

# Impact of Verbal and Web-based Patient Education Programs Driven by Clinical Pharmacist on the Adherence and Illness Perception of Hypertensive Patients

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## ABSTRACT

**Background:** Patient education is a substantial factor for the management of inveterate diseases. The aim of this study is to assess the impact of patient education given by clinical pharmacist using different (verbal and web-based) education techniques on the adherence and illness perception of hypertensive patients. **Methods:** It is a prospective observational study. Patients selected were randomly assigned to 2 groups: Verbal Based Education Group (VBEG) and Web Based Education Group (WBEG). Patients' adherence and hypertension illness perception were measured using "Medication adherence self-efficacy scale-short form (MASES-SF)" and "Illness Perception Questionnaire-revised (IPQ-R)" at the baseline meeting. 1 month after baseline meeting, patient education was given to patients and 4 months after patient education, the questionnaires were repeated. The scores were evaluated and statistically analyzed. **Results:** Of the 120 patients (60 VBEG and 60 WBEG) available for total follow-up at 5 months, after patient education total score of Medication adherence self-efficacy scale-short form increased in both groups. The cumulative percentage change in statistically significant questions was found to be higher in WBEG (62,3%) than in the VBEG (40,4%). After education mean scores of the 7 subscales of illness representation part of IPQ-R were significantly increased in both groups ( $p < 0,05$ ). The cumulative percentage change for five subscales was found to be higher in WBEG (38,8%) than in the VBEG (26,7%). **Conclusion:** Our study shows that patient education has positive effect both on patient adherence and hypertension illness perception of hypertensive patients, regardless of education technique. This study had also shown that WBE had similar positive effects with VBE when driven by clinical pharmacist.

**Key words:** Patient education, Hypertension, Adherence, Knowledge, Web-based Education, Illness perception.

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## INTRODUCTION

Patient attitude is decisive in chronic disease outcomes and education is a valuable factor for modifying patients' behaviour.<sup>1</sup> Patient education is a precious part of care that allows patients to be informed and actively participate in their own treatment.<sup>2</sup> It enables the delivery of essential information and supporting to cope with the disease.<sup>3</sup>

Beliefs that patients have about their illnesses are called as illness perceptions. These beliefs have a substantial role in influencing patients' attitude and results.<sup>4</sup>

The term compliance was defined as "the extent to which a person's attitude (in terms of taking medications, following diets, or performing lifestyle changes) coincides with medical or health advice".<sup>5</sup>



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Hypertension is a chronic ailment described as systolic blood pressure (BP)  $\geq 130$  mm Hg and/or diastolic BP  $\geq 80$  mm Hg.<sup>6,7</sup> Approximately 54% of all strokes and 47% of all ischemic heart disease events, which are the first two leading causes of death in worldwide are caused by hypertension.<sup>8,9</sup> Considering that the number of people with high BP in the world has increased by 90% over the past 40 years, it is essential to develop efficient tools to help hypertensive patients.<sup>10</sup>

To motivate patients to follow their treatment and use their medications propitiously, patients should be informed about the treatment of hypertension and it should be checked whether they understand the potential utilities (and hazards) of hypertension treatment.<sup>11</sup> Pharmacists have a very important role in patient education and care.<sup>12</sup> Clinical pharmacists, with their pharmacotherapeutic knowledge, should aim to increase the patient's knowledge and compliance with medication treatments by educating the patient.<sup>13,14</sup> Well-designed educational interventions with active participation of the patients are necessary for increasing hypertension knowledge, self-monitoring and control.<sup>15</sup> Monitoring patient adherence is also essential to successful management of hypertension.<sup>16</sup> However, there are few studies focusing on the relationship between the level of knowledge and adherence to drug recommendations.<sup>17</sup>

According to a study about effective teaching strategies for patient education which has yielded 23 systematic reviews and meta-analyses; using computer technology was found to be an effective education technique, positively affecting patient knowledge and satisfaction. Audiotapes and videotapes were also found to be more effective than verbal education and discussions.<sup>18</sup> Since technology currently plays a substantial role in patient education and guidance; newer technologies (internet, smartphones) are used for improvement in health care and provide health information to patients.<sup>19</sup> Web-based communications among patients and health care providers, improve the treatment of chronic illnesses and may result in improved health outcomes and decreased costs.<sup>20</sup> We therefore developed a special web-based patient education program driven by clinical pharmacist to evaluate the impact on the adherence and illness perception of hypertensive patients.

