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RESEARCH ARTICLE

Associated Factors with Adherence Level of Elderly Patients with Hypertension to the Prescribed Medication

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Abstract:

Background:

More and more studies have emphasized the level of adherence among patients with hypertension during the last decades.

Objective:

The purpose of this study is to investigate the level of adherence of elderly patients with hypertension to the medication given to them.

Methods:

For this purpose, a quantitative synchronous study was performed on a sample of 73 elderly patients with hypertension. The Self-Efficacy For Appropriate Medication Use Scale [SEAMS] was used to evaluate medication adherence.

Results:

The findings of the study showed that elderly patients with hypertension show a moderate level of adherence to the medication. Age, years of starting treatment, and years of diagnosis were significantly associated with the level of medication adherence in elderly patients with hypertension.

Conclusion:

More studies are needed to highlight the factors that affect the level of adherence to the medication of elderly patients with hypertension.

Keywords: Medication adherence, Elderly, Hypertension, Patients, Dosage, Treatment.

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1. INTRODUCTION

Medication adherence consists of an issue including multiple facets as well as an active process changing over time. According to Vrijens *et al.* [1], it includes three elements: start, apply and stop. Initiation happens when a patient takes the first dose of a prescription drug. Discontinuation takes place when the patient, for any reason, stops taking the prescribed medication. Adherence is the degree to which the actual dosage received by the patient corresponds to the intended dosage regimen, from the start to the last dose. Persistence refers to the time between the start and the last dose directly preceding discontinuation. Medication adherence problems are characterized by two main patterns: non-adherence or good adherence but poor adherence (mainly missed doses and medication interruptions). These are not necessarily independent. For example, suboptimal implementation can lead to poor hypertension control, which in turn can lead to nonadherence [2, 3]. Determining a patient's pattern of nonadherence is of great importance, as the intervention strategy will be subject to the type of pattern.

A meta-analysis of 569 studies on medication adherence revealed an average non-adherence rate of 25% [4]. Adherence is higher in patients with arthritis, IV infection, gastrointestinal disorders or cancer and lower in patients with diabetes mellitus, pulmonary disease or sleep disorders. It is generally assumed that disease severity motivates patients to take their medications exactly as prescribed [5].

Long-term care patients are in need of better medication adherence, and several studies have documented varying

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adherence behaviors in relation to gender, age, condition management, socioeconomic status, study population, and methods used for adherence measurement. There is a reported rate of 75-80% of patients with acute conditions and a reported adherence rate of 50% for patients in long-term care [6]. Of the population of diagnosed hypertensive patients, 75% are unable to achieve full blood pressure control, *i.e*., less than 25% of patients treated for hypertension in several countries achieve good blood pressure control. 50-70% has also been reported as the estimated number of patients who actually take their antihypertensive medication [7].

Sociodemographic and clinical factors associated with medication adherence

1.1. Age

The evidence regarding the contribution of age in predicting medication adherence is mixed. The literature suggesting a harmful impact of younger age on adherence is relatively consistent [8]. For the elderly, a few studies indicate that older age is related to better medication adherence [9]. However, some other studies have presented conflicting results, such as that increasing age affects older people's compliance in the opposite direction [10]. Elderly patients may have additional limitations that affect adherence, such as vision, hearing, and memory problems. In addition, they may have more difficulties following medical instructions due to cognitive impairment or physical complications, such as problems swallowing tablets, opening medicine containers, handling small tablets, distinguishing colors or recognizing drug labeling [11]. Further, older adults may also be more concerned about their health than younger patients, so the non-adherence of older patients may be involuntary in many cases. Therefore, if they can receive the necessary support from healthcare providers or family members, they may be more likely to adhere to medication [8].

1.2. Gender

Evidence on the relationship between gender and adherence is mixed, with some studies suggesting that female patients have a higher level of adherence [12], others that males have a higher level of adherence [13] and others that there is no relationship between gender and adherence [14].

