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Polypharmacy and associated factors in people living in a nursing home in Kayseri Turkey

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Abstract

It has been found that residents of nursing homes have more frequent drug side effects, because they use more drugs than those living in the community. This study was conducted to determine the status of polypharmacy and related factors among the individuals living in a nursing home. Materials and Methods: The cross-sectional study was conducted in a nursing home in the provincial centre of Kayseri in 2016. A socio-demographic questionnaire and Standardized Mini Mental Test (SMMT) were used for data collection. A total of 99 participants were included in the study. Chi square test, unpaired t test and one-way ANOVA test (Posthoc Scheffe test) were used for statistical analyses. Results: It was determined that, 58.6% of the study group was male, mean age was 76.0±9.5 years, and 88.9% used at least one kind of medicine. The prevalence rate of polypharmacy was found 59.6%. According to SMMT scores, 66.7% of the participants had cognitive impairment. Prevalence rate of polypharmacy was found 69.0% among the individuals with cognitive impairment. From the standpoint of polypharmacy, statistically significant differences were found between the participants having and not having chronic diseases, such as hypertension, diabetes, heart disease and chronic obstructive pulmonary disease. Conclusions: Polypharmacy was determined in more than half of the individuals living in nursing home. Individuals living in nursing homes should be informed about the use of medicines and their medicine use should be closely monitored.

Keywords: Nursing home, elderly, polypharmacy, chronic disease, cognitive status

Introduction

In many studies, has been found that the incidence of chronic illness increases with advancing age [1-4]. The increasing of chronic diseases with age also increases the need for drugs [2]. This leads to the use of multiple medicines, which together with the risks of side effects and drug interactions [3].

Pharmacokinetics and pharmacodynamic changes and medical problems that occur during old age make the individual more sensitive to the side effects of medicines. In addition, the decline in cognitive and functional capacity with age causes elderly people to experience comprehension and adjustment problems in medicine use [4].

The term of "Polypharmacy", means the use of multiple medicines for more than one indication at the same time [5,6]. The drawbacks of using multiple medicines may be listed as drug side effects, drug-drug interactions, increased treatment expenditures and drug incompatibility.

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The use of multiple medicines in the elderly complicates treatment, increasing the incidence of drug interactions and side effects with inappropriate medicine use. The risk of morbidity and mortality due to medicines increases the costs and also poses a problem in terms of health security systems [3,5,7].

Most of individuals living in the nursing homes were in the geriatric age group [2,4,7,8]. Drug side effects have been found to be more frequent among those living in nursing homes because they are in the geriatric age group and the people living in the nursing homes use more drugs than those living in the community [7,8].

This study was performed in order to determine the status of polypharmacy and related factors among the individuals living in a nursing home.

Material and Methods

This descriptive study was carried out in 2016, on individuals living in Hacı Rukiye Gazioğlu Nursing Home in the provincial centre of Kayseri. Ethical approval was obtained from Erciyes University Ethics Committee for Clinical Investigations and permission was taken from Kayseri Metropolitan Municipality for the study.

A total of 154 people were living in nursing homes. No sampling was done because all of these people were planned to be included in the study.

A socio-demographic questionnaire and Standardized Mini Mental Test (SMMT) were used for data collection. The individuals in the study group were visited by the researchers in the nursing home. Socio-demograhic questionnaire and SMMT were applied by face to face interviewing method. A total of 99 people with no communication disabilities and who agreed to participate were included in the study. Additionally, the health records in the nursing home were examined. The use of 4 or more kinds of medicines daily was accepted as "polypharmacy" [5]. The medicines were classified according to the classification made by Helling et al. [9].

Data collection tools

Socio-demographic questionnaire is consisting of 20 questions about socio-demographic characteristics of the individuals, their general health status and medicine use.

SMMT was developed by Folstein et all. [10] and Turkish version was validated by Güngen et al [11]. SMMT is a screening test used to assess general cognitive functions. Five main areas are evaluated; orientation, recording memory, attention and accountability, recall and language. The highest score of SMMT is 30. Scores of 25 or above are considered as normal cognitive functions [12].

Statistical analysis

Chi-square test and Fisher's exact test for categorical data, unpaired t test, and one-way ANOVA test (post hoc scheffe) for quantitative data were used for statistical analysis. Chi square analysis was performed with Monte Carlo simulation for the tables in which more than 20% of the expected values less than five [13]. Values of $p<0.05$ were considered statistically significant.