The aim of this study was to assess the effect of patient education and compare the impact of verbal education and web-based education provided by clinical pharmacist on adherence and illness perception of hypertensive patients by increasing the knowledge and awareness of hypertensive patients about hypertension and disease management.

## MATERIALS AND METHODS

### Study design

This study was conducted at the cardiology outpatient clinic of a training and research hospital in Turkey. It is 685 bedded training and research hospital. The study was performed for a span of 5 months from November 1<sup>st</sup>, 2015 - March 30<sup>th</sup>, 2016.

It was a prospective observational study. It was estimated that the difference in the score increase achieved by the pharmacist education was 20% between 2 groups; calculating alpha 0.05 and power 0.80 it was estimated that at least 56 patients should be in each group. We rounded up this number to 60.

120 hypertensive patients accepting to participate in this study were taken. Patients were contacted face-to-face and given information about the project. Patients were eligible to attend to the study if they suited inclusion criteria's. The clinical pharmacist met the patients three times. First one was baseline meeting, the second was during patient education 1 month after baseline meeting and the third was 4 months after education. The entire study design is represented in Figure 1.

### Selection of patients

#### Inclusion criteria

- Patients having a diagnosis of primary hypertension by a cardiovascular physician;
- Using, for a year or over, at least one antihypertensive medication;
- Aged between 18-75 years;
- Patients accepting to have patient education;
- Patients with home computers and ability to use internet;
- Patients visiting cardiology outpatient clinic regularly;
- Available for follow-up for at least 5 months from baseline.

#### Exclusion criteria

- Not self-administering antihypertensive medicines;
- Patients diagnosed with a psychiatric disorder by a doctor;
- Individuals who want to quit the present study;
- Individuals with inadequate datum due to missing follow up.

All patient participants provided written informed consent at the time of enrolment. The study was approved by the Ethical Committee of the Human Research Ethics Committee of Marmara University, Institute of Health Science, Istanbul, Turkey (Approval date and approval number: September 14<sup>th</sup>, 2015 -

18). All procedures performed in the study involving human participants followed the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration.

During baseline meeting in the cardiology outpatient clinic, patients received comprehensive info about the study and the process. Clinical pharmacist recorded every patient's profile data using patient data form. All the patients' hypertension illness perception and adherence were measured and answers were recorded. The patients with written approval were included to computerized automatic randomization. Patients were divided into two groups: Verbal Based Education Group (VBEG) and Web Based Education Group (WBEG).

### Patient education

All the patients in VBEG was given patient education at the same cardiology outpatient clinic by the clinical pharmacist using face-to-face verbal patient education technique. A week before education date, clinical pharmacist called every patient in VBEG for inviting them to education. The duration of the verbal patient education was the same as the duration of the web-based education and was 13 min. However depending on the questions of the patients the duration of the meeting was lasted approximately 20 min. The education was about hypertension management, increase to treatment adherence, appropriate diet for hypertensive patients and proper antihypertensive drug usage.

WBEG was given patient education by the clinical pharmacist using web-based patient education technique. Clinical pharmacist informed the patients in WBEG by phone after sending the link of education video via email. Patient education video was designed, prepared and recorded by clinical pharmacist and its scenario was the same with the verbal education content, [<https://www.youtube.com/watch?v=nGpvOrd2LX4&feature=youtu.be> (it was reachable during project and patients' access to this link was confirmed by using informatics data)]. The patient education video was about hypertension management, increase to treatment adherence, appropriate diet for hypertensive patients and proper antihypertensive drug usage.