Educational level: Several studies show that patients with a higher educational level may have greater adherence [14]. Intuitively, it can be expected that patients with a higher level of education should have better knowledge about their disease and treatment and therefore have a higher level of adherence. However, even highly educated patients may not fully understand their conditions or not believe in the benefits of complying with their medication. There is some evidence to suggest that patients with lower levels of education have better adherence, perhaps because patients with lower levels of education may trust doctors' advice more [15].

Duration of treatment: Severe illnesses are associated with improved adherence than chronic illnesses [16]. Longer treatment duration may also compromise medication adherence, as longer duration may compromise patients' beliefs about medication efficacy [8]. However, evidence for the role of treatment duration in predicting adherence is inconsistent [14].

Number of pills and treatment complexity: The number of pills one has to take for hypertension tends to result from combinations of antihypertensive drugs and makes the daily medication routine more or less demanding, which ultimately can be a barrier to optimal adherence [17]. There is consistent evidence demonstrating the negative effect of treatment complexity on adherence [14].

1.3. Social Support

Support is related to interpersonal relationships within an individual's social context, including friends, neighbors, family, caregivers, colleagues or support groups. Sufficient and available social support positively affected treatment and medication adherence of the patients with hypertension and made them able to cope with the disease effectively [18, 19].

In Parketal's research [20], the purpose of the study was to identify important factors, including socioeconomic variables, individual history of hypertension, and cognitive functions that contribute to medication adherence in the elderly with hypertension. The study involved 241 elderly people with hypertension (44% were aged 75 years or older and 60% were men). The results of the survey showed that the rate of non-compliance with medication reached 41%. Cognitive functions, adherence to an anti-hypertensive lifestyle and work status were associated with medication adherence.

In the research, Lo *et al.* [21] aimed to identify the factors significantly associated with adherence to treatment in a group of elderly people with hypertension. The researchers conducted a cross-sectional study in 195 adults [mean 76 years] while the assessment of the level of adherence to treatment was made using the Morisky Medication Adherence Scale. The results showed that more than half of the participants [55.9%] recognized some degree of non-adherence to treatment. Older age, living without a family member, and subjective perception related to treatment determinants were associated with the level of adherence to treatment.

1.4. Aim and Research Questions

The purpose of the present paper is to investigate the effect of sociodemographic and clinical factors on the level of adherence of elderly patients with hypertension to the medication given to them. The main research question is the following: Are socio-demographic as well as clinical factors (gender, age, educational level *etc*.) related to the level of adherence of elderly patients with hypertension to the medication given to them?

2. METHODS

2.1. Research Design

This is a quantitative cross-sectional study including independent and dependent variables. The dependent variable is the level of adherence among patients, while the independent variables include sociodemographic and clinical factors.

2.2. Sample

The population of the present study was defined as all elderly patients (over 60 years) with hypertension in Greece and specifically in semi-urban areas. For this purpose, a convenience sample was used using the convenience sampling method [22]. Convenience sampling, although a non-probability sampling method, is the most applicable and widely used method in social research. A total of 100 elderly patients with hypertension in the community were selected to participate in the research, of which 73 finally completed the questionnaire The criteria for entering the research were [1]: the age of the participants to be over 60 years old [2], the existence of a diagnosis of hypertension and [3] the administration of treatment for more than one year. An exclusion criterion was the existence of a confirmed mental disorder. The questionnaire was distributed to the participants in paper form in the period April-May 2021. All procedures were performed in accordance with the ethical standards of the 1964 Declaration of Helsinki, as revised in 2000.

2.3. Questionnaires

The assessment of the level of adherence to therapeutic treatment in elderly hypertensive patients was performed using the Self-Efficacy for Appropriate Medication Use Scale [SEAMS] [21]. The SEAMS scale is a validated self-report scale that measures the patient's confidence in the ability to take appropriate medications. The scale has been shown to exhibit high internal reliability and strong validity [23]. It consists of a total of 16 questions, on a Likert scale (1=Not at all sure, 2=A little sure, 3=Very sure) with a possible range of the total evaluation between 16 and 48.

