

Factors Related to Medication Adherence in Hypertensive Patients in the Iranian Population

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ABSTRACT

Aims This study aimed to examine the acute effects of exhaustive incremental exercise on serum leptin, glucose, and lactate in one session in trained 18-26 years old men. Medication adherence is one of the most important concepts in the field of physical diseases, including hypertension. Many patients do not adhere to the treatment and ignore the doctor's instructions, which can cause many economic, physical, and cultural problems for the individual, family, and society. This study aimed to investigate the factors related to medication adherence using social cognitive theory in hypertensive patients.

Instrument & Methods This descriptive-analytical study was carried out on 112 patients (male and female) with hypertension in Yasuj, Iran in 2020. Data collection tools included the demographic information questionnaire, the Maurice therapy adherence questionnaire, and the bandura social theoretical constructs questionnaire (including self-efficacy, social support, and self-regulatory constructs). The collected data were analyzed using SPSS 22 software.

Findings The rate of treatment adherence was 46.4% among patients (55.6% for men and 40.3% for women). There was a statistically significant relationship between age, education, and adherence to treatment ($p < 0.0001$). The self-efficacy self-regulatory constructs predicted 22% of the variance in treatment adherence.

Conclusion The results of this study showed that medication adherence in hypertensive patients referred to medical centers in Yasuj is at a weak level. Due to the correlation between the constructs of social cognitive theory and medication adherence, the constructs of this theory can be used in adherence to treatment in patients with hypertension.

Keywords Social Cognitive Theory; Medication Adherence; Hypertension

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Introduction

Hypertension is one of the most common and challenging public health problems worldwide [4, 2]. Hypertension is defined as systolic blood pressure (SBP) of 140mmHg or more, a diastolic blood pressure (DBP) of 90mmHg or more, or taking antihypertensive medication. More than 1.5 billion people worldwide are affected by hypertension. It is predicted that by 2025, about 2 billion people will suffer from the disease [3-5]. High blood pressure is one of the causes of atherosclerosis, heart failure, stroke, and renal insufficiency in many countries, and is the second most common risk factor for diseases so it accounted for 1.9% (equivalent to 27 million DALY) [6, 7]. Controlling blood pressure is especially important to minimize its complications. Studies have reported hypertension control worldwide between 20% to 50% [8-12] and in Iran between 17% to 52% [13-16].

Medication therapy prescribed by a physician is one of the methods to control hypertension [17]. Medication adherence is the patient's adherence to medication instructions and includes two aspects of taking medication on time and based on the program and method of prescription by a physician [18]. The rate of medication adherence in Iran has been reported between 7 and 50% [19-22]. Studies have shown that non-adherence to medication is the most common cause of uncontrolled hypertension [23]. Patients with high blood pressure who have poor medication adherence are more prone to coronary heart disease, heart failure, and cerebrovascular disease [24]. Failure to medication adherence also leads to higher costs of health care, longer hospitalization, and mortality [25]. Medication adherence is a complex behavior that can be influenced by patients, service providers, and the health system [26]. In addition, knowing modifiable mechanisms related to adherence is essential for behavior change [27]. Psychological theories and approaches can identify changeable factors associated with a behavior [28]. Social cognitive theory is one of the theories for improving self-care behaviors in patients with chronic diseases [29]. This theory is a set of different constructs, including knowledge, self-efficacy, social support, outcome expectations, outcome value, and self-regulation, and emphasizes that personal and environmental characteristics influence behavior; and believes in the two-way confrontation of person, behavior, and environment. This theory, while stating the predictors and effective principles in the formation of behavior, offers solutions to change behavior [30].

Due to the increasing prevalence of hypertension and the importance of medication adherence, and the consequences and complications caused by lack of medication adherence, this study aimed to determine the effective factors for medication adherence in hypertension patients.

Instrument & Methods

This cross-sectional descriptive study is part of a study that was carried out on patients with hypertension, who were under the support of the comprehensive health centers in Yasuj, Iran in 2020. The sample size was determined considering the study by Fakhri *et al.* [31], with the first type error of 0.05 and the power of 112.95 patients. Multi-stage random sampling was used for sampling. Out of the selected centers, two health centers were selected using a simple random sampling method, then by referring to the health centers, 112 patients were randomly selected among the patients' records. The inclusion criteria were a definitive diagnosis of hypertension by a physician, a systolic blood pressure of 140mmHg or higher or diastolic blood pressure of 90mmHg or higher, having records in comprehensive health centers, and taking high blood pressure medication. The exclusion criteria were the age range under 30 years old and no use of hypertension medication.

