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RESEARCH ARTICLE

A Comparison between Multimedia and Traditional Education in Encouraging Adherence to Treatment Regimen in Patients with Hypertension

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Abstract:

Background:

Adherence to treatment regimen plays a crucial part in the prevention of the consequences of hypertension, thus identification and employment of effective educational methods to enhance patients' adherence to their treatment plans is important.

Objective:

The present study compares the effectiveness of multimedia and traditional methods of patient education in persuading patients with hypertension to stick to their treatment regimens.

Methods:

Conducted in 2019, the present study is an experimental work of research which lasted for 5 months. A convenience sample of 160 patients who visited the clinic and cardiac sections of a hospital located in the south-west of Iran was selected and then randomly divided into an intervention and a control group. The intervention consisted of multimedia education provided in 6 sessions and telephone follow-ups. The control group was given the traditional care. The research instruments were a demographics questionnaire and a medication adherence scale. Data were collected before, immediately after, and one month after the intervention. The collected data were analyzed using SPSS v. 19, independent t-test, and *chi*-square test.

Results:

The difference between the adherence to treatment regimen scores of the two groups as calculated immediately after and one month after the intervention was found to be statistically significant ($P<0.001$).

Conclusion:

Patient education *via* multimedia can significantly increase patients' adherence to their treatment regimens. Accordingly, it is recommended that nurses and other healthcare providers utilize this new educational approach to facilitate patient education and enhance adherence to treatment plan in patients with hypertension.

Keywords: Hypertension, Multimedia, Education, Treatment adherence, Traditional education, Patients.

1. INTRODUCTION

Hypertension is a major medical and public health issue which is becoming increasingly important. Hypertension can double the risk of coronary artery disease [1]. Preventing and controlling hypertension is the top public health challenge in many countries as the condition is known a silent killer with a variety of clinical, economic, and social consequences [2]. As one of the preventable causes of death in the world [3], hypertension is closely linked with the lifestyle, psychological health, and quality of life of patients and can, if not controlled timely and properly, leads to other diseases, significant physical impairment, reduced efficiency, and eventually a shorter life span [4].

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The reported prevalence of hypertension in various societies ranges from 5.2% to 55.3%. According to WHO, nearly 40% of adults worldwide aged over 25 years suffer from hypertension. In Iran, 27% of the adult population is reported to have hypertension [5].

The most common (or prevalent) reason for uncontrolled hypertension is patients' failure to follow their treatment regimens [4] which can have such dire consequences as relapse of the condition, need for hospitalization, and increased risk of being affected by the side effects. On the other hand, adherence to one's treatment regimen has the potential to improve the chances of recovery [6].

Nurses have the best opportunity to identify patients' educational needs and can provide information and self-care education [7, 8]. In order for patients' educational needs to be met properly, there is a need for new and flexible educational approaches [9]. Interventions toward encouraging adherence to treatment regimen can play a significant role in controlling hypertension [10]. Due to the chronic nature of their disease, patients with hypertension are in need of receiving education which empowers them to improve their health status. Through education, many of the consequences of the disease can be controlled or eliminated [11].

One of the new approaches to education is the multimedia method. The use of multimedia increases the clarity of education, makes the educational content more understandable and interesting, broadens patients' comprehension, enhances the permanence of learning, increases patients' participation in learning, and provides for proper feedback [12]. However, education alone cannot reduce the probability of hospital readmissions [13] and there is a need for effective methods of follow-up for after discharge of patients [3]. Multimedia education is defined as using basic types of media material such as text, video, sound, graphics, animation and incorporating this approach into a learning environment [14]. Teaching through multimedia provides a relatively cost-effective, timesaving, user-friendly and easy to reach approaches in patient and caregiver education [15]. Nowadays, multimedia sources of information such as videos, audio, and pictures are combined in education strategies [14]. Using multimedia method help educators in overcoming linguistic, physical and cultural barriers and in addressing different learning needs. Multimedia education also provides unique experiences in presenting materials in various formats and from different perspectives for patients [16].

A combination of healthcare interventions and telephone follow-ups by nurses can be more effective than nursing interventions without the use of new educational methods and follow up the effectiveness of patient education. A study reports that education accompanied by telephone follow-up or social media-based follow-up *via* smartphones improves self-management in patients with hypertension [3].

