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Can e-learning change patients' awareness of controlling blood pressure?

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Abstract---Background and Aim: Hypertension is one of the chronic diseases that has been introduced as a silent killer and public health crisis in the world. Due to the increase in this dangerous disease, education about blood and blood pressure control can help reduce it. This study aimed to investigate the effect of virtual education on the knowledge of patients with hypertension. Materials and Methods: The present study is an intervention that was performed on 70 people over 35 years of age with hypertension in Varamin. Sampling in this study was random. In this study, individuals were divided into two groups of 35 intervention and control. First, the level of knowledge of both groups was determined using a researcher-made electronic questionnaire. Then, the intervention group was given virtual training through the Skype platform. After two months, the knowledge of both groups was measured again using an electronic questionnaire, and

statistical data were analyzed using SPSS 26 software and the necessary tests. All necessary measures were taken in compliance with ethical standards in research and health protocols. Results: The results of this study showed that there was no significant difference between the two groups before the intervention ($P > 0.05$). But the two groups were statistically different in terms of knowledge of educational intervention knowledge ($P < 0.05$). Also, the evaluation of the intervention group was significantly increased after the training. Discussion and Conclusion: The results indicate that providing education is effective on the level of awareness of patients with hypertension. On the other hand, with the increase in awareness of people with hypertension, the occurrence of behaviors that control blood pressure can be expected.

Keywords---e-learning, patients, controlling, blood pressure.

Introduction

High blood pressure refers to the intermittent or continuous increase in blood pressure in a person. This increase in blood pressure may occur during the systolic phase or in the diastolic phase (1). High blood pressure is one of the chronic diseases that has been introduced as a silent killer and public health crisis in the world (2) (3, 4). When we talk about a person with high blood pressure, it means that the pressure in the blood vessels is higher than normal (2). This hypertension is equivalent to systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg (5-12). Stroke, kidney failure, heart disease, premature death, and disability such as blindness are some of the complications of high blood pressure (1, 2, 13-15). Although the main cause of high blood pressure is not known, factors such as smoking, poor diet, inactivity, obesity, constant stress, alcohol consumption, type 2 diabetes, snacking, poor living conditions, genetics, age, gender, and social factors influence its creation (1, 13, 16, 28).

Hypertension is the most common chronic disease in developed societies and is responsible for approximately 7.1 million deaths per year worldwide, affecting 6 to 25 percent of the world's adult population (17). In 2010, global hypertension was estimated at approximately 1.4 billion people and is likely to significantly exceed 1.6 billion by 2025 (18). The prevalence of hypertension in different parts of the world is estimated at 30 to 40% (19). During the corona pandemic, certain comorbidities, such as coronary artery disease and diabetes, have been reported to be associated with an increased risk of infection and increased mortality, which was the most common comorbidity in a report of hypertension (20). By controlling hypertension, the rate of heart attack, damping, disability, and cardiovascular disease can be reduced (5, 6). Raising awareness about high blood pressure and offering health education programs to increase public awareness about high blood pressure is very effective in reducing its incidence (13). The use of appropriate interventions to increase the awareness of patients with hypertension has an important role in controlling this disease (2). One of these interventions is health education which seems to be effective in increasing knowledge, changing attitudes

and beliefs related to this disease, and modifying behavior (2). Lifestyle training has helped lower blood pressure (10, 21). Also, training in the proper use of antihypertensive drugs and lifestyle modification reduces hospital costs and mortality from cardiovascular disease in people with hypertension (10, 21). A healthy lifestyle includes: a healthy diet, maintaining a normal weight, having enough activity and exercise, not smoking, and limiting alcohol consumption (22). Research in this area has shown that other important issues that are addressed in lifestyle are the study of stress, rest, and sleep (22). Due to the importance of this issue, this study aimed to investigate the effect of Virtual education on patients' awareness to control blood pressure in 2020.

