that approximately 30% of hospitalizations in elderly people were caused by adverse drug events (Goren, Demirkapu, Akpınar Acet, Cali, & Gülçebi İdrizoglu, 2017).

Another common condition in elderly patients is the use of nonprescription drugs, over-the-counter (OTC) drugs (Dhyani, Rohekar, Patil, & Ganachari, 2015; Mangoni & Jackson, 2004; Vilches & Suman, 2004), or complementary and alternative medicine (CAM; Eng, 2008; Moses, 2005). The noncontrolled use of these products may potentially lead to serious health problems in patients. Especially in elderly patients, drugs used without a physician recommendation may lead to several acute and chronic health problems such as drug–drug interactions, increased drug side effects, increased mortality and morbidity, and increased health expenditures (Bower et al., 2011; Gören et al., 2017; Hines & Murphy, 2011; Huntley, Johnson, Purdy, Valderas, & Salisbury, 2012; Olmos et al., 2012; Salisbury, Johnson, Purdy, Valderas, & Montgomery, 2011; Siddiqui, Min, Verma, & Jamshed, 2014). These products are used simultaneously with prescription drugs, may affect pharmacokinetic profiles of these medicines, may increase or decrease their effects, may cause undesirable side effects, and may trigger drug–drug interactions (Huntley et al., 2012; Siddiqui et al., 2014).

Family physicians are the first contact point for elderly patients with comorbid diseases and multiple drug use and offer holistic health care. At each visit, they can evaluate elderly patients for comorbid conditions and control the drugs that they use to prevent adverse drug events and drug interactions (Bower et al., 2011; Marengoni et al., 2011; Olmos et al., 2012; Salisbury et al., 2011).

In this study, we investigated comorbid conditions, prescription or nonprescription drug use, and nondrug treatment methods in patients above 65 years of age who attended two outpatient clinics of the Family Medicine Department in Akdeniz University Hospital in Turkey. Our aim was to assess the comorbidity and multimorbidity status and to evaluate the use of prescription and nonprescription drugs in our own elderly patient population.

Materials and Methods

This study was designed to be cross-sectional and descriptive and was conducted with 240 adults above the age of 65, who attended two outpatient clinics of the Family Medicine Department in Akdeniz University Hospital in Turkey, between January 2016 and June 2016, and who agreed to take part in the study by giving their consent to participate in the study. Data were collected directly from the patients by face-to-face interview technique.

The study was approved by the Ethics Committee of the Clinical Investigations of the Faculty of Medicine of the University of Akdeniz in a scientific and ethical manner with decision numbered 70904504/253. All investigations were conducted according to the principles of the Declaration of Helsinki.

Statistical Methods Used

The size of the sample for this study was calculated as 240 with the OpenEpi Version 3 open source calculator with the reliability level set at 99%, the frequency percentage set at 50%, the confidence interval set at 5%, and the sample error set at 0.05. The data obtained in the study were analyzed with the Statistical Package for Social Sciences for Windows 22 (SPSS Inc., Chicago, IL). Kolmogorov–Smirnov tests were applied to data meeting the assumption of a normality distribution. One-way analysis of variance (ANOVA) tests were used for data meeting the assumption of homogeneity of variance. Pearson correlation analysis and t tests were applied for data with distributions that met parametric assumptions. Chi-square tests (Pearson's, Yates-adjusted or Fisher's exact test according to sample size), Mann–Whitney U tests, and Spearman correlation analysis were used in situations where parametric assumptions were not met. In all comparisons, $p < .05$ was considered statistically significant.

Results

A total of 244 elderly people including 140 females (58.0%) and 100 males (42.0%) participated in this study. The mean age of the participants was 71.02 (minimum = 65; maximum = 87; SD = 5.39). The average age of men and women was similar (women = 70.31, men = 72.02).

Fifty-six percent of the participants had a primary education, 15% through high school, and 13% through college. The majority of participants (88%) identified themselves as middle income. Ninety-six percent of the participants lived in urban areas. Almost all participants (99.08%) were covered by health insurance.

Participants had a mean number of chronic illnesses of 3.61 (minimum = 0, maximum = 12, SD = 2.06, median = 3) per patient. Table 1 details the number of chronic diseases. As the age of the participants increased, the number of chronic diseases also increased statistically significantly (Pearson's correlation coefficient = .216; $p < .001$).

In this study, the rate of multimorbidity was 85%. The multimorbidity rate was 86% in women and 83% in men.

Table 1. Details the Number of Chronic Diseases in Participants.