Results

The The mean age of the study group was 76.0±9.5 years. Of the participants, 58.6% were male, 84.8% were widowed, 49.5% were illiterate, 89.9% had health security and 70.7% had personal income (Table 1).

Table 1. Sociodemographic characteristics of the study group

Chracteristics	Groups	Number	%
Age Groups	58-64	10	10.1
	65-74	33	33.3
	75-84	34	34.3
	85 and over	22	22.2
Gender	Male	58	58.6
	Female	41	41.4
Educational level	Illiterate	49	49.5
	Literate without diploma	12	12.1
	Primary school	35	35.4
	High school and over	3	3.0
Marital status	Married	7	7.1
	Never Married	8	8.1
	Widowed	84	84.8
Having children	Yes	72	72.7
	No	27	27.3
Health security	Yes	89	89.9
	No	10	10.1
Personal income	Yes	70	70.7
	No	29	29.3
Smoking status	Never smoked	42	42.4
	Ex–smoker	30	30.3
	Current smoker	27	27.3
Total		99	100.0

It was determined that 88.9% of the individuals in the study group was using at least one kind of medicine continuously (4.0% one, 6.1% two, 19.2% three, 59.6% four or over kinds of medicines) (Table 2). This percentage was 82.2% for the males and 97.6% for the females.

General prevalence rate of polypharmacy was found as 59.6% in the study group, 56.9% for men and 63.4% for women. The relations between some socio-demographic characteristics and polypharmacy were shown in Table 3. There was no significant relationship between gender and polypharmacy ($p>0.05$). Polypharmacy was most prevalent in 75–84 age group (76.5%) and significantly higher than the other age groups ($p<0.05$). There was no statistically significant relationship between polypharmacy and other socio-demographic characteristics ($p>0.05$) (Table 3).

The mean score of SMMT was found 21.3±5.9 in the study group and 66.7% of the participants were accepted as cognitive impairment according to SMMT scores. On the other hand, 41.4% of the study group stated that they had hypertension, 32.3% heart disease, 20.2% diabetes mellitus, and 7.1% chronic obstructive pulmonary disease (COPD).

The relations between health-related characteristics of the participants and polypharmacy were shown in Table 4.

Prevalence rate of polypharmacy was found 60.9% among the individuals with cognitive impairment. There was no significant relationship between polypharmacy and cognitive status (p>0.05). Prevalence rate of polypharmacy was found 57.7% among the participants who perceived general health status as poor. There was no statistically significant relationship between polypharmacy and general health perception (p>0.05) (Table 4).

As shown in Table 4, prevalence rate of polypharmacy was 73.2% for the individuals with hypertension, 85.0% for those with diabetes, 87.5% for those with heart disease and 100% for those with COPD. There was a statistically significant relationship between polypharmacy and these chronic diseases (p<0.05).

Table 5 and 6 show the distribution of the medicines used by the individuals according to the medicine groups and gender and age groups of the individuals. As shown in the tables, most commonly used medicines in the study group are cardiovascular drugs, analgesic and anti-inflammatory drugs and gastrointestinal system drugs respectively.

Table 2. Drug use status in the study group

Drug use status		Number	%
Continuous drug use	**Yes**	**88**	**88.9**
	No	11	11.1
Number of drugs	**0**	11	11.1
	1	4	4.0
	2	6	6.1
	3	19	19.2
	4 and over	59	59.6
Polypharmacy	Yes	59	59.6
	No	40	40.4
Total		99	100.0

Table 3. Polypharmacy according some sociodemographic factors

Sociodemographic Characteristics	Groups	n	Polypharmacy		X2	p
			number	%		
Age Groups	58-64	10	3	30.0	8.556	0.036
	65-74	33	17	51.5		
	75-84	34	26	76.5		
	85 and over	22	13	59.1		
Gender	Male	58	33	56.9	0.424	0.515
	Female	41	26	63.4		
Educational Level	Illiterate	49	30	61.2	2.268*	0.519
	Literate without diploma	12	9	75.0		
	Primary school	35	18	51.4		
	High school and over	3	2	66.7		
Marital Status	Married	7	4	57.1	1.826*	0.401
	Never married	8	3	37.5		
	Widowed	84	52	61.9		
Having Children	Yes	72	47	65.3	3.539	0.060
	No	27	12	44.4		
Health Security	Yes	89	54	60.7	Fisher's exact test	0.514
	No	10	5	50.0		
Private Income	Yes	70	44	62.9	1.055	0.304
	No	29	26	89.7		
Smoking Condition	Never smoked	42	21	50.0	3.926	0.140
	Ex–smoker	30	22	66.7		
	Current smoker	27	13	48.1		
Total	99	59	59.6			

