Original Article

Relationship Between Polypharmacy and Medication Adherence in the Hypertensive Elderly Patients

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Abstract

Background: Proper adherence to the medication regimen in hypertensive elderly patients is important. This study aimed to investigate the relationship between polypharmacy with adherence to the medication regimen in hypertensive elderly patients.

Materials and Methods: Using stratified random sampling method, the present descriptive-analytical study was performed on 384 hypertensive elderly patients in Gonabad, Iran in 2016. The study population included males and females aged over 60 years who were covered by Gonabad urban and rural community health centers. Data were collected using demographic questionnaire and the eight-item Morisky Medication Adherence Scale (MMAS-8).

Results: The mean daily medications in participants was 6±2.43, and a high medication adherence was observed among 36.7% of the subjects. Chi-square test showed a significant relationship between polypharmacy and medication adherence ($P = 0.006$).

Conclusion: Physicians and nurses can play an important role in preventing the risks of polypharmacy, as well as non-adherence to medication regimen by educating the hypertensive elderly patients or their caregivers.

Keywords: Polypharmacy, Medication adherence, Elderly, Hypertension

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Introduction

Hypertension (HTN) is one of the most common chronic diseases and a major cause of premature death worldwide, with upwards of 1 in 4 men and 1 in 5 women – over a billion people – having the condition (1, 2). HTN is defined as an increase in systolic blood pressure of 140 mm Hg or an increase in diastolic blood pressure of 90 mm Hg (3). Moreover, it has been one of the top 10 causes of death in Iran until 2016 so that about 30% of the population over the age of 30 suffer from it (4).

Increasing age is associated with an increase in the prevalence of HTN, with an incidence of 60-70% among the elderly people aged over 60 years (5). Cardiovascular complications are two to three times more common in hypertensive elderly people as compared to normotensive ones (6). In addition, the high prevalence of HTN significantly increases mortality and disability in the elderly people (6).

Over the last century, there has been a significant increase in the world's older population around the world due to the reduced mortality rate, increase life expectancy, and reduced birth rates (7). On average, a 75-year-old elderly person suffers from 3.5 chronic diseases, and the specific treatments of each disease lead to an increase in the number of medications used (7).

Over-the-counter (OTC) medications in the elderly are also higher than other populations, accounting for 97% of the medication regimens in them (4). It has also been found that the elderly people are taking one or two OTC medications for every 2 to 3 prescription drugs (4).

Polypharmacy among older adults is a relevant issue (8), which refers to the simultaneous use of five or more drugs (9). Results of studies show that the prevalence of polypharmacy increases with age, which may be due to increased inappropriate drug prescription, inappropriate treatment, medication errors, and increased number of OTC drugs leading to an increase in health care costs and adverse drug reactions (8, 10). According to a study by Charlesworth et al, from 1988 to 2010, the prescription of 5 drugs and more for the elderly has increased almost to 40% (11).

The medication regimen will be effective if the patient uses their medications accurately and regularly (12). Although medications are often the first choice in the

treatment of chronic diseases such as HTN, studies have shown that the elderly have difficulty adhering to their medication regime (11, 13). Adherence to a medication regimen is defined as "the extent to which a person's behavior agrees with the agreed medication regimen from a health care provider" (14). According to the World Health Organization (WHO), non-adherence to medication regimens is the leading cause of death (15). Patients with chronic diseases may develop recurrence and disability progression if they do not adhere to their medication regimen, requiring immediate treatments and re-hospitalization (16). Stroke is also an important complication of non-adherence to medication in hypertensive patients (16). On the other hand, non-adherence to medication regimens is one of the barriers to the prevention and proper treatment of cardiovascular diseases, as well as preventing an increase in the cost of treatment (17).

According to the WHO, poor medication adherence is the most important cause of uncontrolled HTN, and it is estimated that 50 to 70% of hypertensive patients do not take their medications as prescribed (18).

Comorbidities, financial reasons, reduced physical and cognitive abilities, and inability to pay for medications are important barriers to adherence to medication regimens in these patients (18). Side effects of HTN medications, such as sudden drops in blood pressure, gastrointestinal problems, drowsiness, and depression, can also lead to a decrease in medication adherence of HTN patients (18, 19).