Since adherence to treatment regimen plays a key role in controlling hypertension and achieving better treatment results, and because there have been no studies in Iran comparing multimedia education with traditional patient education in terms of their effectiveness in encouraging adherence to treatment regimen for hypertension, the present study aims to compare multimedia with traditional education in terms of their effectiveness in encouraging adherence to treatment regimen in patients with hypertension.

2. MATERIALS AND METHODS

The present study is a quasi-experimental work conducted in the clinic and cardiac sections of the university hospital of Fasa University of Medical Sciences located in the south-west of Iran from December 2018 to June 2019. The research sample consisted of all the patients with hypertension who visited the heart clinic and the CCU and post CCU sections of the above-mentioned hospital and met the inclusion criteria.

The inclusion criteria were: being on hypertension medications for 6 months, having had hypertension for at least 6 months as confirmed by a cardiologist, being literate and able to understand Farsi, having access to a means of tele-communication (a cellphone or telephone), and not parti-cipating in a similar study at the same time. The exclusion criteria were: suffering from a severe physical condition, having secondary hypertension, lack of access to means of telecommunication, missing more than one intervention session, having a self-declared psychological disease, and failure to continue participation in the study for any reason.

The following formula was used to calculate the sample size required for the present study [17]:

With a confidence level of 95%, power of test of 0.84, and study accuracy of 0.5 SD, the sample size required in each group was calculated to be 63 which was raised to 80 patients in view of the possibility of sample loss in the course of the study.

Initial sampling was conducted according to the convenience sampling method in inpatient setting: all the patients who visited the clinic and the patients who were hospitalized in CCU and post CCU and met the inclusion criteria were selected for the study. Subsequently, the subjects were divided into two groups-control and intervention-each consisting of 80 members using a random number table.

The data collection instrument was a questionnaire that consisted of two parts: part one addressed the respondent's demographics and part two measured the degree of treatment adherence in patients with hypertension. The treatment adherence questionnaire was developed and tested by Dehghan *et al.* in 2014. The face validity and content validity of the questionnaire were confirmed by 25 patients with hypertension and a panel of university professors, respectively. Its construct validity was measured *via* the two methods of exploratory factor analysis and concurrent validity. The results of the former method for a sample size of 330 patients with hypertension were as follows: df=378, X^2=4944.6, p<0.001, and KMO=0.76. The internal homogeneity of the scale was found to be 0.8. The reliability coefficient of the instrument was verified *via* the test-retest method on 50 patients with hypertension. An internal cluster coefficient (ICC) of 0.95 proved that the scale possessed excellent consistency [18].

The treatment adherence questionnaire consists of 28 items which fall into 6 subscales: medication adherence and

monitoring (8 items), refraining from self-medication (5 items), avoiding an unhealthy diet (5 items), adhering to a healthy diet (5 items), physical activities (2 items), and refraining from tobacco use (3 items). Responses are scored based on a 5-point Likert scale: No=1, Rarely=2, Occasionally=3, Usually=4, and Always=5. Questions 15, 16, 17, 18, 21, 22, 23 are scored reversely:: No=5, Rarely=4, Occasionally=3, Usually=2, and Always=1. The score range is between 28 and 140, and a score of 86 or above indicates the respondent's adherence to his/her treatment regimen.

Having acquired an ethical code and introduction letter from the university, the researchers informed the participants about the objectives of the study and the voluntary nature of their participation. They were also assured of the confidentiality of their information. Next, the participants were asked to sign the informed consent form. The intervention was comprised of multimedia education, including education *via* videos and slides, as well as verbal instructions, printed material (an educational pamphlet), and problem-solving sessions. The validity of the educational content was verified by 15 nursing professors and cardiologists at the university. The educational pamphlet was, in fact, the printed version of the education provided *via* the educational video and slides and complied with the latest clinical guidelines on hypertension, factors affecting hypertension, and methods of controlling it. The pamphlet had been previously reviewed and revised by 15 nursing professors and cardiologists.

Multimedia education was provided through 6 two-hour sessions over 6 weeks (one session a week). Designed based on academic textbooks and the viewpoints of university professors, the content of the educational video and pamphlet addressed the various aspects of the disease and its treatment, including: the pathophysiology of hypertension and complications, factors effective in controlling hypertension, the right method of measuring blood pressure, types of medications, physical activity (regular walking for 0.5-1 hours a day), and the effects of adherence to medication and food regimens and an improved lifestyle on controlling hypertension. The education was presented by a board member with a master's degree in internal surgery nursing in the conference room of the hospital.