Higher scores indicate better patient self-efficacy in adherence to treatment.In addition, apart from these 16 questions, the demographic characteristics of the patients were recorded (gender, age, years since diagnosis, years since treatment, marital status, and level of education).

2.4. Statistical Analysis

Statistical data analysis was performed using statistical analysis software, IBM SPSS version 25. Data analysis was based on descriptive statistics indicators, frequencies (ν) or percentage (%), as well as mean (SD) and standard deviation (SD). Inductive statistical tests, such as the t-test, for comparison of the mean of two independent samples and the test for comparison of the mean of three or more independent samples, one-way ANOVA, were used to compare the level of medication adherence with respect to patient demographics. Pearson correlation was performed to explore the relation of adherence to age, years of diagnosis and years of therapy. The Kolmogorov-Smirnov test was also performed to investigate the normality of the data. All comparisons were made using a significance level of α=0.05.

3. RESULTS

Demographic and occupational data of the sample.

The first section of the results chapter presents the findings of the analysis regarding the demographic characteristics of the 73 elderly people with hypertension who participated in the research. In total, 51 (69.9%) women and 22 (30.1%) men participated in the present study. The majority of the samples were elementary education graduates (n=62, 84.9%] while a smaller percentage of participation was recorded by patients who were High School graduates (n=11, 15.1%). Finally, Table **1** shows that 60.3% (n=44) of the participants were widowed and 32.9% (n=24) were married. A smaller percentage of the sample declared themselves single (n=3, 4.1%) and divorced (n=2, 2.7%).

Table 1. Sociodemographic characteristics of the sample (n=73).

-		ν	%
Gender	Male	22	30.1%
	Female	51	69.9%
Education	Elementary education	62	84.9%
	High school	11	15.1%
Family Status	Single	3	4.1%
	Married	24	32.9%
	Divorced	2	2.7%
	Widowed	44	60.3%

Table **2** shows the results for age and years since diagnosis and initiation of treatment for the 73 study participants. The findings showed that the average age of the sample was 76.7 (SD=9.0) years. In addition, participants had, on average, been diagnosed with hypertension in the past 16.7 (SD=8.6) years and had been on medication for an average of 16.6 (SD=8.5) years.

Table 2. Age and years of diagnosis and therapy.

-	Mean (MO)	Standard Deviation (SD)
Age	76.7 (min 61,2-max 79,1)	9.0
Years of Diagnosis	16.7 (min 7,4-max 18,6)	8.6
Years of Therapy	16.6 (min 7,3-max 18,4)	8.5

The reliability of the SEAMS tool was then assessed in the survey sample. For this purpose, Cronbach's α reliability index was used, which is a measure of the study's internal reliability. The Cronbach's α reliability coefficient for the SEAMS scale in the research sample was found to be equal to α=0.944, and it is an indication of the very strong reliability of the tool.

Table **3** shows that the level of adherence for men was equal to 36.1 (SD=8.0), while the level of adherence for women was equal to 33.9 (SD=9.2). The t-test showed that the observed difference between men and women is not statistically significant [t [71]=0.976, p=0.332]. Furthermore, Table **3** shows that the level of adherence for elementary education graduates was equal to 33.9 (TA=8.8), while the level of adherence for High School graduates was equal to 38.1 (TA=8.5). The t-test showed that the observed difference between high school graduates and high school graduates is statistically significant [t [71]=2.099, p=0.042]. This result shows that a higher level of education is associated with a better level of adherence to treatment. Finally, Table **3** shows that the level of adherence for singles was equal to 41.3

[TA=5.9], the level of compliance for married people was equal to 35.3 [TA=8.8], the level of adherence for divorced people was equal to 40.0 [TA=1.4] while the level for widowers was equal to 33.5 [TA=9.1]. The one-way ANOVA test showed that the observed difference between elderly people with different marital statuses is not statistically significant [f [2, 70]=1.116, p=0.349].

Table 3. T-test and one-way ANOVA regarding adherence in relation to gender, education and family status in patients with hypertension.