Number of chronic diseases	Number of participants	Ratio in all participants (%)
0 disease	14	5.8
1 disease	20	8.3
2 disease	42	17.5
3 disease	46	19.2
4 disease	43	17.9
5 disease	34	14.2
6 disease	20	8.3
7 disease	12	5.0
8 disease	5	2.1
9 disease	3	1.3
≥10 disease	1	0.4
Total	240	100.0

Table 2. The Distribution of Diseases by Age Group.

Disease	%
Hypertension	71.66
Diabetes mellitus	40.00
Hyperlipidemia	31.25
Depression	18.75
Hypothyroidism	17.91
Osteoporosis	16.66
Cancer	8.75
Heart failure	7.5
Cerebrovascular accident	5.4
Chronic kidney failure	5.4
Asthma	5.0
Chronic obstructive pulmonary disease	5.0
Anxiety	4.1
Hyperthyroidism	0.4

Although the multimorbidity rate in female patients was higher than that in male patients, this difference was not statistically significant ($p > .05$). The distribution of multimorbidity by age group was evaluated. It was determined that 82.4% of patients aged 65 to 74 years, 91.4% of patients aged 75 to 84 years, and 100% of patients aged above 80 years had multimorbidity. Despite the increase in multimorbidity rates with age, the difference between age groups was not statistically significant.

Hypertension was found to be the most common disease (71.7%) in male and female patients. The distribution of diseases by age group is shown in Table 2. Distribution of disease by age group was assessed with individual multipanel Chi-square tests, and statistically significant differences were found between age groups only for the incidence of three diseases (Chronic renal failure [CKF], heart failure [HF] and asthma; $p < .05$). Diseases with statistically significant differences in distribution by age group are shown in Table 3.

Prescription Drugs and Polypharmacy Conditions

The mean number of drugs used by participants daily was 4.26 (minimum = 0, maximum = 15, SD = 2.82). This rate was 3.98 for women and 4.65 for men (Table 4).

As the age of participants increased, the average number of medications they used increased. As expected, there was a strong positive correlation between the total number of chronic illnesses and the median number of medications used (Pearson's correlation coefficient = .80, $p < .001$).

In this study, the rate of polypharmacy was 42% (38% in women and 47% in men). The difference between genders was not statistically significant ($p > .05$). Polypharmacy was evaluated by age group. The polypharmacy rate for 65 to 74 years was 36.4%, for 75 to 84 years was 56.9%, and for 85 years and above was

50%. This difference between age groups was statistically significant as assessed by Chi-square test ($p < .05$). In this study, there was no statistically significant difference between the participant education or income and the polypharmacy rates ($p > .05$).

Without a doctor's recommendation, the rate of nonprescription medication use was 20% (21% in women and 18% in men). The difference between the two sexes was not statistically significant ($p > .05$). Forty-four percent of the nonprescription medication users were using medications on the advice of a pharmacist, and 34% of the nonprescription medication users were using the medications on the advice of a family member. Although the rate of nonprescription drug usage decreased as age increased, the difference between the age groups was not statistically significant ($p > .05$). The rate of nonprescription medication use in rural areas was 44% and was 36% in urban areas, but this difference was not statistically significant ($p > .05$).

When the relationship between multimorbidity and nonprescription drug use was assessed, 20.1% of participants with multimorbidities and 19.4% of participants without multimorbidities were using nonprescription medications. The difference between the groups was not statistically significant ($p > .05$). The relationship between multimorbidity and nonprescription drug use is shown in Table 5.

Thirty-five percent of participants reported that they used a natural/herbal product. This rate was 40% in women and 28% in men. There was no statistically significant difference between the sexes in terms of natural/herbal use rates ($p > .05$). The Top 3 most common natural/herbal products used by participants were sage tea (22%), linden (18%), and ginger (6%). Natural/herbal products were generally used for flu/cold (21%), relaxation and sedation (18%), health promotion (12%), cough (8%), constipation (7%), arthralgia (4%) prostate disease (4%), and strengthening immunity (2%).