Materials and Methods

The present study is a control-oriented intervention. The target population of the study is people over 35 years of age with hypertension in Varamin. The sample size was calculated using the following formula, with 35 people in each group. That is, a total sample size of 70 people was estimated.

$$n = \frac{2\sigma^2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{d^2}$$

Hypertension, age over 35, taking the antihypertensive drug, having a health care record, being literate and able to use a smartphone and Skype platform, and people's willingness to participate in the study were the inclusion criteria. Those who did not participate in the second stage of completing the electronic questionnaire or did not want to continue participating in the study were excluded from the study. The random sampling method was used. As the size of the city and the socio-economic structure of the city are almost homogeneous, among the three health centers in the city, two centers were selected for data collection and sampling. After visiting the centers, a list of people with hypertension who were over 35 years old was prepared. The division of individuals into intervention and control groups was completely random in that 35 people were in the intervention group and 35 people were in the control group. To be randomized, the study samples were divided into intervention and control groups in pairs and individually, respectively.

Individuals in the intervention and control groups were selected from both centers. The data collection tool in this study was an electronic researcher-made questionnaire, consisting of two sections of demographic characteristics of the subjects and a questionnaire on participants' awareness of hypertension. Demographic characteristics included age, gender, occupation, and education, and the awareness questionnaire section consisted of 50 three-choice questions "Yes", "No", and "I do not know" to assess patients' awareness. Questions were designed to define hypertension, its causes, complications, and risk factors. The awareness variable was quantitatively continuous and the final results were calculated with a numerical scale. Therefore, the scoring of the mentioned questionnaire was such that in the awareness questions section, the correct answer was given 3 points, the "I do not know" was given 2 points, and the wrong answer was given 1 point.

Therefore, each person's score was calculated between 50-150. For validity and reliability of the questionnaire, content validity methods and Cronbach's alpha test were used, respectively. To determine the validity, a questionnaire was sent to 10 health education specialists and faculty members of Shahid Beheshti University of Medical Sciences. Based on the opinions of experts, the necessary corrections were made to the questionnaire. The content validity index of the questionnaire was 0.83 which was confirmed. To calculate the Content Validity Index (CVI) to ensure that items are best designed to measure structures; Three four-part criteria (simplicity, relevance, transparency, and clarity) were considered for each item in the questionnaire and the same experts were asked to comment. For this purpose, the content validity index was measured from the total number of agreeing points for each item with a rank of 3 and 4 divided by the total number of responses.

A CVI score above 0.79 was considered appropriate; The CVI score was between 0.70 and 0.79 questionable and needed to be revised; A CVI score of less than 0.70 was considered unacceptable and was eventually dropped. To determine the reliability, the questionnaire was completed by 30 samples (patients with hypertension who were not included in the study). Then, using Cronbach's alpha test, the reliability coefficient of knowledge questions was calculated to be 0.75. To prevent the exchange of information between the intervention and control groups and after making sure that the patients of both groups know how to work with the Skype platform, the control group was first contacted and contacted in cyberspace and the Skype platform. And people were taught how to complete the questionnaire. Then, the patients in the intervention group were contacted in cyberspace and the Skype platform and were taught how to complete the questionnaire. After completing the electronic questionnaire, the patients in the intervention group were given virtual training for one hour through a lecture session.

The axes of education included the definition of hypertension, its complications, factors, and risk factors. At the end of each session, an intervention pamphlet was sent to the intervention group, including the items taught, and it was recommended that they read the pamphlet. Patients in the control group were not given any training. After two months, the electronic questionnaire was sent again to the smartphones of the two groups of control and intervention. For people who did not have a smartphone or could not use it, the questionnaire was sent to a family member's mobile phone and it was recommended that they read only the questionnaire questions to that person and did not interfere in answering the questions. Finally, the data of 70 participants in the study, using SPSS 26 software and descriptive and inferential statistics, including chi-square for qualitative variables and independent t-test and Fisher's exact test, to examine the differences between the variables between the two groups of women and The man was analyzed.

Results

The results of the present study are summarized in the following tables.

Table 1
Demographic characteristics of the samples in the intervention and control groups

Intervention Variable		Abundance	Percentage in group	Control Abundance	Percentage in group	P-Value
Gender	Male	15	42.9	18	51.4	0.47*
	Female	20	57.1	17	48.6	
	Jobless or housewife	23	65.7	22	62.9	1**
	self-employment worker	7	20	7	20	
Education	Employee primary education	3	8.6	4	11.4	0.18**
	Secondary school education	14	40	18	51.4	
	High school or diploma	7	20	11	31.4	
	University education	11	31	4	11.4	
Age		3	8.6	2	5.7	0.25***
		Mean	Standard deviation	Mean	Standard deviation	
		56.57	10.26	59.14	8.17	