Four months after education, both groups' adherence and hypertension illness perception were measured. All patients were given information about this stage. Questions of the patients were answered.

### Study outcomes

#### Patient adherence

The impact of the patient education on patient adherence was appraised utilizing the Turkish version

of the "Medication adherence self-efficacy scale-short form (MASES-SF) in hypertensive patients". The medication adherence self-efficacy scale was developed by Ogedegbe *et al.*<sup>21</sup> to assess medication adherence and compliance. Validity and reliability studies for the short form Turkish version have been completed by Hacıhasanoğlu *et al.* in Turkey.<sup>22</sup> The 13 questions on the short form have a 4-point Likert format, from 1 = not sure at all to 4 = very sure and reliability of  $\alpha = 0.94$ . Patients were asked to rate their confidence in taking their antihypertensive medications under a variety of situations that may pose difficulties. Higher scores indicate a greater level of self-efficacy. MASES-SF does not include subscales.<sup>22</sup> Adherence was measured 2 times; at the baseline meeting and 4 months after patient education.

MASES-SF was analyzed using Cronach's alpha to ensure reliability and  $\alpha = 0.94$  was found. This demonstrates the reliability and validity of the scale used in the study.

#### Patient hypertension illness perception

The impact of the patient education on patient hypertension knowledge was appraised utilizing the Turkish version of "Illness Perception Questionnaire-revised (IPQ-R)". The illness perception questionnaire was developed by Weinmann *et al.* in 1996 and reviewed by Moss-Morris *et al.*<sup>23,24</sup> Turkish validation of IPQ-R was done by Armay *et al.*<sup>25</sup> Hypertension illness perception was measured 2 times; at the baseline meeting and 4 months after patient education.

IPQ-R is comprised of three parts: Illness representation, identity and cause. The illness representation consists of 38 questions with 7 subscales. All questions were ranked on a five-point Likert scale (1, strongly disagree to 5, strongly agree). In the study of validity and reliability of IPQ-R, illness representation part of the IPQ-R was analyzed using Cronach's alpha to ensure reliability for each subscale and it was found that the Cronach's alpha internal consistency varied between 0.69 and 0.77 and were adequate. For each subscale, the average of the questions related to that subscale announced by the authors in the data analysis were taken. High scores on identity, timeline, consequences and cyclical dimensions represent strongly held beliefs about the number of symptoms attributed to the illness, chronicity of the condition, negative consequences of the illness and cyclical nature of the condition. High scores on treatment control, personal control and coherence dimensions, represent positive beliefs about controllability of the illness and a personal understanding of the condition.<sup>26</sup> Illness representation part of the IPQ-R was analyzed using Cronbach's alpha and it was found that the

Cronbach’s alpha inner consistence varied between 0.69 and 0.92. This demonstrates the reliability and validity of the scale used in the study.

The cause part of IPQ-R consists of 18 items with 4 subscales. Cause part investigates thoughts about the possible causes of one’s illness. All items were ranked on a five-point Likert scale. In the study of validity and reliability of IPQ-R, it was found that the Cronbach’s alpha value of cause part internal consistency varied between 0.25 and 0.72 and were adequate. Higher scores indicate strongly held beliefs about the causes of the illness.<sup>26</sup>

Cause part of the IPQ-R was analyzed using Cronbach’s alpha and it was found that the Cronbach’s alpha inner consistence varied between 0.29 and 0.65. This demonstrates the reliability and validity of the scale used in the study.

The identity part was not included in the present study.

**Statistical analysis**

Analysis was done using SPSS 11.0 version. The *p*-value of all data was considered statistically significant in the range of <0.05 and 95% confidence. Whether the distribution of the data was normal or not was determined by the Kolmogorov-Smirnov test and it was found that the distribution was not normal. Mann-Whitney U test, a nonparametric test for continuous variables, was used to compare two groups. Chi-square tests were used in the analysis of categorical data. To determine the effect of education, Wilcoxon test, a non-parametric test, was used in the analysis of the difference between the previous and the subsequent findings. To evaluate the correlation between parameters Spearman correlation analysis was used. Cronbach’s alpha test was applied for the inner consistency of the scales used.