Table 3. Diseases With Statistically Significant Differences in Distribution by Age Group.

| | Age groups | | | | | | |
| | 65-74 years | | 75-84 years | | ≥85 years | | |
Disease	Number (n)	Ratio in age group (%)	Number (n)	Ratio in age group (%)	Number (n)	Ratio in age group (%)	Statistical significance level
Chronic kidney failure	6	3.4	7	12.1	0	0	$p < .05$
Heart failure	10	5.7	6	10.3	2	33.3	$p < .05$
Asthma	9	5.1	1	1.7	2	33.3	$p < .01$
Other diseases							$p > .05$

Table 4. Number of Drugs Used by Participants.

| | Number of participants | |
Number of drugs used	n	%
No drugs	20	8.33
1 drugs	22	9.17
2 drugs	22	9.17
3 drugs	42	17.50
4 drugs	34	14.17
5 drugs	24	10.00
6 drugs	29	12.08
7 drugs	18	7.50
8 drugs	14	5.83
9 drugs	3	1.25
≥10 drugs	12	5.00
Total	240	100.00

Discussion

Over the past century, life expectancy has increased dramatically (Violan et al., 2014; WHO, 2018). As people get older, their health problems increase. Multimorbidity and polypharmacy are major problems that arise as populations age. Studies have shown that elderly people use many prescription or nonprescription medicines for their health problems and are exposed to the side effects and interactions of these medicines (GSA, 2013; Hines & Murphy, 2011).

In this study, the mean number of chronic illnesses among participants was found to be 3.61. It was found that 94.2% of all participants had at least one chronic disease and 85% had two or more chronic diseases. In the United States, one in four American adults has multimorbidity, and approximately one third of people above 65 years old have four or more chronic illnesses (Buffel du Vaure et al., 2016). In the United Kingdom, one out of every six people has two or more chronic illnesses (Barnett et al., 2012). In Turkey, in a study conducted by Ellidokuz, 72% of people above 65 years of age had two or more chronic diseases (Ellidokuz, Ellidokuz, Uçku, & Aydın, 2005). Because our study and the above study were conducted in a hospital's outpatient clinic, the rates of comorbidity in these two studies may be higher than the studies done in the community in other countries.

Multimorbidity rates were 85% in this study. The rate of multimorbidity was 86% in women and 83% in men. In studies conducted in different countries, multimorbidity differed among people above 65 years of age (Prazeres, Santiago, & Simoes, 2015). In a systematic review by Violan et al. (2014) that included a total of 70,057,611 patients from 12 countries, the average rate of multimorbidity in patients older than 65 years in primary care was 95.1%. According to another systematic review published by Marengoni et al. (2011), the rate of multimorbidity in persons 65 years of age and older was 55% to 98%. Barnett et al. (2012) reported that 65% of people above 65 years of age had multimorbidities in a study conducted in Scotland. The multimorbidity rate in our study was approximately close to the vast majority of studies conducted in the world.

Many studies have shown that multimorbidity and the number of chronic illnesses increase with aging (Buffel du Vaure et al., 2016; Lefevre et al., 2014; Marengoni et al., 2011; Picco et al., 2016; Willadsen et al., 2016). In this study, as the age of participants increased, the total number of chronic diseases also increased statistically significant (Pearson's correlation coefficient = .216; $p < .001$).

In general, it is known that the frequency of multimorbidity in women is higher than in men (Agborsangaya, Lau, Lahtinen, Cooke, & Johnson, 2012; Agur, McLean, Hunt, Guthrie, & Mercer, 2016). In this study, the multimorbidity rate in women (86%) was higher than the multimorbidity rate in men (83%) in people above 65 years, but this difference was not statistically significant ($p > .05$).

Another factor associated with multimorbidity is the socioeconomic status of the patients. Studies have shown that the rate of multimorbidity in low-income patients is higher (Agborsangaya et al., 2012; Agur et al., 2016; Kuo & Lai, 2013; Lefevre et al., 2014; Schafer et al., 2012). In this study, it was also found that as the level of income decreased, the multimorbidity rates increased. The rate of multimorbidity was 85.7% among low-income people, 85.3% among middle-income people, and 76.9% among high-income people. The differences

Table 5. The Relationship Between Multimorbidity and Nonprescription Drug Use.

	Nonprescription drug use			Statistical significance level (Chi-square test)
	NO (%)	YES (%)	Total (%)	
Multimorbidity NO (number of chronic diseases ≤ 1)	80.6	19.4	100	$p > .05$
Multimorbidity YES (number of chronic diseases ≥ 2)	79.9	20.1	100	
Total	80	20	100	

between low- and high-income groups were statistically significant ($p < .05$). For this reason, physicians who care for low-income elderly patients should consider multimorbidity to provide better health care.

The most common diseases in elderly people participating in this study were hypertension (71%), diabetes mellitus (40%), hyperlipidemia (31.3%), atherosclerotic cardiovascular disease (25.4%), and depression (18.8%). In a systematic review published by Willadsen and colleagues (2016), a total of 115 studies were evaluated, and the majority of these studies were conducted in a primary care setting. According to this systematic review, the most common diseases in elderly were diabetes mellitus, stroke, cancer, ischemic heart diseases and chronic obstructive pulmonary disease. In the same study, hypertension was considered a risk factor, not a disease, and was reported to be the most common risk factor in patients. In our study, the diseases we identified in elderly people are quite similar to those found in studies conducted in other countries.

