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Factors Regarding Adherence to Medication in Patients with Hypertension Based on Health Belief Model in the South of Kerman, Iran, in 2019

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ABSTRACT

Introduction: Hypertension is the most important public health problem in developing countries. This study aimed to investigate factors associated with medication adherence of hypertension based on the health belief model.

Method: This was an analytical cross-sectional study. In this study, 403 hypertensive patients in Shahdad and Andoohjerd of Kerman were selected by census method. Data collection tools were a researcher-made questionnaire including the Health Belief Model (HBM) and Moriskyself-report questionnaire. Cronbach alph was 0.9. Mean (SD), Frequency (percentage) used to descriptive statistics and two Independent sample t-test, Mann-Whitney U test and Binary Logistic Regression were used for data analysis. All statistical analysis were done in SPSS 19 with significant level of 5 %.

Results: More than half of the patients (57.1%) had poor medication adherence. Most of the subjects (84.1%) used less than three drugs. Chi square test results showed a significant relationship between drug compliance and age group, education and job results of multiple logistic regression showed, three factors of awareness (OR=1.116, p =0.016), cues to action (OR=0.68, p =0.030) and perceived barriers (OR=0.83, p=<0.001) had significant effect on Medication Adherence .

Conclusion: Effective interventions based on the health belief model and with emphasis on raising awareness, practicing guide and removing perceived barriers can increase medication adherence in patients with hypertension.

Keywords: Medication Adherence, Hypertension, Health Belief Model

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Introduction

Hypertension has been defined by the levels of blood pressure (BP) above which lowering BP will reduce the cardiovascular risk associated with elevated BP. This level has been classically 140/90mm Hg (1). Unfortunately, the prevalence of hypertension in young and middle-aged adults (between 18 and 59 years old) is increasing (2). The prevalence of high blood pressure increases the risk of cardiovascular disease, which will worsen health problems of the population and impose great health costs on the healthcare system. In China, the rates of treatment and control of hypertension were less than 30% (3). Non-adherence to hypertension self-care behaviors results in poor BP control. Also, In the Polish population, HT occurs in 29% of the population, and is even more prevalent among people older than 65, who account for over 50% of the cases (4).

Evidence indicates increase of hypertension in developing countries so much that 26% of the total population of the countries in Eastern Mediterranean Region and 21.7% of the population of Middle Eastern countries are fighting it (5). In a population-based research in Kerman, the prevalence of pre-hypertension and hypertension were 35.5% (42.7% men, 28.1% women) and 18.4% (20.2% men, 16.7% women), respectively (6) .In the study by Najafipour et al. in Kerman, the prevalence of pre-hypertension was 28.5%. and hypertension was 19.2% (7).

It is estimated that the rate of people suffering from hypertension will increase to 1.56 billion by 2025(8). Medication adherence considers the proportion of the coordination of the patient's behavior with drug consumption regarding the recommendations of the physician or health expert (9). In the study by Morowati sharif abad et al. on HIV patients, the mean scores of 7□ and 30□day medication adherence were 89.38 and 94.44 respectively (10). For this purpose, researchers have used effective models in health education to make changes in health behaviors such as medication adherence. Based on this model, populations learn infection control precautions, and perceive its importance (perceived benefits)(11). They also may imagine the risk imposed on them by exposure to people infected with COVID-19 (perceived susceptibility). Furthermore, they may also learn much about COVID-19 complications and prognosis (perceived severity) and the importance of preventive and protective measures (perceived benefits). Besides, they may understand that the benefits of preventive and protective measures exceed any effort associated with its use (perceived barriers). Also, they should trust their abilities to overcome any barriers while practicing preventive and protective measures (self-efficacy). The health belief model is vital in changing risk factors and individual behaviors(11).

literature review showed more than half of the patients have poor adherence to treatment and 50% of the patients stop their medication in the first year, and also the prevalence of high blood pressure in Kerman is high (12). So, the purpose of this study was to investigate factors regarding adherence to medication in patients with hypertension based on the health belief model in the south of Kerman, Iran, in 2019

Methods

Participants and Sample size

This an analytical cross-sectional study. Since the whole population of Shahdad in Kerman had a family physician with electronic files, all patients with hypertension visiting healthcare centers who were under the coverage of health society of Shahdad and Andoohjerd (403 subjects) were identified and entered the study with census method. After getting a code of ethics (IR.KMU.REC.1398.191) and presenting the required explanations for observing ethical principles, informed and voluntary participation of the individuals, researcher-made questionnaire was completed for them. The inclusion criteria were: living in Shahdad and Andoohjerd, high blood pressure, and not having another disease, and the exclusion criteria were: use of other drugs, unwillingness to cooperate, and death of the patient.