Data were collected using a demographic questionnaire, the Morisky Medication Adherence Scale (MMAS), and the scale of constructs of social cognitive theories through the self-report method. Demographic information included age, gender, education level, occupation status, family history of hypertension, marital status, medication therapy, and blood pressure control. The medication adherence was measured by Morisky Medication Adherence Scale (MMAS). The questionnaire was designed by Morisky *et al.* in 2006 with 8 items. The items of 1 to 7 were scaled based on the options of "yes" (0) or "no" (1). In item 5, the answer of "yes" received a score of 1, and the answer of "no" received a score of 0. The item of 8 is scored based on the Likert scale from "never" (0) to "always" (4). The total score of the questionnaire is between 0 to 8, so that a score lower than 6 indicates poor medication adherence, scores of 6 and 7 indicate moderate medication adherence, and a score of 8 indicates high medication adherence. The validity and reliability of this tool were confirmed in Iranian samples [32]. The questionnaire of social cognitive theory constructs including self-efficacy, social support, and self-regulation constructs was designed by the research team using reviewing studies and questionnaires of social cognitive theory. The constructs of social support of family and friends was evaluated using 8 items for medication adherence through ng a part of the House translation version of the questionnaire, which measured the subscales related to family and friends [33]. Responses were scored using a 5-point Likert (never, rarely, sometimes, most of the time, and always). In this questionnaire, the higher the score, the higher the perceived social support. The self-efficacy construct for medication adherence was assessed through 3 items taken from the modified Finlow scale [34]. The answers to questions were

scored using a 5-point Likert scale (strongly agree to strongly disagree). Self-regulation was measured using 4 items through a 5-point scoring scale consisted the answers of never to always. The face and content validity of the questionnaire was confirmed by 10 health education and health promotion specialists. The reliability of the questionnaire was obtained through Cronbach's alpha coefficient for social cognitive theory constructs between 0.73 and 0.98.

This research was approved by the Research Ethics Committee of Yasuj University of Medical Sciences. Participation in this study was voluntary with personal consent. The consent form was filled out by the participants before the study and they were assured that their information would be confidential. Data were analyzed using SPSS 22 software with a significance level of 0.05 through the descriptive statistics and appropriate analytical statistics (Pearson correlation and linear regression).

Findings

The age range of the participants was 34-85 years, and the mean±SD age was 54.32±8.41 years. Most of them were female, married, and had a family history of hypertension (Table 1).

Table 1) Results of demographic factors

Variable	Number (%)	Medication adherence		p.
		N	%	
Gender				
Male	45 (40.1)	25	59.7	0.082
Female	67 (59.9)	27	40.3	
Age range (year)				
30-39	3 (2.6)	3	100	0.028
40-49	31 (27.6)	14	45.2	
50-59	47 (41.9)	16	34	
>60	31 (27.6)	19	61.3	
Marital status				
Single	1 (.9)	0	0	0.341
Divorced	13 (11.6)	8	61.5	
Married	98 (87.5)	44	94.4	
Education level				
Illiterate	18 (16)	8	44.4	0.002
High school	39 (34.8)	16	41	
Diploma	19 (17)	3	15.8	
Higher education	36 (32.2)	25	69.4	
Occupation				
Unemployed	4 (3.6)	2	50	0.204
Housekeeper	54 (48.2)	22	40.7	
Retired	35 (31.2)	15	42.9	
Employed	19 (17)	13	68.4	
Family history				
yes	63 (56.3)	26	41.3	0.254
no	49 (43.7)	26	53.1	
Use of sphygmomanometer				
Yes	66 (59)	26	39.4	0.085
No	46 (41)	26	56.5	
Smoking				
Yes	7 (6.3)	3	42.9	0.580
No	105 (93.7)	49	46.7	
Use of hookah				
Yes	9 (8.1)	5	55.6	0.731
No	103 (91.9)	47	45.6	

There was a significant relationship between age, education level, and medication adherence (p<0.05; Table 2).

The dependent variable was the nature of the treatment, and the predictor variables were self-efficacy, family support, and self-regulation. Multiple regression assumptions were examined. The lack of alignment between the predictor variables was assessed by the variance inflation factor, and VIF<5 was obtained in the final model for the predictive variable. The normality hypothesis was tested using standardized residual graphs versus standardized values of predictor variables, and the normality was confirmed. Also, linear regression analysis showed that in the third step, the variables of self-efficacy and self-regulation predict 22% of the variance of drug adherence (Table 3).