**RESULTS**

**Program implementation**

120 patients were recruited and randomized to the VBEG (*n* = 60) and WBEG (*n* = 60), respectively (Figure 1). Mean age of the patients in VBEG was 58 and 60% of these patients were female, whereas mean age of the patients in WBEG was 55.2 and 65% of these patients were female. In some of the demographic characteristics of the patients statistically significant differences observed between groups. Baseline characteristics of the patients are shown in Table 1.

**Patient adherence**

Of the 120 patients (60 VBEG and 60 WBEG) available for total follow-up at 5 months, before patient education

there were no significant differences at total score of MASES-SF between groups. After patient education total score of MASES-SF increased in both groups (Table 2). The increase in total score of statistically significant questions (question no 1, 2, 3, 4, 8, 11, 12, 13) for both groups was found as VBEG from 25.9 ± 8.2 to 27.2 ± 6.6 (*p*<0.05) and WBEG from 25.9 ± 8.0 to 27.9 ± 6.1 (*p*<0.05). Although after patient education there was no significant difference at total score of MASES-SF between groups (*p*>0.05); the cumulative percentage change in statistically significant questions was found to be higher in WBEG (62.3%) than in the VBEG (40.4%).

**Patient hypertension illness perception**

Of the 120 patients (60 VBEG and 60 WBEG) available for total follow-up at 5 months, after education mean scores of the 7 subscales of illness representation part of IPQ-R were significantly increased in both groups (*p*<0.05) (Table 3).

Score increase including timeline (acute/chronic), consequences, personal control, time line (cyclical), emotional representations subscales were higher in WBEG. The cumulative percentage change for these

**Table 1: Baseline characteristics of patients.**

Characteristics	VBEG (n = 60)	WBEG (n = 60)	p
Male, <i>n</i> (%)	24 (40)	21 (35)	0.706
Mean age, years (SD)	58 (8.7)	55.2 (8.6)	0.044
Mean weight, kg (SD)	84.7 (12.6)	80.2 (14.4)	0.049
Mean height, cm (SD)	165 (7)	166.1 (8.5)	0.584
Mean waist circumference, cm (SD)	107.5 (15.7)	101.3 (18.1)	0.024
Married, <i>n</i> (%)	54 (90)	51 (85)	0.680
Education, over 8 years, <i>n</i> (%)	15 (25)	23 (38)	0.490
Cigarette using, <i>n</i> (%)	13 (21.7)	21 (35)	0.490
Alcohol using, <i>n</i> (%)	8 (13.3)	13 (21.6)	0.303
Mean duration of hypertension, years (SD)	11.5 (9.1)	9.2 (7.2)	0.306

**Note.** VBEG Verbal Based Education Group, *n* number of patients, WBEG Web Based Education Group, *SD* standard deviation, 8 years duration of compulsory education in Turkey  
All data are considered to be statistically significant at *p*-value<0.05 and 95% confidence interval.