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Procedure

After referring to healthcare centers, the list of patients with high blood pressure was extracted by Integrated Health System (SIB) , the patients were called, and a limited number of old patients and those who weren't able to go to the clinic were studied through visits to their house. The response rate was calculated as 95%.

Data collection

Data collecting tool included a researcher-made questionnaire based on the health belief model with variables of perceived sensitivity, perceived severity, perceived benefits, perceived barriers, guide to action and self-efficacy along with demographic specifications which were validated before conducting the study.

The validity of the questionnaire was corrected and confirmed by 7 health experts and related experts. Finally, the content validity index score was calculated to be more than 0.85 for the questions of all the models' constructs. The reliability of the questionnaire was the stability type, and the questionnaire completed by 15 health workers and this reliability was also measured separately with the subject of internal consistency through Cronbach's induction, which rewrite the value 0.80 obtained. Also, the reliability of Morisky-self report questionnaire with four questions has been confirmed with Cronbach's alpha coefficient of 0.69 (13) in the study by Moharamzad et al. on patients with hypertension. The question items included demographic (14 questions), awareness (10 questions) perceived sensitivity (7 questions), perceived severity (7 questions), perceived benefits (8 questions), Perceived barriers (7 questions), self-efficacy (7questions), and cues to action (8 questions). Questions relating to the constructs of health belief model was based on a 5-Point Likert scale, except for the cues to action whose choices were yes/ no and whose score was 0 to 1. Also, 4 questions of Morisky self-report questionnaire were designed with yes/no responses.

Data analyses

Descriptive statistics (frequency, percentage, mean and standard deviation) were used to describe the characteristics. For analysis, the statistical tests of Mann-Whitney U test, chi-square, logistic regression were used. The data were analyzed using SPSS 19. The Significance level was considered 0.05**.**

Results

In this study, 403 patients with mean (SD) history of hypertension of 4.6 (6.6) were studied. Table 1 shows the demographic features of these people. As it is observed, the age of most patients under the study was above 56 (66.8%) and the smallest age group belonged to the cases under 45 (11.2%). Most studied subjects were female 299 (74.2%). As regard to marital status, the highest percentage was related to the married individuals (307 people) (76.2). Most of the studied subjects were housewives (45 people) (63.3%) and just 89 of them (6.9%) were employees or retired. Also, most studied people were illiterate regarding education (248 people) (61.5%).

According to table 1, more than half of the patients (230 individuals) (57.1%) had poor medication adherence. The results of Pearson chi-square test according to table 2 showed that the relation between medication adherence and age, education and occupation is significant ($P<0.05$) ($r=0/7$), and with gender and marital status, it is not significant ($P> 0.05$).

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Table 1. Demographic Characteristics of the Study Samples

Variables		N	%
Gender	Female	299	74.2
	Male	104	25.8
Age	30-45	45	11.2
	46-55	89	22.1
	56-65	128	31.8
	<65	141	35
Marital Status	Married	307	76.2
	Single, divorcee or widow	96	23.8
Occupation	Farmer and ranchman	128	18.11
	Housewife	45	63.3
	Employee and retired	89	6.9
	Worker-unemployed- self-employed	141	11.7
Education	Illiterate	248	61.5
	Elementary	96	23.8
	Secondary school and higher	59	14.6
Medication adherence	Good adherence	230	57.1
	Poor adherence	173	42.9
Number of drug used	<3	339	84.1
	>3	64	15.9

Table 2. Demographic Characteristics of the Study Samples Based on Medication Adherence

Variables	Good adherence (n=173)		Poor adherence(230)		P value*
	N	%	N	%	
Age					
32-45	27	60	18	40	
46-55	33	37.1	56	62.9	0.001
56-65	31	42.2	97	75.8	
65>	75	53.2	66	46.8	
Gender					
Male	47	45.2	57	54.8	0.356
Female	119	39.8	180	60.2	
Education					
Illiterate	92	37.1	156	62.9	0.001
Elementary	29	30.2	67	69.8	
Secondary school and higher	45	76.3	14	23.7	
Marital status					
Single	38	39.6	58	60.4	0.812
Married	128	41.7	179	58.3	
Occupation					
Housewife	93	36.5	162	63.5	
Employee and retired	21	75	7	25	
Farmer and ranchman	22	30.1	51	69.9	<0.001
Worker-unemployed and self-employed	30	63.8	17	36.2	

**chi square test*

Given that our data were nonparametric, we investigated the relation between medication adherence and constructs of the health belief model with Mann-Whitney U test. Results of the table 3 showed in terms of study variables there was a significant difference between the two groups so that the median score of Awareness, Perceived Sensitivity, Perceived Severity ,Perceived Benefits, and Self-efficacy was significantly higher in the Good Adherence group ($p<0.001$). Also, the

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median score of Perceived barriers in the Good Adherence group was significantly lower than the Poor adherence group (p<0.001).