At the end of the educational sessions, telephone follow-ups were employed to monitor the patients' extent of adherence to the presented instructions, answer the patients' queries, and encourage the patients to actively participate in self-care activities and adhere to their treatment regimens. Based on a review of relevant sources and the comments of nursing professors and cardiologists, the issues addressed in the telephone follow-ups included: correct use of prescribed medications, timely visits for having one's blood pressure measured, timely visits with the clinician, correcting such habits as smoking and alcohol consumption, following the recommended low salt, low fat and high fiber diet, and applying the regular walking exercise to reduce the risk of cardiac and cerebral disorders. In this part of the intervention, the patients were contacted once a week at the end of the fourth, fifth, and sixth weeks of the intervention (three times

overall). Each call lasted about 20 minutes and the patients had the researchers' phone number to contact them if necessary. There is not any modification in consumption of the antihypertensive medications during follow up.

The control group was provided with traditional care and was not exposed to any educational interventions. The traditional patient education which is performed by hospital nurses is on a unilateral basis and only provides patients with a brief introduction to their medications-the patients are not actively involved in their education.

The collected data were analyzed using descriptive and inferential statistics in SPSS v. 23. To compare the treatment adherence scores of the two groups as obtained at three points in time (before, immediately after, and one month after intervention), the researchers first examined the normality of the scores *via* the Kolmogorove-Smirnov test. The results showed that the data were normally distributed. Next, repeated-measures ANOVA was used to compare the mean scores of the intervention and control groups; the level of significance was set at $p < 0.05$.

3. RESULTS

160 patients with hypertension participated in the present study. The average age of the participants in the intervention and control groups was 54.96 ± 12.76 and 58.41 ± 12.41, respectively. For the intervention group, the history of hypertension and length of use of hypertension medications were found to be 5.67 ± 6.30 and 5.21 ± 6.16 years, respectively; for the control group, the findings were 5.81 ± 5.45 and 5.59 ± 4.61 years. The distributions and percentages of the frequency of the other demographic variables are given in Table **1**.

Independent t-test results showed that the pretest adherence to treatment regimen scores of the study groups in total were not significantly different and the groups were similar in this regard ($p=0.83$). On the other hand, the results of independent t-tests showed the scores of the study groups, as obtained immediately after and one month after the end of the intervention, to be significantly different ($p < 0.001$) (Table **2**). Also, The number of hypertension medications being used didn't affected adherence in the intervention and control group ($p > 0.56$, $p > 0.64$).

4. DISCUSSION

The results of the study showed a statistically significant difference between the mean scores of the subjects in the intervention and control groups regarding their adherence to their hypertension treatment regimens immediately after and one month after the intervention. Also, the differences between the scores of the groups in each dimension of treatment adherence as calculated immediately after and one month after the intervention were found to be significantly different. In a similar study, the adherence to treatment regimen scores of the subjects as obtained immediately and one month after their peer support intervention were significantly different from their pretest scores in the three domains of medication regimen, food regimen, and physical activity [19].

Table 1. Distribution and percentage of the frequency of the demographics of the intervention and control groups.

P-value	Test Statistic	Control		Intervention		Variables
		%	Frequency	%	Frequency	
-	-	-	-	-	-	**Sex**
0.71	$x^2=0.62$	31	25	31.9	28	Male
-	-	69	53	68.1	52	Female
-	-	-	-	-	-	**Marital status**
0.23	$x^2=5.82$	4.6	6	4.4	5	Single
-	-	81.7	61	81.9	62	Married
-	-	4.6	6	4.4	5	Divorced
-	-	9.1	7	9.3	8	Widowed
-	-	-	-	-	-	**Education**
0.31	$x^2=4.42$	82.4	57	73.3	56	Elementary school
-	-	9	12	14.7	14	High school
-	-	8.6	11	12	10	Bachelor's degree and above
-	-	-	-	-	-	**Occupation**
0.87	$x^2=1.29$	61.9	44	56.1	40	Homemaker
-	-	2.4	5	2.9	4	Unemployed
-	-	4	4	5.6	6	Unskilled worker
-	-	5.9	5	5.6	6	Office clerk
-	-	8.6	6	5.6	6	Retired
-	-	17.2	16	24.2	18	Others
-	-	-	-	-	-	**Number of hypertension medications being used**
0.56	$x^2=1.46$	74.4	59	82.4	61	One
-	-	21.3	18	16.2	15	Two
-	-	4.3	3	1.4	4	Three

Table 2. A comparison between the mean adherence scores of the intervention and control groups as obtained before, immediately after, and one month after the intervention.