*Chi-square test ** Fisher exact test *** Independent t-test

According to Table 1, the highest number of study participants in the intervention group (57.1%) were women, and in the control group (51.4%) were men. Also in the intervention group, 65.7% of the participants were unemployed or housewives and in the control group, 62.9% of the participants were unemployed or housewives. In the intervention group, 40% of the participants had a level of primary education, and this rate is 51.4% in the control group. Also, the mean age in the intervention group was 56.57 and in the control group was 59.14. Using an independent t-test, the mean and standard deviation of the age of the subjects in the control and intervention groups were 10.26 ± 56.57 and 8.17 ± 59.14 respectively, which did not show a statistically significant difference ($p = 0.25$). Also, the analysis of demographic characteristics of the two groups of intervention and control by statistical tests showed that these two groups are not significantly different in terms of gender, occupation, and education. Therefore, the two groups are homogeneous in terms of age, sex, occupation, and education ($P > 0.05$).

Table 2
Comparison of participants' knowledge scores before and after the intervention in
the intervention and control groups

Awareness score	Group	Population	Awareness score means	Standard deviation	p-value
Final score (before intervention)	Intervention	35	125.8	9.40	0.25*
	Control	35	128.6	10.38	
Final score (after intervention)	Intervention	35	133.2	11.37	0.005*
	Control	35	124.7	13.17	

*Independent T-test

According to Table 2, the results of the independent t-test show that before the intervention, the difference in mean knowledge score between the intervention and control groups was not statistically significant. P-value = 0.25 but the difference in mean knowledge of patients with hypertension before and two months after The intervention is statistically significant (p-value = 0.005). Due to the homogeneity of the samples in terms of age, sex, level of education, and occupation, this difference in the mean of participants' awareness indicates the positive effect of the researcher's educational interventions on the level of awareness of patients with hypertension.

Discussion and Conclusion

High blood pressure is a major risk factor for many diseases and the leading cause of death worldwide (23). High blood pressure is a major modifiable risk factor for stroke, cardiovascular disease and renal failure, and disability worldwide (24, 25). Because the symptoms of high blood pressure are not known, people do not feel the dangers and do not believe they are at risk (23). This problem makes the prevention of hypertension a major challenge for the health system (23). In general, the findings of this study indicate the effect of educational intervention in the control of hypertension. The mean knowledge score of the intervention group increased compared to the control group after providing the training, which indicates the effect of the virtual educational intervention to increase patients' awareness. The virtual educational method used in this study was virtual lectures and educational pamphlets via the Skype platform. In Abedi et al.'s study in 2018 in Golestan, which aimed to determine the effect of educational intervention on the promotion of self-care behaviors of patients with hypertension, the average self-care behavior in the intervention group after training, compared with the control group, significantly increased Was found (26).

The results of a study conducted by Soheili et al. In 2017 in Urmia to determine the effect of a lifestyle education intervention on blood pressure in diabetic patients with hypertension showed that the mean blood pressure in the intervention group compared to the control group decreased significantly. In this study, it was stated that lifestyle educational interventions can significantly reduce hypertension in diabetic patients with high blood pressure, which is consistent with the results of our study (17). The results of the study of Zareipour et al. In Urmia in 2017 show that the In-person training intervention program is effective on blood pressure control knowledge, attitude and behavior, and by

raising the level of knowledge and attitude, blood pressure control behaviors can be improved in hypertensive patients. (2). The results of a study conducted by Muthulakshmi et al in 2019 on adolescent students in India clearly show that there has been a significant increase in the awareness of students in the intervention group after the presentation of In-person training (27).

The present study was performed on people with hypertension over the age of 35 during the Covid 19 pandemic, and the prevalence of the coronavirus pandemic was one of the limitations of this study. Due to the pandemic, it was not possible to provide training and monitor patients in person. Also, suitable infrastructures for online education, including a suitable high-speed Internet platform, are among the limitations of this study. Also, this age group did not have high education and it was difficult to electronic training of these people. Of course, the type of training and training methods are also very important and we need more research to reach a suitable training model in this regard. Because it must be determined what educational method should be used in each age group. The results of the present study showed that providing virtual education or E-learning to increase awareness about hypertension has been effective. Therefore, by increasing the level of patient awareness through the provision of virtual training, blood pressure control behaviors can be improved among patients.

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