Considering the importance of drug adherence in the control and treatment of HTN as well as the high rate of polypharmacy in hypertensive elderly people, this study aimed to investigate the relationship between polypharmacy and adherence to medication regimens in these patients.

Materials and Methods

Using stratified sampling method, this descriptive-analytical study was performed on 384 hypertensive elderly people in Gonabad, Iran in summer and autumn 2016. The study population included all men and women aged over 60 years who were covered by Gonabad urban and rural community health centers. Each of the health centers of the urban and rural community was considered as one group. Then three centers were selected by a simple random sampling method and in each center the elderly with high blood pressure were chosen randomly. The sample size was calculated using G*Power software and 95% confidence with p = 0.5 and d = 0.5. The inclusion criteria were as follows: elderly patients aged 60 years or older, blood pressure ≥ 140/90, diagnosis of HTN at least 6 months before the study, treated with HTN medications, taking more than 5 drugs, no disability, self-care ability, and absence of severe psychiatric problems. After obtaining the necessary permissions from Gonabad

University of Medical Sciences and the patients' written consent to participate in the study, data were collected using a demographic questionnaire and the eight-item Morisky Medication Adherence Scale (MMAS-8) through in-house interviews. The demographic information questionnaire was researcher-made and included questions on age, sex, marital status, place of residence, level of education, and employment status. The MMAS-8 was developed by Morisky et al (20). This questionnaire consists of 8 items. All questions of this questionnaire score based on Yes (1) and No (0) format, except Item 8 which is scored using a five-point Likert scale (never = 0, rarely = 1, sometimes = 2, often = 3, and always = 4). Items 5 and 8 are scored reversely in comparison to other items. To calculate the overall score of the questionnaire, the scores of all items of the questionnaire are added together. The overall score ranges from 0 to 8; and a score higher than two indicates a weak drug adherence, a score of one and two moderate adherence, and a score of zero high adherence (21). The validity and reliability of this questionnaire were confirmed by Ghanei Gheshlagh et al in Iran in 2015. The reliability of the questionnaire was determined based on Cronbach's alpha coefficient of 0.72 (22). Data analysis was then carried out using descriptive statistics and chi-square test in SPSS software version 16.

Results

The mean age of the study participant was 80.55 ± 9.75 years. The majority of subjects (42.4%) suffered from HTN for more than 10 years and most of them (44.8%) lived with their spouse. Table 1 shows the demographic information of patients. Based on the results of the study, 36.7% of hypertensive patients had high medication adherence, 46.4% of them had moderate medication adherence, and only 16.9% had poor medication adherence. Polypharmacy was observed in 78.3% of patients, and the mean number of daily medications was 6 ± 2.43 drugs (Table 2). Chi-square test showed a significant relationship between polypharmacy and adherence to the medication regimen (*P* = 0.006).

Discussion

This study was performed to investigate the relationship between polypharmacy with adherence to the medication regimen in hypertensive elderly patients. Our results revealed that the average number of drugs was 6 ± 2.43 per day. The average number of drugs taken by elderly was also 5.1 ± 3.22 and 6.2 ± 3.53 in studies by Yavari et al (23) and Dianati et al (24), which was almost consistent with the results of the present study. On average, the elderly people take between five and eight drugs a day (25). In this study, polypharmacy was observed in 78.3% of the cases. Furthermore, the polypharmacy prevalence was 56.6% and 42.2% in studies by Delshad Noghabi et al (26) performed on the elderly with various chronic diseases and Haider et al (27) performed on adults

Table 1. Demographic Information of Research Subjects

Variable		Frequency	Percentage
Sex	Male	178	46.4
	Female	206	53.6
Marital status	Married	259	67.4
	Widow(er)	119	31
	Divorced	6	1.6
Place of residence	City	164	42.7
	Village	220	57.3
Level of education	Illiterate	151	39.4
	Elementary	165	42.9
	Diploma	57	14.8
	University	11	2.9
Employment status	Employee	3	0.8
	Retired	46	12
	Farmer	66	17.2
	Self-employed	51	13.3
	Housewife	163	42.4
	Disabled	55	14.3

older than 18 years with mental disorders, which were inconsistent with the present study. This may be due to differences in regulations and supervisions governing drug administration, differences in demographic characteristics, and type of the disease under study.