We estimated the effect of these factors on medication adherence using multiple logistic regression.

According to Table 4, the results of multiple logistic regression showed that the variables of knowledge score, perceived barriers and cues to action with odds ratios of 1.16, 0.83 and 0.68, respectively, had a significant effect on medication adherence (p<0.05).

Table 3. Relation between Medication Adherence and Constructs of the Health Belief Model in the Studied Patients

Variable	Good adherence		Poor adherence		P-value*
	Median	IQR	Median	IQR	
Awareness	18	8	12	3	<0.001
Perceived Sensitivity	31	5	29	5	<0.001
Perceived Severity	33	7	31	7	0.001
Perceived Benefits	39	6	35	8	<0.001
Perceived barriers	14	8	29	4	<0.001
Self-efficacy	29	17.25	16	5.5	<0.001
cues to action	6	4	4	1	<0.001

Mann-Whitn ey U test

Table 4. results of logistic regression in determining factors affecting medication adherence in patients with hypertension

Variable	Levels	Univariate model				Multiple model			
		OR	95% CI		p	OR adj	95% CI		P
Age	32-45	1	----	----	----	1	----	-----	-----
	46-55	0.489	0.23	1.03	0.060	0.70	0.25	1.94	0.503
	56-65	0.50	0.25	1.01	0.560	1.11	0.39	3.11	0.838
	>65	0.939	0.46	1.91	0.862	1.17	0.39	3.46	0.770
Education	Illiterate	1	----	----	----	1	----	-----	-----
	Elementary	0.68	0.42	1.09	0.11	1.05	0.55	2.00	0.878
	Secondary school and higher	2.48	1.29	4.75	0.006	1.12	0.40	3.08	0.823
Occupation	House wife	1	----	----	----	1	----	----	----
	Employee and retired	5.05	1.70	14.93	0.003	2.45	0.70	8.57	0.161
	Farmer and ranchman	1.84	0.94	3.62	0.074	0.77	0.30	1.97	0.586
	Worker-unemployed and self-employed	0.63	0.37	1.06	0.085	0.57	0.28	1.13	0.112
Number of medication	<3	1	----	----	----	1	----	----	----
	>3	1.81	1.02	3.20	0.04	1.77	0.84	3.75	0.131
Awareness	----------	1.16	1.03	1.30	0.013	1.16	1.02	1.31	0.016
Perceived Sensitivity	----------	1.03	0.95	1.13	0.442	1.03	0.94	1.13	0.501
Perceived Severity	----------	1.028	0.94	1.12	0.559	1.05	0.95	1.16	0.355
Perceived Benefits	----------	1.08	0.99	1.19	0.081	1.07	0.97	1.18	0.168
Perceived barriers	----------	0.82	0.75	0.89	<0.001	0.83	0.76	0.905	<0.001
Self- efficacy	----------	0.98	0.89	1.05	0.488	0.97	0.89	1.06	0.539
cues to action	----------	0.66	0.47	0.91	0.013	0.683	0.784	0.484	0.03

Discussion

Hypertension is the most important public health problem in developing countries. Lowering BP will reduce the cardiovascular risk associated with elevated BP. Findings of this study indicate that more than half of the patients (58.8%) had poor medication adherence. The study by Kamran et al. on rural population of Ardabil (2013) showed that

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just 24% of the population had an optimal medication adherence (14). But in the studies by Fernandez et.al in 2014 , it was 57% (15), Yang et.al in 2014 reported just 43.5% (16) optimal adherence. In the study by Shamin et al. in 2016, the adherence rate of medication was only 23% (17). In a study by Obrikorang, in 2018, in Ghana, the rate of non-adherence was 58.6% (18). This difference in the rate of medication adherence in various studies may be due to the differences in the living environment and age group, also the degree of poor adherence in the present study could be due to the younger age of the participants, that 60% of the population was 32-45 years old.

The results of the present study showed that the status of blood pressure control in patients is inadequate. The relation between medication adherence and age, education and occupation was significant, but its relation with gender and marital status was not significant.

Based on the results of the present study, by aging, the medication adherence is reduced which is consistent with findings of the study by Mazloomi et al. in Kerman in 2016 (19). Unlike this study, in the study by Uchmanowicz et al. in 2019, a direct and significant relation has been reported between hypertension control and the people's age(20). One of the reasons may be due to age-related forgetfulness, but in a study in 2021 on Mexican Americans who migrate at younger ages, and may experience greater disability over time, however, Vásquez showed that family support can help reduce disability among older people. Also, the low level of literacy among old people compared to the younger individuals in Shahdad can be the cause of the difference.