***: Chi square analysis was performed with Monte Carlo simulation, because more than 20% of the expected values is less than 5.**

Table 4. Multiple drug use according some health-related characteristics of the study group

Health Related Characteristics	Groups	n	Multidrug Users		X^2	p
			number	%		
General Health Perception	Good	40	21	52.5	2.27	0.321
	Moderate	33	23	69.7		
	Poor	26	15	57.7		
Cognitive Impairment (n=96*)	Yes	64	39	60.9	0.19	0.659
	No	32	18	56.3		
Hypertension	Yes	41	30	73.2	5.36	0.021
	No	58	29	50.0		
Diabetes mellitus	Yes	20	17	85.0	6.72	0.010
	No	79	42	53.2		
Heart disease	Yes	32	28	87.5	15.29	<0.001
	No	67	31	46.3		
COPD	Yes	7	7	100.0	**	0.024
	No	92	52	56.5		
Total		99	59	59,6		

*: Three participants were not answered SMMT
**: Fisher's exact test

Table 5. Distribution of the drugs used in the study group according to the gender of the participants and drug groups

Drugs	Gender							
	Male (n=58)		Female (n=41)		Total (n=99)			
	number	%	number	%	number	%	X2	p
Cardiovascular drugs	32	55.2	26	63.4	58	58.6		
Analgesic and anti-inflammatory drugs	20	34.5	21	51.2	41	41.4		
Gastrointestinal system drugs	24	41.4	14	34.1	38	38.4	0.53	0.466
Diuretics	9	15.5	16	39.0	25	25.3	7.03	<0.001
Endocrine drugs	9	15.5	9	22.0	18	18.2	0.67	0.414
Psychiatric drugs	4	6.9	11	26.8	15	15.2	7.42	<0.001
Central nervous system drugs	9	15.5	6	14.6	15	15.2	0.01	0.904
Respiratory system drugs	8	13.8	7	17.1	15	15.2	0.20	0.654
Genitourinary system drugs	7	12.1	4	9.8	11	11.1	*	0.718
Vitamins	3	5.2	7	17.1	10	10.1	*	0.053
Ophthalmic drugs	6	10.3	2	4.9	8	8.1	*	0.326
Antibiotics	4	6.9	3	7.3	7	7.1	*	0.936
Hematopoietic system drugs	4	6.9	3	4.9	7	7.1	*	1.000
Dermatologic drugs	4	6.9	0	0.0	4	4.0	*	0.086
Ear drugs	1	1.7	0	0.0	1	1	*	1.000

**: Fisher's exact test

Table 6. Distribution of the drugs used in the study group according to the gender of the participants and drug groups

Drugs	Gender											
	58–64 (n=10)		65–74 (n=33)		75–84 (n=34)		85+ (n=22)		Total (n=99)			
	number	%	number	%	number	%	number	%	number	%	X^2	P
Cardiovascular drugs	3	30.0	17	51.5	27	79.4	11	50.0	58	58.6	10.79	0.013
Analgesic and anti-inflammatory drugs	4	40.0	8	24.2	14	41.2	15	68.2	41	41.4	10.52	0.015
Gastrointestinal system drugs	3	30.0	13	39.4	12	35.3	10	45.5	38	38.4	0.91	0.822
Diuretics	2	20.0	9	27.3	9	26.5	5	22.7	25	25.3	0.32	0.957
Endocrine drugs	2	20.0	6	18.2	9	26.5	1	4.5	18	18.2	4.34	0.227
Psychiatric drugs	0	0.0	4	12.1	5	14.7	6	27.3	15	15.2	4.54*	0.209
Central nervous system drugs	0	0.0	5	15.2	6	17.6	4	18.2	15	15.2	2.11*	0.550
Respiratory system drugs	0	0.0	1	3.0	11	32.4	3	13.6	15	15.2	13.42*	<0.001
Genitourinary system drugs	0	0.0	4	12.1	6	17.6	1	4.5	11	11.1	3.72*	0.294
Vitamins	1	10.0	0	0.0	5	14.7	4	18.2	10	10.1	6.08*	0.108
Ophthalmic drugs	0	0.0	3	9.1	4	11.8	1	4.5	8	8.1	1.92*	0.590
Antibiotics	0	0.0	3	9.1	4	11.8	0	0.0	7	7.1	3.78*	0.286
Hematopoietic system drugs	0	0.0	3	9.1	3	8.8	0	0.0	6	6.1	3.05*	0.384
Dermatologic drugs	0	0.0	1	3.0	2	5.9	1	4.5	4	4.0	0.82*	0.845
Ear drugs	0	0.0	1	3.0	0	0.0	0	0.0	1	1.0	2.02*	0.568