Table 2) Correlation between the studied constructs and medication adherence among the subjects

Variables	5	4	3	2	1
1-Self-efficacy	-0.286*	0.435*	0.109	0.057	1
2- Support Family	-0/053	-0.036	0.349*	1	
3- Support Friend	0/022	0.067	1		
4-Self-Regulatin	-0.273*	1			
5-Adherence to Treatment	1				

* Correlation is significant at the 0.0001 level (2-tailed)

Table 3) Linear regression analysis to determine the predictors medication adherence

Variable	B	SEB	Beta	T
Self-efficacy	-0.215	0.105	-0.206	-2.051
Self-Regulation	-0.120	0.066	-0.183	-1.823

Adjusted R squared=0.220, p<0.0001

Discussion

Medication therapy prescribed by a physician is one of the methods to control hypertension [17]. Medication adherence depends on several factors, which may be different in various cultures. Considering the lack of a study to investigate the factors related to treatment adherence of hypertension in Kuhgiluyeh & Boyer-Ahmad provinces in Iran, this study aimed to determine the effective factors on medication adherence in hypertension patients in Yasuj, Iran. The findings showed poor medication adherence among the subjects. The rate of medication adherence in the studied patients was 46.4%, and medication adherence in men was higher than in women, however, this difference was not statistically significant. Researchers reported medication adherence by 79.4% [35], 84.4% [36], and 68.8% [37], respectively, which these levels of medication adherence are higher than the findings of this study. Pan *et al.* in China, Algabbani in Saudi Arabia, and Shah *et al.* in Pakistan reported medication adherence by 27.4% [38], 42% [39], and 23.4% [8], respectively. Ori *et al.* reported the medication adherence rate in Iran by 33% [19] and Heizomi *et al.* reported the adherence rate at a moderate level so that only 7% and 34% of the patients had high and moderate medication adherence, respectively [20]. Zinat Motlagh *et al.* reported 36% medication adherence in Kohgiluyeh & Boyer-Ahmad [40]. The rate of medication adherence reported in the

studies is lower than the findings of this study. Based on the World Health Organization, medication adherence is a multi-dimensional phenomenon, influenced by the economic-social factors, health care team services, the factors related to the health system, disease status, the factors affecting the treatment, and the factors related to the patients. The effects of the mentioned factors are different in various societies [19]. It seems that the differences between the findings of this study and other studies depend on cultural and socio-economic factors, as well as differences like the study population. On the other hand, the study population in the above studies included patients with hypertension. However, the sample of this study included patients, who were referred to health care centers and followed their treatment processes; so they can be different concerning medication adherence.

The results showed a statistically significant relationship between age and education level with higher levels of medication adherence. Oori *et al.* reported a higher rate of medication adherence in the elderly compared to other age groups [19]. Also, Nguyen *et al.* [41] and Yang *et al.* [42] reported a higher medication adherence in older people, which is in accordance with the findings of this study.

The relationship between medication adherence and older age may be related to learning opportunities and patients' experience in self-care in controlling blood pressure and medication adherence. It can be said that older people are more likely to consider themselves at risk for complications from hypertension than younger people; therefore, their medication is higher. The results also showed a statistically significant relationship between education and medication adherence, and the higher the level of education, the greater the medication adherence. The education level increases patients' awareness of their illness by increasing their awareness and knowledge, which in this regard, the findings are consistent with the studies [8, 33, 43]. Among the constructs of social cognitive theory, self-efficacy and self-regulation played an important role in explaining the variance of medication adherence. Among these variables, self-efficacy was the strongest predictor of medication adherence. The constructs of social cognitive theory in this study predict 22% of the variance of medication adherence behavior. Yang *et al.* showed that perceived self-efficacy was the most important modulatory variable affecting medication adherence in patients with hypertension [42]. Warren-Findlow & Seymour [34] also reported self-efficacy as a predictor of self-care behaviors and medication adherence, which is consistent with the findings of this study. One of the limitations of the present study is the pandemic of Covid-19, which affect the processes of completion of the questionnaires. Also, the method of self-report data collection was another limitation of the study, which challenged the correct reporting and

transmission of some medication adherence-related behaviors.

Conclusion

The results of this study showed the poor medication adherence in the patients with hypertension, who were referred to medical centers in Yasuj city. It is most likely related to the nature of the disease, financial issues, low awareness, and old age of patients, which requires more attention to prevent the complications due to the lack of control of hypertension. The results of the study also showed that social cognitive theory is effective in explaining medication adherence behavior in hypertensive patients. Considering the correlation between the constructs of social cognitive theory and medication adherence, the constructs of this theory can be used to educate hypertensive patients about medication adherence.

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Ethical Permissions: This research was approved by the Research Ethics Committee of Yasuj University of Medical Sciences (Ethical code: IR.YUMS.REC.1399.041).

Conflicts of Interests: The results of this study are not in conflict with the interests of any individual or organization.

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