**Table 2: Comparison of VBEG and WBEG's mean scores for MASES-SF before and after education.**

Confidence in taking medications:	Patients	Before patient education, mean (SD)	After patient education, mean (SD)	p*
1. When you are busy at home	VBEG (n = 60)	3.3 ± 0.9	3.4 ± 0.8	0.034
	WBEG (n = 60)	3.0 ± 1.0	3.2 ± 0.9	0.006
	p**	0.124	0.280	
2. When there is no one to remind you	VBEG (n = 60)	3.3 ± 1.0	3.4 ± 0.8	0.020
	WBEG (n = 60)	3.2 ± 1.0	3.4 ± 0.9	0.038
	p**	0.725	0.969	
3. When you worry about taking them for the rest of your life	VBEG (n = 60)	3.2 ± 0.9	3.4 ± 0.8	0.002
	WBEG (n = 60)	3.4 ± 0.9	3.6 ± 0.7	0.023
	p**	0.262	0.169	
4. When you do not have any symptoms	VBEG (n = 60)	3.2 ± 1.1	3.4 ± 0.8	0.006
	WBEG (n = 60)	3.2 ± 1.1	3.6 ± 0.7	0.001
	p**	0.986	0.141	
5. When you are with family members	VBEG (n = 60)	3.3 ± 1.0	3.4 ± 0.9	0.059
	WBEG (n = 60)	3.3 ± 0.9	3.4 ± 0.8	0.157
	p**	0.991	0.991	
6. When you are in a public place	VBEG (n = 60)	3.2 ± 1.1	3.3 ± 0.9	0.011
	WBEG (n = 60)	3.2 ± 1.0	3.3 ± 0.9	0.059
	p**	0.917	0.889	
7. When the time to take them is between your meals	VBEG (n = 60)	3.3 ± 0.9	3.3 ± 0.9	0.180
	WBEG (n = 60)	3.2 ± 0.9	3.3 ± 0.8	0.046
	p**	0.615	0.677	
8. When you are travelling	VBEG (n = 60)	3.0 ± 1.2	3.2 ± 1.0	0.007
	WBEG (n = 60)	3.2 ± 1.1	3.3 ± 0.9	0.008
	p**	0.574	0.588	
9. When you take them more than once a day	VBEG (n = 60)	3.3 ± 0.9	3.3 ± 0.8	0.059
	WBEG (n = 60)	3.2 ± 0.9	3.3 ± 0.8	0.102
	p**	0.639	0.590	
10. When you have other medications to take	VBEG (n = 60)	3.4 ± 0.9	3.5 ± 0.8	0.180
	WBEG (n = 60)	3.3 ± 0.8	3.4 ± 0.7	0.157
	p**	0.229	0.220	
11. When you feel well	VBEG (n = 60)	3.3 ± 1.1	3.5 ± 0.7	0.004
	WBEG (n = 60)	3.2 ± 1.1	3.7 ± 0.6	0.001
	p**	0.856	0.245	
12. If they make you want to urinate while away from home	VBEG (n = 60)	3.3 ± 1.0	3.4 ± 0.9	0.034
	WBEG (n = 60)	3.2 ± 1.1	3.5 ± 0.8	0.002
	p**	0.906	0.439	
13. Make taking your medications part of your routine	VBEG (n = 60)	3.3 ± 1.0	3.5 ± 0.8	0.020
	WBEG (n = 60)	3.5 ± 0.7	3.6 ± 0.6	0.025
	p**	0.640	0.605	
Total score	VBEG (n = 60)	42.4 ± 13.0	44.0 ± 10.9	0.000
	WBEG (n = 60)	42.1 ± 12.5	44.6 ± 10.1	0.000
	p**	0.715	0.913	

**Note.** VBEG Verbal Based Education Group, WBEG Web Based Education Group, MASES-SF Medication adherence self-efficacy scale-short form, SD standard deviation, p\* comparison of groups' mean scores before and after education, n number of patients, p\*\* comparison of the mean scores of VBEG and WBEG. All data are considered to be statistically significant at p-value <0.05 and 95% confidence interval.

subscales was found to be higher in WBEG (38.8%) than in the VBEG (26.7%). Whereas for other 2 subscales including treatment control and illness coherence, the cumulative percentage change was found to be higher in VBEG (21.1%) than in the WBEG (10.1%).

After patient education mean scores of the psychological cause subscale of cause part of IPQ-R were significantly increased in both groups ( $p < 0.05$ ). On the other hand, change in mean scores of immunological cause and

chance subscales failed to reach statistical significance. Change in mean score of risk factors subscale was significant in VBEG ( $p < 0.05$ ), whereas was not significant in WBEG ( $p > 0.05$ ) (Table 3).