***: Chi square analysis was performed with Monte Carlo simulation, because more than 20% of the expected values are less than 5**

Discussion

It was determined that, 88.9% of the study group, 82.2% of males and 97.6% of females, were using at least one kind of medicine continuously. The mean number of medicines used in the study group was 3.8±2.0. Of the study group, 59.6% were used four or over kinds of medicines daily (Table 2). So, prevalence rate of polypharmacy in the study group was accepted as 59.6%. In a study, conducted in 23 elderly nursing homes in Turkey; 11.7% of the participants reported using four kinds, and 17.3% reported using five or more kinds of medicines [14]. In the study of Esengen et al, 94.4% of women, and 80.4% of men used at least one medicine, and the usage of five or more kinds of medicines was reported to be 42.6% for females and 22.8% for males [4]. In another study conducted by Gökçe Kutsal et all, it was reported that 23.2% of elderly individuals used only one, 17% used two, 19.2% used three, and 38.2% used four or more kinds of medicines [15].

One of the factors that affect medicine use and compliance in the elderly is cognitive functions [4]. Cognitive functions can affect the individuals in many ways, such as information about the drug, memory and anticipation. On the other hand, visual problems and diminished motor skills in the elderly can lead to problems such as the inability to open the drug box and the failure to read the drug prospectus, which affect the medicine use negatively [16–18].

The mean of SMMT scores in the study group was found 21.3±5.9. According to the SMMT scores, 66.7% of the individuals have cognitive impairment. There may be problems with the decrease of cognitive capacity in the elderly, in understanding the medicine and in adaptation [4]. Prevalence rate of polypharmacy was found 60.9% among the individuals with cognitive impairment in our study (Table 4). However, there was no significant relationship between cognitive status and polypharmacy. Inadequate information of the elderly about the medicines increases the likelihood of making mistakes at the time and dosage of drugs, and therefore the risk of side effects [4]. For this reason, polypharmacy in the individuals with cognitive impairment is especially important.

One of the important factors affecting medicine use in old age is the number of medicines used [19–21]. As the number of medicines used by older people increases, the rate of misuse of medicines and the incidence of adverse drug interactions increases [19,22]. Therefore, an increase in the number of medicines used in the elderly affects the level of information about the medicines and causes the use of incorrect medicines [20]. Some studies show that women use more medicines than men [4,19]. In a study conducted in 2006, it was found that more than half of the elderly were on continuous medication and that polypharmacy was higher in women [11]. In our study, prevalence rate of polypharmacy was found 56.9% for men and 63.4% for women (Table 3). However, the difference between the genders was not statistically significant.

Prevalence rate of polypharmacy was found 30% among the individuals who are under 65 years of age and 76.5% in 75–84 age group. The difference between the age groups was found statistically significant. In a study, it has been specified that the use of four or more kinds of medicines at the same time is most seen in the 71-80 age group [21]. It has been reported that as the organ functions decrease with aging, the number of chronic diseases increases. Studies show that the number of medicines prescribed is also increasing with aging [5,23].

No statistically significant relationship was found between polypharmacy and the other socio-demographic factors, such as educational level, marital status, having children, having health

security, having personal income and smoking status. There are some studies showing that higher educational level, to be married, and having personal income affect rational drug use of the older adults [4,15,24]. However, we couldn't find any study shoving an association between rational drug use and health security, having children, and smoking condition.

In older ages, people are faced with age-related health problems and many acute and chronic illnesses that ruin the quality of life and as a result the general health perceptions of the individuals are negatively affected. It is normal for individuals to increase the number of medicines they use because of having one or more illnesses. In the study group, 96.2% of the individuals with poor general health perception were using at least one kind of medicine. However, there was no statistically significant relationship between polypharmacy and general health perception (Table 4).