In elderly patients with chronic diseases who obtain health care from different specialties, polypharmacy is an important problem. Elderly people may have difficulty remembering all the medicine they use. Therefore, a drug use history in elderly people should be taken very carefully. In this study, after the medication history was taken from the participants, their electronic records were checked for the drugs used. Participants used an average of 4.26 medicines daily. Men used more medicines than women (respectively, 4.65 and 3.98). Only 8.3% of participants in this study did not use any medication. Approximately 92% of participants were using at least one medication daily, 82.5% of them were using at least two medications, 73.3% of them were using at least three medications, 55.8% of them were using at least four medications, and 41.6% of them were using at least five medications. In a study conducted by Dişcigil, Tekinç, Anadol, and Bozkaya (2006) in Turkey, patients above 65 years of age used 4.5 drugs per day. In a study conducted by Lam et al. in Hong Kong, people aged above 65 years used eight medications daily on average (Lam, Cheung, & Wong, 2015).

The cut-off value for polypharmacy in these studies is generally accepted to be 5 (Institut de recherche et documentation en économie de la santé [IRDES], 2014). The prevalence of polypharmacy varies among countries. In developed countries, the prevalence of polypharmacy is lower among community-dwelling older adults (IRDES, 2014). In studies conducted in developed countries, polypharmacy prevalence is 41% in Iceland (Willadsen et al., 2016), 65.9% in Canada (Proulx & Hunt, 2015), 43.4% in the United States (Hazra, Dregan, Jackson, & Gulliford, 2016), and 35.8% in Australia (Gupta & Agarwal, 2013). In studies conducted in developing countries, it has been reported that 85% to 90% of elderly patients use at least one medication daily (Bahat et al., 2012; Maher, Hanlon, & Hajjar, 2014). The prevalence of polypharmacy in our study was 42% and was similar to developed countries.

The rate of nonprescription medication use in this study was 20% for all participants, 21% for women, and 18% for males. The difference between the two sexes was not statistically significant ($p > .05$). In the United States, 58.6% of people aged 57 to 85 years reported using a nonprescription medication (Hazra et al., 2016). In a study conducted by Sayir, Aslan Karaoğlu, and Evcik Toprak (2014) in Turkey, the rate of using nonprescription medication was reported to be 33% in those aged 65 years and above, who attended primary care, and the most commonly used nonprescription medications were painkillers (60.6%), cold medications (15.2%), laxatives (12.1%), and vitamin/mineral tablets.

Approximately one third of participants reported using a natural/herbal product. This rate was 39.3% for females and 28% for males. According to a systematic review that Harris et al. conducted in 2012 that included 49 studies from 15 countries, the prevalence of using any CAM within a year in elderly people was on average 32% (Harris, Cooper, Relton, & Thomas, 2012). In Turkey, in a study conducted by Tulunay, Aypak, and Yikilkan (2015), 30% of older adults with chronic diseases used herbal products. The results of these studies were very close to those found in our study (34.6%).

According to previous studies, the most commonly used CAM type was phytotherapy in Turkey (39.41). Phytotherapy is the use of plant-derived medications in the treatment and prevention of disease. The most frequently used conditions for these products were influenza/cold (21%), tension/stress (18%), and health promotion (12%).

Conclusion

Because of the increase in the elderly population worldwide, physicians are increasingly providing care to more elderly patients. Managing medications is a considerable

part of providing care to elderly people. Because older people are more susceptible to adverse drug reactions and drug interactions, physicians should receive a comprehensive drug history, review medications to reduce polypharmacy, and if necessary eliminate unnecessary medications to protect the health and prevent adverse drug reactions. In different countries, education, culture and health habits, and access to health services of elderly people are different. These differences may have affected multimorbidity and polypharmacy rates. For this reason, physicians who care elderly patients should consider community features.

Limitations of this study are the small number of participants and it was conducted in a restricted area. More implementation studies in various medical settings where older adults receive care are needed to bring attention to polypharmacy and multimorbidite.

The strength of the study is that it is conducted by direct interviews with elderly patients. In this study, we wanted to draw attention to the fact that elderly people use nonprescription drugs in addition to prescription drugs. We think that more studies on this subject will contribute to the literature.

Declaration of Conflicting Interests

Funding

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