Unlike the findings of this study, the results of the study by Poor mohammad et al. in 2017 (21), and the study by Yue et al. in 2015(22) showed that there was a significant relation between gender and self-care behaviors regarding hypertension ,and that these gender differences about self-care behaviors among various diseases, on the other hand, may be derived from the existing differences in awareness, sensitivity and perceived severity towards illness and the time of suffering, and also existence of other diseases in men and women. Similar to the findings of the present study, the study by Yang et al. showed that there is no difference between men and women in hypertension control (16). Similar to the results of the present study, in the study by Matio et al. in 2016 ,there was no significant relation between marital status and self-care behaviors (23), and unlike the results of the present study, findings of the study by Poormohammad et al. in 2017(21), and the results of the study by Mazloomi et al. in 2016(19) showed that self-care behaviors for hypertension had a significant relation with marital status. This difference may be due to the effective role of social support by family in various societies for adopting self-care behaviors among married people.

Also, in the present study, most of the subjects were women and more women referred to health centers, so it seems more likely to perform self-care behavior. The results of the present study showed that generally literacy increase beyond elementary increases medication adherence in people with hypertension, which is consistent with the study by Yekta et al. in 2004(24). However, unlike this study, in the study by Motlagh et al. in 2016, there was no significant relation between the education level and self-care behaviors in people with hypertension (25). The reason of this difference may be due to the difference in educational plans in various societies in the self-care field.

The results of the present study showed that there was a significant relation between occupation and medication adherence which is consistent with the study of Abed et.al in 2013 (26) .However, unlike this study, in the study by Obrikorang etal. (2018), there was no significant relation between occupation and self-care behaviors (18), and the reason may be the difference in occupational status, lifestyle and the welfare resulted from the occupation. In the present study, 75% of the people were employees and retirees, so due to the fact that employees are

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more disciplined, and retirees are more at home, they can be more careful about taking their medications and show more adherence.

The findings of this study showed that the main and most effective factor predicting the behavior of medication adherence in the patient is awareness factor, and the results of the present study are consistent with the study by Shamin etal. in India (2016) (17), but unlike this finding, in the study by Poormohammad et al. (21), the results indicated lack of a significant relation between awareness and self-care behaviors of people with hypertension. In the present study, there is a significant relation between perceived sensitivity and medication adherence of patients with hypertension which was consistent with the study by Kamran et.al (2014) (14). Furthermore, there was a significant and direct relation in the study by Obrikorang et al. in 2018(18). Similar results in other studies show that perceived sensitivity increases the perception of risk and fear of non-compliance and subsequent complications. In the construct of perceived benefits, there was a significant and direct relation with medication adherence which is consistent with the results of the study by Kamran et al. (2014) (14) .

The study by Fernandez(15), and also the study by Yu et al. (2015) in China which was similar to this study showed that a significant relation was observed between higher level of self-efficacy and better medication adherence (22). Similar to the findings of this study, in the study by Chen Kao et al. in 2021(27), and the study by Kamran et al. (2014), a significant relation was observed between higher level of perceived severity and better medication adherence (14). Moreover, by providing guide to action, the rate of medication adherence increases. In the study by Mazloomi etal. (2015) (19), and the study by Yu et.al in 2015 (22) consistent with the results of the present study, a significant relation was observed between guide to action and better medication adherence .

It seems that by showing the benefits of taking drugs and increasing the self-efficacy and skill of people in taking drugs, people are more committed, and this shows that skills and self-efficacy are very important. In this study, it was determined that by increasing perceived obstacles by patients, the rate of medication adherence is reduced, which is consistent with the findings of the study by Mazloomi et al. in 2016(19), Yu et.al (2014) (22), and also the study by Obrikorang et.al (2018) (18), but it was inconsistent with the results of the study by Mujeeba et.al in 2021, who stated that the perceived benefits and obstacles don't influence medication adherence (28). The greater the barriers to work, the more people lose the desire to adhere to their medications regularly, so it is better to reduce barriers to work and increase motivating factors.

Limitations

Low level of literacy, lack of cooperation in completing the questionnaires, negative attitude of the participants, and short duration of the study were the limitations of this study. So, it is recommended that the study be performed in urban societies with greater populations.

Conclusion

The prevalence of adherence to hypertension management was low in patients with hypertension. This is due to poor awareness, perceived obstacles and lack of cues to action. For improving adherence in hypertensive patients, it is necessary to recognize the value and importance of the patients' perceptions of medications, promote incentives such as family support, and reduce barriers to poor medication adherence.

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Conflict of Interest

There is not conflict of interest between the authors.

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Authors' Contributions

Conception and design: AZ, EM, Analysis and interpretation of the data: SVAT, Drafting of the article: ASH, EM, HSH, SVAT Critical revision of the article for important intellectual content: AZ, ASH, EM, HSH, Final approval of the article: SVAT, EM, ASH, Provision of study materials: ASH Obtaining of funding: ASH, HSH.

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