In our study, 41.4% of the individuals had hypertension, 32.3% heart disease, 20.2% diabetes mellitus, and 7.1% COPD. There was a statistically significant relationship between polypharmacy and chronic diseases in our study. This result can be explained by the increased incidence of chronic diseases with advancing age and the coexistence of multiple drugs in the treatment of these chronic diseases.

In the literature, it has been reported that the medicines most commonly used by nursing home residents are cardiovascular system drugs, analgesics and hematopoietic system drugs. [4,14]. Analgesic drug use has been reported to be 60.4% in a study on 4162 elderly individuals aged 65 years or older living in the community [25]. Muscle-skeletal system pain is present in almost all of the elderly population. In a study conducted on elderly individuals living in both community and nursing homes, it has been determined that individuals have one or more rheumatic diseases in most cases [26].

Among the drugs used in our study group, the most commonly used drug is cardiovascular system drugs (58.6%), followed by analgesic and anti-inflammatory drugs (41.4%) and gastrointestinal system drugs (38.4%) (Table 5). This result is similar to the literature. No significant difference was found between males and females from the standpoints of the usage of these drugs. In the study of Seçkin et al [27], analgesics and anti-inflammatory drugs took the first place in medicine use and in the study of Arslan et al, analgesic and anti-inflammatory drug use rates were 30.0% for females and 15.3% for males [14]. A study on 1,800 elderly individuals the age of 75 and over indicated that women were using analgesics at a higher rate than men [14,25].

It was determined that, 26.8% of the women and 6.9% of the men were using psychiatric drugs and the percentage of psychiatric drug use among the women was significantly higher than that of the men. Similarly, the percentage of the women using diuretic drugs was 39.0% and this percentage was found significantly higher than that of men (Table 5). These results may reflect the higher prevalence rates of hypertension and psychiatric diseases, such as depression, among the women.

In our study group, the use of cardiovascular system (79.4%) and respiratory system drugs (32.4%) were significantly higher in the 75-84 age group than the other age groups. On the other hand, the percentage of analgesic and anti-inflammatory drugs increase with age, and it was significantly higher in the age group of 85 and over than the other age groups (Table 6). No significant difference was found between the age groups from the standpoints of the use of the other drugs.

There is an important limitation of this study. The results cannot be generalized to all the people living in the nursing homes in the country, because the study was conducted in only one nursing home and the number of correspondents was limited.

It was concluded that, chronic diseases and polypharmacy are common problems in individuals living in the nursing home. Drug side effects may cause important health problems, especially for the individuals having cognitive impairment. For this reason, the individuals living in the nursing homes should be informed about the use of medicines and their medicine use should be closely monitored by the health personnel.

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References

1. Güneş D. Yaşlıların ilaç kullanimi konusundaki bilgileri ve etkileyen faktörlerin değerlendirilmesi. Yüksek Lisans Tezi, Atatürk Üniversitesi, Erzurum, 2014.
2. Ünsal A, Demir G, Çoban-Özkan A, Gürol Arslan G. Huzurevindeki yaşlilarda kronik hastalik sikliği ve ilaç kullanimları. Adnan Menderes Üniversitesi Tıp Fakültesi Dergisi. 2011;12(3):5-10.
3. Onar E, Kapucu S. Yaşlılarda çoklu ilaç kullanimi: Polifarmasi. Akademik Geriatri Dergisi. 2011;3(1):22-8.
4. Esengen Ş, Seçkin Ü, Borman P, Bodur H, Gökçe-Kutsal Y, Yücel M. Huzurevinde yaşayan bir grup yaşlida fonksiyonel-kognitif değerlendirme ve ilaç kullanimi. Turk J Geriatr. 2000;3(1):6-10.
5. Yeşil Y, Cankurtaran M, Kuyumcu ME. Polifarmasi. Klinik Gelişim Dergisi. 2012;25(3):18-23.
6. Veehof L, Stewart R, Haaijer-Ruskamp F, Jong BM. The development of polypharmacy: A longitudinal study. Fam Pract. 2000;17(3):261-7.
7. Dişcigil G, Tekinç N, Anadol Z, Bozkaya AO. Toplum içinde yaşayan ve bakimevinde kalan yaşlilarda polifarmasi. Turk J Geriatr.2006;9(3):117-21.
8. Nguyen JK, Fouts MM, Kotabe SE, Lo E. Polypharmacy as a risk factor for adverse drug reactions in geriatric nursing home residents. Am J Geriatr Pharmacother. 2006;4(1):36-41.
9. Helling DK, Lemke JH, Semla TP, Wallace RB, Lipson DP, Cornoni-Huntley J. Medication use characterictis in the elderly: The Iova 65+ rural health study. J Am Geriatr Soc. 1987;35(1):4-12.
10. Folstein MF, Folstein SE, McHugh PR. Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;12(3):189-98.
11. Güngen C, Ertan T, Eker E, Yaşar R, Engin F. Standardize mini mental testin Türk Toplumunda hafif demans tanisinda geçerlik ve güvenirliği. Anadolu Psikiyatri Derg. 2002;13(4):273-81.
12. Deborah B. Psychiatric rating scales. In: BJ Sadock, VA Sadock, eds. Comprehensive Textbook of Psychiatry. vol. II. Philadelphia: Lippincott Williams& Wilkins. 2000;755-83.