P-value	Test Statistic	Control	Intervention	Group
		Mean±S.D	Mean±S.D	
0.83	t=0.12	84.74±7.26	85.41±7.63	Total score before intervention
<0.001	t=10.43	82.84±6.83	92.61±5.48	Total score immediately after intervention
<0.001	t =12.28	81.19±6.65	95.54±4.56	Total score one month after intervention
-	-	3.12 = F	22.5 = F*	Statistical test
-	-	0.04	<0.001	*P*-value

F: Greenhouse-Geisser*

In Demircelik's study (2016), education *via* interactive multimedia CDs significantly decreased anxiety and depression in the subjects in the intervention group and increased their self-care knowledge [20]. Sayady *et al*. (2018) reported a decrease in the diastolic blood pressure and heart rate of pati-ents having cerebral angiography following multimedia education [12]. In the study of Wang and Chiou (2011), compared to the subjects in the control group, the patients who were educated with an interactive multimedia CD were found to have better knowledge and adherence to their treatment regimens and a stronger sense of being in control of their lives; multimedia education also increased their self-care knowledge [21]. According to the study of Chiou and Chung (2012), patients who were educated with interactive multimedia DVDs had a better knowledge of their conditions and felt less uncertain when they were in need to make decisions about their treatment [22].

In Conway and Kelechi's study (2017), digital health interventions include interactive voice response (with or without human interaction), short message service (text messaging), tele monitoring and/or tailored care management, and Web-based software were identified for improving adherence [23]. In Schroedera *et al*' s study (2005), patients receiving nurse-led adherence support were no more adherent at six months than patients receiving usual care. Also, there was no difference at six months between the groups with regard to systolic or diastolic blood pressure [24]. In Guevara *et al*' s study (2019) The nursing intervention "Teaching: Individual" to increase adherence to the therapeutic regimen in hypertension patients indicates an innovative care approach intended for low-income population [25]. All of the above findings demonstrate the beneficial effects of multimedia education on patients' learning and positive behavioral

changes: multimedia has a high interactive potential which makes the transfer of educational content more simple and interesting and, consequently, increases learners' absorption of the educational content.

In another study, telephone follow-ups over a three-month period after education in self-care improve the physical, psychological, and social aspects of the quality of life of patients with colostomy [26]. In their study, Nundy *et al*. (2013) evaluated the effectiveness of text messaging in encouraging self-management in patients with heart failure after discharge and conclude that patients who receive telephone follow-ups are more successful at self-management and improving their lifestyles [27]. Similarly, studying the effects of providing care *via* the telephone to cure depression after CABG, Rollman *et al*. (2009) reported a significant difference between the posttest scores of the intervention and control groups: the intervention group showed better psychological well-being, physical performance, and emotional signs [28]. In the study of Hung *et al*. (2014), the subjects in the telephone follow-up group were found to have higher adherence to their treatment regimens; also, regarding adherence to food regimen, the difference between the intervention and control groups was significant [29].

5. LIMITATIONS

One of the limitations of the present study was the possibility of exchanging the educational information between the intervention and control groups. To control the influence of that limitation, the researchers emphatically asked the subjects in the intervention group to refrain from sharing their education with the control group. Also, the control group was not provided with any educational aids. It is suggested to conduct future studies to explore the effectiveness of multimedia education in improving the treatment adherence and quality of life of patients with other chronic diseases.

CONCLUSION

The results of most studies are consistent with the findings of the present study: increasing patients' awareness *via* the above-mentioned educational methods results in their better adherence to their treatment plans. Accordingly, as members of healthcare teams, nurses can play a more effective part in patient education by applying multimedia education which is, due to its multisensory and interactive nature, able to suit various learning styles and make for easy, long-lasting learning [30]. Moreover, telephone follow-up and consultation can be used as beneficial ways of self-assessment, monitoring, and decision-making [16, 31]. Telenursing enables patients to have a more effective relationship with healthcare experts when necessary [32].

ETHICS APPROVAL AND CONSENT TO PARTI-CIPATE

Ethics Committee of the National Agency for the Development of Health Research Fasa located in the southwest of Iran approved the study (approval number: 97357).

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed throughout this research are included in this published article.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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