Factors such as the increased incidence of numerous acute and chronic diseases with age, increased access to OTC drugs, production of newer and better drugs, changes in patients' expectations and health care system are effective on the increased drugs used in the elderly people (26).

The results of the current research showed that 36.7% of hypertensive patients had high medication adherence and only 16.9% had poor medication adherence. Shabany-Hamedan et al (12) showed that 57.8% of patients did not adhere to their medication regimen. In addition, the results of a study by Hadi et al (28) revealed that 60.4% of the research subjects did not adhere to their medication regimen. This discrepancy may be attributed to the differences in the study population of the present research with aforementioned studies; the present study was performed on patients over 60 years of age but the study

by Hadi et al (28) was carried out on participants aged 25-65 years. While Shabany-Hamedan et al (12) evaluated kidney transplant patients, the present study investigated the hypertensive elderly patients.

In the elderly people, overall medication adherence was reported to be between 26%-59% (29). Increasing number of drug use in these individuals leads to an increase in the risk of side reactions, risk of drug interactions, and poisoning, which may exacerbate cognitive and behavioral changes in the elderly, consequently disrupting the implementation of medication prescriptions, and non-adherence to medication regimen (30).

Controlling and lowering blood pressure in patients encourages them to continue treatment, but a consistent high blood pressure and failure to control it may lead to treatment withdrawal and medication non-adherence (31). Studies have also shown that medication non-adherence is due to a misunderstanding of the barriers or benefits of doing such practice in most cases (31, 32).

The present study showed a significant relationship between polypharmacy and adherence to the medication regimen, with hypertensive elderly patients who had polypharmacy adhered to their medication regimen less frequently, which is consistent with the studies by Cárdenas et al (33) and Delshad Noghabi et al (26). However, Zelko et al (34) found that patients with type 2 diabetes who had polypharmacy had a high level of medication adherence, which may be due to differences in the type of disease and the population under study.

The results of previous studies on chronic diseases have shown that patients stop taking their medications frequently due to the unpleasant complications of some drugs, and the disbelief in the efficacy of drugs on their health at the present time and in the future (34, 35). The costs of complex and multi-drug regimens can also lead to non-adherence to therapeutic and medication regimens (36). On the other hand, an increase in the number of drugs used may cause the elderly people to forget the time of some drugs, as well as make them unfamiliar with the medication instructions (37).

Physicians and nurses play an important role in prescribing medicines correctly and reasonably. Physicians can prescribe the lowest number of drugs, if possible, to treat patients so that the elderly people do not make mistake in taking the appropriate drug

Table 2. Distribution of Absolute and Relative Frequency of Medication Adherence Among Research Subjects by Polypharmacy Multiplicity

Polypharmacy	Medication adherence						Total	Test Result
	Poor		Moderate		High			
	Number	Percent	Number	Percent	Number	Percent		
4 Drugs	23	35.4	25	14	35	24.8	83	
5-9 Drugs	37	56.9	138	77.5	94	66.7	269	χ^2=14.3, df=4, P=0.006
10 Drugs and more	5	7.7	15	8.4	12	8.5	32	
Total	65		178		141			

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(38). Nurses can also play an effective role by educating the patient about the importance of proper and timely medication administration, as well as developing appropriate programs aiming at reducing the side effects of medications, trying to avoid drug interference with the patient's daily life plans, and teaching helpful strategies to help remember drugs and ensure continued adherence to the therapeutic regimen in hypertensive patients (16).

Conclusion

According to the results of the present study, polypharmacy can decrease medication adherence in hypertensive elderly patients. These findings urge primary care practices to implement evidence-based interventions to prevent unnecessary polypharmacy and improve medication adherence in elderly patients.

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