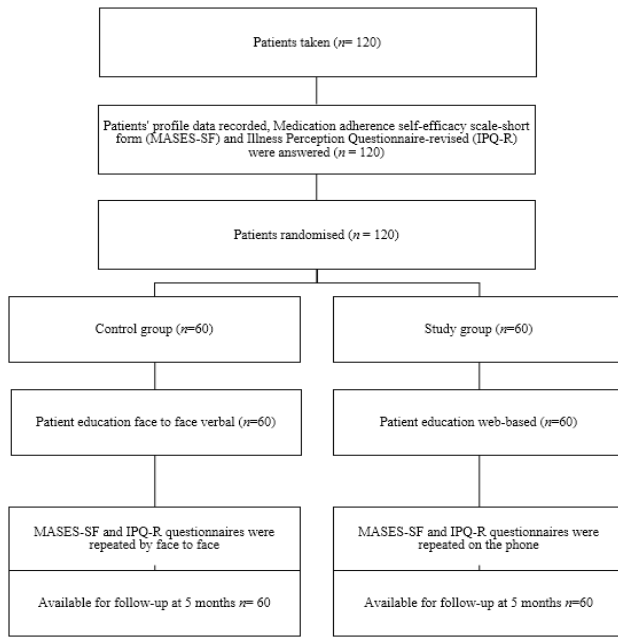
### DISCUSSION

Educational programs are usually beneficial in chronic illnesses.<sup>27</sup> Our study supplies novel insight into the

**Table 3: Comparison of VBEG and WBEG's mean scores for IPQ-R before and after education**

		Patients	Before patient education, mean (SD)	After patient education, mean (SD)	$p^*$
Illness representation	Timeline (acute/ chronic)	VBEG (n = 60)	24.9 ± 5.5	26.5 ± 3.5	<0.001
		WBEG (n = 60)	24.5 ± 5.5	26.6 ± 3.4	<0.001
		$p^{**}$	0.667	0.768	
	Consequences	VBEG (n = 60)	19.2 ± 5.2	19.6 ± 4.6	0.020
		WBEG (n = 60)	15.8 ± 4.5	16.6 ± 4.2	0.003
		$p^{**}$	<0.001	<0.001	
	Personal control	VBEG (n = 60)	22.9 ± 4.6	25.1 ± 2.3	<0.001
		WBEG (n = 60)	22.4 ± 4.9	25.2 ± 2.2	0.006
		$p^{**}$	0.439	0.830	
	Treatment control	VBEG (n = 60)	18.9 ± 3.5	20.3 ± 2.3	<0.001
		WBEG (n = 60)	18.7 ± 3.3	19.4 ± 2.6	0.006
		$p^{**}$	0.525	0.046	
	Illness coherence	VBEG (n = 60)	16.8 ± 4.6	19.1 ± 2.9	<0.001
		WBEG (n = 60)	18.8 ± 4.5	20.0 ± 3.0	0.005
		$p^{**}$	0.006	0.080	
Timeline cyclical	VBEG (n = 60)	13.8 ± 2.8	14.4 ± 2.7	<0.001	
	WBEG (n = 60)	12.2 ± 3.1	13.1 ± 3.1	<0.001	
	$p^{**}$	0.007	0.037		
Emotional representations	VBEG (n = 60)	18.5 ± 6.5	19.3 ± 5.9	0.018	
	WBEG (n = 60)	17.2 ± 6.6	18.1 ± 6.1	0.049	
	$p^{**}$	0.305	0.245		
Cause	Psychological cause	VBEG (n = 60)	21.7 ± 4.2	22.7 ± 4.2	<0.001
		WBEG (n = 60)	21.1 ± 3.9	22.1 ± 3.4	0.001
		$p^{**}$	0.405	0.422	
	Risk factors	VBEG (n = 60)	20.9 ± 4.3	21.3 ± 4.5	0.017
		WBEG (n = 60)	20.7 ± 4.4	21.2 ± 4.1	0.092
		$p^{**}$	0.722	0.899	
	Immunological cause	VBEG (n = 60)	7.8 ± 2.2	7.7 ± 2.2	0.109
		WBEG (n = 60)	7.6 ± 2.3	7.5 ± 2.2	0.707
		$p^{**}$	0.685	0.645	
	Chance	VBEG (n = 60)	4.6 ± 1.8	4.6 ± 1.8	0.321
		WBEG (n = 60)	4.5 ± 1.9	4.6 ± 2.0	0.520
		$p^{**}$	0.807	0.925	