-		Medication Adherence		t or F	p
		Mean (MO)	Standard Deviation (SD)		
Gender	Male	36.1	8.0	0.976[t]	0.332
	Female	33.9	9.2	-	-
Education	Elementary education	33.9	8.8	2.099[t]	0.152
	High School	38.1	8.5	-	-
Family Status	Single	41.3	5.9	1.116[F]	0.349
	Married	35.3	8.8	-	-
	Divorced	40.0	1.4	-	-
	Widowed	33.5	9.1	-	-

Note: *t=t-test, A=one-way ANOVA*

Finally, Table **4** presents the findings of the Pearson correlation coefficient for the level of adherence to treatment in terms of age, years since diagnosis, and years since treatment initiation. From the analysis, it emerged that age [r=-0.322, p=0.005], years since diagnosis [r=-0.289, p=0.015] and years the elderly receive treatment [r=-0.286, p=0.0016] are negatively associated [with a reduced level] of adherence to treatment.

Table 4. Pearson correlation of adherence to age, years of diagnosis and years of therapy.

-		Medication Adherence	Age	Years of Diagnosis	Years of Therapy
Medication adherence	Pearson r	1	-.322**	-.289*	-.286*
	p-value		.005	.015	.016
	N [participants]	73	73	73	73
Age	Pearson r		1	.704**	.711**
	p-value			.000	.000
	N[participants]		73	73	73
Years of diagnosis	Pearson r			1	.997**
	p-value				.000
	N[participants]			73	73
Years of therapy	Pearson r				1
	p-value				
	N[participants]				73

Note: **Statistically significant correlation at a level 0.01.
* Statistically significant correlation at a level 0.05.

4. DISCUSSION

The purpose of the present study was to highlight factors that influence the level of adherence to medication among patients with hypertension. The findings of the analysis showed that age, years since the initiation of treatment and years since diagnosis were found to be significant, while gender, education level, and marital status were not confirmed to be associated with the level of medication adherence. In the study of Theofilou [24], it was found that younger patients are presented as more adherent in comparison to older patients. This could be explained by the fact that in advanced age, the use of pills is greater in youth, causing in this way non–adherence [25, 26].

Illness and treatment duration is another factor that may affect adherence. In this study, illness, as well as treatment duration, presents a negative relation to the level of adherence, which means that more years of diagnosis and treatment are not a favorable factor for adherence. This finding could be explained by the fact that patients seem to be very tired after many years of therapy, and they face difficulties regarding their adherence. Nevertheless, other similar studies have indicated that exceeding 10 years of diagnosis is correlated to higher adherence scores [27, 28].

CONCLUSION

There are several limitations to this study. First, the sample size was not calculated in a rigorously mathematical way, given the lack of previous studies in this area. The 73 patients we included in the study, although meeting the condition of n>30, may be underpowered by power analyses to find significant differences and to detect significant associations. Secondly, the convenience sampling strategy may have limited the representativeness of our study sample, as we were only able to reach patients who were easily and immediately accessible. The third limitation of the study is potential measurement bias. Although the adherence scale used in this study has been widely adopted by researchers in other settings, the validity of the measures has never been verified in the context of Greece in a sample of elderly patients. Based on the above limitations, more studies are needed on the level of compliance in the treatment of elderly people with hypertension with a sample selection that will be representative of the general population. In addition, research is needed that will record other possible factors that influence the level of compliance in the treatment of elderly people with hypertension. Such factors may be the level of social support of the elderly from their family/friends, the level of health literacy and the severity of depressive symptoms. Additionally, an important area of future research is to conduct an experimental study to identify those interventions that can change the behavior of the elderly with hypertension and increase their adherence to treatment.

LIST OF ABBREVIATIONS

SEAMS = Self-Efficacy For Appropriate Medication Use Scale

SD = Standard Deviation

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Permission was obtained from the Scientific Council of the Hospitals to conduct the research.

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are the basis of this research. All the humans were used in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931).

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants of this study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None.

CONFLICT OF INTEREST

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