13. Sümbüloğlu K, Sümbüloğlu V. Biyoistatistik. Yenilenmiş 14. Baskı, Hatipoğlu Yayıncılık, Ankara, 2010.

14. Arslan Ş, Atalay A, Gökçe Kutsal Y. Yaşlılarda ilaç tüketimi. Turk J Geriatr. 2000;3(2):56-60.

15. Gökçe KY. Yaşlılarda çoklu ilaç kullanimi. Turk J Geriatr. 2006; (Özel Sayı): 37-44.

16. Çuhadar D, Sertbaş D, Tutkun H. Huzurevinde yaşayan yaşlilarin bilişsel işlev ve günlük yaşam etkinliği düzeyleri arasindaki ilişki. Anadolu Psikiyatri Derg. 2006;7(4):232-239.

17. Kurtoğlu TR. Seyranbağları Huzurevi'ndeki yaşlilarin medikososyal durumlarinin değerlendirilmesi ve bu kişilerde depresyon, bilişsel bozukluk ve yeti yitimi sikliği araştirmasi. Doktora Tezi, Gazi Üniversitesi, Ankara,1998.

18. Maral I, Aslan S, İlhan MN, Yıldırım A, Candansayar S, Bumin M. Depresyon yayginliği ve risk etkenleri: huzurevinde ve evde kalan yaşlilarda karşilaştirilmali bir çalışma. Anadolu Psikiyatri Derg. 2001;12(4):251-9.

19. Özdemir L. yaşlilikta ilaç uyumu ve ilaç uyumunu etkileyen faktörler. Akademik Geriatri Dergisi. 2012;4(1):18-22.

20. Topbaş M, Yarış F, Çan G. Yaşlılar kullandiklari ilaçlarla ilgili yeterli bilgiye sahipler mi? Trabzon'da bir sağlik ocaği bölgesindeki araştirma sonuçları. Ege Tıp Dergisi. 2003;42(2):85-90.

21. Şahin G, Baydar T. Use of drugs among older persons. In: Troisi J, Gökçe Kutsal Y, eds. Aging in Turkey: Malta. Vertas Pres. 2006;55-84.

22. Ertürk A. Huzurevindeki yaşlilarin ilaç kullanim hatalari ve etkileyen faktörler. Yüksek Lisans Tezi, Cumhuriyet Üniversitesi, Sivas, 2005.

23. Azad N, Tierney M, Victor G, Kumar P. Adverse drug events in the elderly population admitted to a tertiary care hospital. J Health Manag. 2002;47(5):295-306.

24. Solmaz T. Evde yaşayan 65 yaş ve üzeri yaşli bireylerin ilaç kullanimi ve kendi kendine ilaç kullanim yetisi. Yüksek Lisans Tezi, Selçuk Üniversitesi, Konya, 2008.

25. Grimby C, Fastbom J, Forsell Y, Thorslund M, Claesson CB, Winblad B. Musculoskeletal pain and analgesic therapy in a very old population. Arch Gerontol Geriatr. 1999;29(1):29-43.

26. Akman N. Yaşlılarda Romatizmal Hastalıklar. In: Gökçe Kutsal Y, editör. Geriatrik Rehabilitasyon. TFTRD Geriatrik Rehabilitasyon Çalışma Grubu Yayını, Ankara. 2010;61-7.

27. Seçkin Ü, Bodur H, Gökçe-Kutsal Y. Yaşlılarda ilaç tüketimi. Turk J Geriatr. 1998;1(1):36-8.