**Note.** VBEG Verbal Based Education Group, WBEG Web Based Education Group, IPQ-R Illness perception questionnaire-revised, SD standard deviation,  $p^*$  comparison of groups' mean scores before and after education,  $n$  number of patients,  $p^{**}$  comparison of the mean scores of VBEG and WBEG. All data are considered to be statistically significant at  $p$ -value < 0.05 and 95% confidence interval.



**Figure 1: Study flow diagram.**

positive impacts of web-based patient education on hypertension illness perception and adherence of hypertensive patients and compares this impact with VBE. Our study demonstrates WBE had similar effects with VBE when driven by clinical pharmacist.

The impact of nonadherence to antihypertensive treatment is the most important cause of uncontrolled BP.<sup>28</sup> Pharmacists can improve patient awareness of treatments and increase patient adherence.<sup>29</sup> In our study the statistically significant increases in scores after education had shown that the patient education driven by clinical pharmacist was found to be successful in increasing patient adherence in both groups.

Experimental studies have demonstrated that the beliefs and perceptions of the patient about hypertension may be an obstacle in controlling hypertension.<sup>30</sup> Before and after education, there is statistical significant difference in the knowledge of patients in both groups about importance of taking hypertension medicine when there is no symptom (Table 2 - question 4, 11). This result promotes the idea developed by Polanska *et al.* poor knowledge on adherence to the treatment plan negatively impacts patient awareness and attitudes<sup>31</sup> and creates a substantial problem in hypertension control.<sup>32</sup> In another study including 4783 patients, with about half of the patients prescribed an antihypertensive drug quit the treatment within 1 year due to the nonadherence.<sup>33</sup> Therefore, education of hypertensive patients is of great importance. Our data demonstrate the possible positive effect of education both on patient adherence and hypertension illness perception, as the

score of the patients included in our study increased after the patient education, regardless of education technique. These findings are consistent with those in the previous studies concerning the effects of educational programs on hypertensive patient knowledge.<sup>15,34,35</sup> Previous studies using video-based, computer-based and web-based patient education methods have evaluated the efficacy of patient education on modifying health behavior more than medication adherence and illness perception.<sup>36,37</sup> Differently from previous studies, we found that the web-based patient education driven by clinical pharmacist was also successful in increasing adherence and illness perception of hypertensive patients.

Many studies evaluate the effects of patient education, but only a few of them evaluate the effect of web-based patient education programs. Due to the systematic review of 19 studies including 1.717 participants, only 3 studies have investigated the impact of individualized web-based patient education programs. These studies consistently reported statistically significant findings about the effectiveness of the web-based patient education intervention in improving the performance of personal care behaviors. The results in the literature examining the effectiveness of individualized patient education interventions are similar to our findings.<sup>38,39</sup>

On the other hand, there are different ideas about efficacy of video-based, computer-based and web-based patient education methods in literature. In the study conducted in the US computer-based patient education on self-management of the disease was not shown to be superior to paper-based patient education.<sup>39</sup> Whereas Fredericks *et al.* reported that findings suggest that the use of a personalized web-based patient education intervention may be more effective than a brochure or standard patient education webpage.<sup>37</sup> Studies done in Turkey have also demonstrated that online health education and consulting improves patients' satisfaction and quality of life.<sup>40-43</sup>

In our study, similar to these studies, patients reached education video via the website. But differently there was no interactive intervention on the website and the video was not individualized. Clinical pharmacist designed a special video and real patients played the scenario. Patients in the study were able to watch it from everywhere on internet. Although there was no interactive intervention with the patient via the website, we showed that WBE had similar effects with VBE when driven by clinical pharmacist and contribute the hypertension management in hypertensive patients.

This study has several limitations. The blood pressure was not measured because it was not within the scope

of our purpose. Additionally, study participants were recruited from a small geographic region within Istanbul City; therefore, the generalizability of the study sample may be limited.

In addition, economic assessments should be done to determine the cost-effectiveness of the intervention and the potential sustainability of the service.<sup>44</sup> No pharmacoeconomic assessments have been made because of the time constraints of the study.

Our study should be thought as anterior study that indicated the positive impact of WBE on hypertension management in hypertensive patients. Including an evaluation of blood pressure check and cost-effectiveness assessment a wider scale study should be developed with at least 1 year period. Throughout this period, patient adherence and hypertension management should be periodically reassessed to evaluate whether positive effects of education will proceed or not over time. As in previous studies, the effect of education has been shown to change with time.<sup>34,45</sup>

To our knowledge, this is the first web-based patient education driven by clinical pharmacist to hypertensive patients in Turkey. Our patient education-focused pharmacist intervention significantly increased total score of MASES-SF and mean scores of the 7 subscales of illness representation part of IPQ-R in both groups ( $p < 0.05$ ) (Table 2, Table 3). The intervention had positive effects on WBEG, similar to that of the VBEG.

## CONCLUSION

Our study shows that patient education provided by clinical pharmacist has positive effect both on patient adherence and hypertension illness perception of hypertensive patients, regardless of education technique. Our data also demonstrate that WBE seemed to have similar positive effects with VBE when driven by clinical pharmacist. These benefits could lead to reach more patients with time and cost saving. However, WBE is not meant to replace the essential and individual relationship between a patient and a pharmacist.

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## CONFLICT OF INTEREST

The authors report no conflicts of interest to disclose.

## ABBREVIATIONS

**BP:** Blood pressure; **WHO:** World Health Organisation; **VBEG:** Verbal Based Education Group; **WBEG:** Web Based Education Group; **MASES-SF:** Medication adherence self-efficacy scale-short form; **IPQ-R:** Illness Perception Questionnaire-revised; **SD:** Standard deviation.

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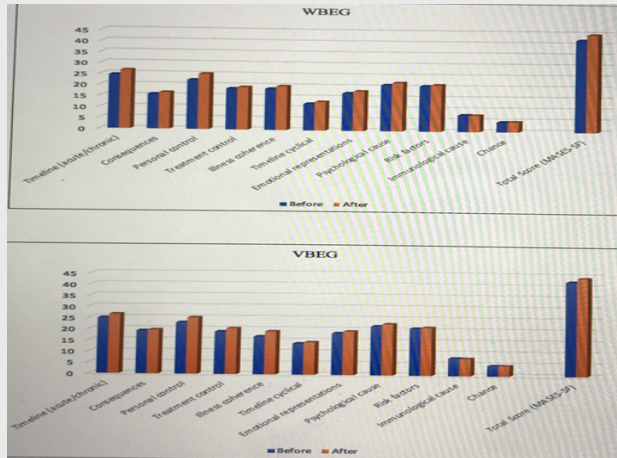


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## SUMMARY

The aim of this study is to assess the impact of patient education given by clinical pharmacist using different (verbal and web-based) education techniques on the adherence and illness perception of hypertensive patients. Patients having a diagnosis of primary hypertension by a cardiovascular physician; using, for a year or over, at least one antihypertensive medication and aged between 18 – 75 years were taken to the study. Patients selected were randomly divided into 2 groups: Verbal Based Education Group (VBEG) and Web Based Education Group (WBEG). Patients' adherence and hypertension illness perception were measured at the baseline meeting and 4 months after patient education. The scores were evaluated and statistically analyzed. After education, there were statistical significant increase in the adherence and illness perception scores of patients in both groups. It was shown that patient education has positive effect both on patient adherence and hypertension illness perception of hypertensive patients, regardless of education technique. It was also found that WBE had similar positive effects with VBE when driven by clinical pharmacist.

### PICTORIAL ABSTRACT



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