

# Comparison of Effect of Two Methods of Face-to-Face Education and Distance Education (via Short Message Service) on Amount of Following Remedial Diet in Patients Suffering From Hypertension

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## Abstract

**Background:** A large amount of money is allocated to hypertension in terms of remedial and care costs, but fighting against this disease begins with education.

**Objectives:** This study has been conducted with the aim of comparing the effect of two methods: face-to-face education and distance education (via short message service [SMS]) on amount of following remedial diet in patients suffering from hypertension.

**Patients and Methods:** In this clinical trial study, 72 patients who were suffering from hypertension participated. They were selected by the purposeful sampling from three hospitals in Abadan city, Iran. Each of the three groups were similar in terms of age, gender, level of education, marital status, and duration of suffering from hypertension. The first group was under face-to-face education for eight sessions of 30 minutes; the second group under distance education (via SMS); and the third group did not receive any education as they were the control group. The tools used for collecting data involved three questionnaires (demographic data [two parts], following medicinal diet (three parts: MMAS-3, therapeutic lifestyle changes, and dietary approach to stop hypertension), and evaluating the amount of patients' awareness about their disease. This study applied descriptive and deductive statistics with SPSS Version 20 for statistical analysis.

**Results:** The results showed that the mean of examined realms, after interference in both the face-to-face and the distance education groups, had a significant statistical difference with the before-interference mean ( $P = 0.0001$ ). Inter-group comparison between systolic and diastolic blood pressure and awareness realms showed that there was a significant statistical difference between the face-to-face education group compared with the control group ( $P < 0.05$ ). However, in other realms, no significant statistical difference was observed between the two educational groups ( $P < 0.05$ ).

**Conclusions:** Having access to distance education is easier for patients with hypertension and it saves time; therefore, it may be the most appropriate method to assist them in following their allocated treatment.

**Keywords:** Hypertension, Face-To-Face Education, Distance Education, Remedial Diet

## 1. Background

Hypertension is an important public health problem (1). It is the leading risk factor for premature death, stroke, and cardiovascular events (1, 2). Based on the report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC7), nearly 50 million Americans and approximately one billion of people all over the world suffer from hypertension. Its prevalence in developed countries is 37.3%, and it is estimated that 3.4% of people in developed countries will have suffered from hypertension by 2025 (3). In Iran, the prevalence of hypertension among adults aged 25 - 64 years was estimated at 26.6% in 2007 (4). Hypertension is one of the most current reasons for referring outpatients to their lo-

cal doctors (5). Significant progress has been made over the past several decades in the treatment of hypertension through the use of various medications. Nevertheless, it has been extremely difficult to control hypertension in 40% of hypertensive patients (6). One of the most important reasons for this deficiency is that they do not to follow a remedial diet (7). Despite an increase in the awareness, treatment, and control of hypertension, among minority groups undiagnosed and uncontrolled hypertension remains a challenge (8-10). Several studies show that the management of hypertension is inadequate for older people, particularly those in primary care (11-13). Uncontrolled blood pressure can result in several problems, such as coronary artery disease, brain attack, congestive heart failure,

eye problems, diseases of the peripheral arteries, chronic kidney disease, and premature death (14-16).

Controlling blood pressure is associated with different factors, such as gender, obesity, and how medicinal treatment and diet continue (17). Moreover, studies have shown that hypertension can be controlled by: cutting down on alcohol consumption and receiving Na; regular physical activity (18-28) minutes two to three-times a week; a diet rich in fruit and vegetables and low-fat products; and taking medicine appropriately and on time (14, 15, 29).

The world health organization (WHO) defines “following treatment” as: how a patient encounters taking medicine, observing their diet, or making lifestyle changes in a way that conforms to the recommendations presented by health experts (30). The studies of Oliveria and colleagues (19) and Calhoun and colleagues show that although several treatments have been presented for hypertension, the number of patients following the treatment is still low. Also, some external factors increase the difficulty; such as, limited access to remedial services, the high cost of treatment, the high cost of doctors’ fees, the problems of referring patients among different physicians, and the lack of awareness about the serious side effects of hypertension (18). Fighting against disease starts with education and it is necessary that patients be aware of the significance of their disease or injury; the prescribed diet; the aims, dangers, and advantages of conducted measurements; the required change in their daily activities; and the role of different health experts and other important people (20).

Two principal roles of nurses in today’s world are educating patients and being available for consultation by patients (17, 21). The teaching role of nurses can be important in promoting the of level of society’s health and hygiene, disease prevention, rehabilitation of the patients, and enabling a rapid return to the patient’s favored level of health (21-23). Considering that modifying their current diet to a remedial one is the responsibility of the patients, it is necessary for nurses to teach patients and support them to control the process of disease by encouraging them to make the necessary lifestyle changes, to take their medicine according to the prescription, to be determined to follow the remedial diet program with care personnel and to conform their behavior to a healthier pattern (17).

Today, progress in computer technology and the expansion of using several tools and methods of communication allows other methods of education to be used in a “virtual” manner; namely, distance education (24). During recent years, cellphone technology has undergone a revolution, which can compete with the world wide web network. Therefore, learning via cellphones could be regarded as a form of learning in the future (25). Moreover, the short message service (SMS), as one of the secondary services of

cellphones, has a special place among users because of convenience, flexibility, low cost, and the considerable characteristic of a verbal connection. Research has been conducted in terms of education by SMS, indicating that it can be used as a live and useful method for teaching and educational discussion (26). Also, some studies have shown that SMS has an advantage in improving follow-up compared with traditional programs (4, 27, 28, 31). As chronic patients, including those suffering from hypertension, are widespread in society and in different areas, getting them together in the same place at the same time is difficult. With hypertension’s high (and increasing) prevalence, side effects, related expenses, and the importance of long-term follow-up, it would be ideal to have an affordable method in place to solve this problem, which can be implemented for a large number of clients (24-26, 32).

## 2. Objectives

The aim of this study is to compare the effect of two methods of education: face-to-face and distance education (SMS) on amount of following remedial diet in patients suffering from hypertension who have been referred to hospitals in Abadan city.

## 3. Patients and Methods

This trial was a prospective, non-randomized, controlled study (a quasi-experimental study), which was conducted in April 2013. Each patient was randomly assigned to one of the three groups: control, traditional (face-to-face), and SMS. This study was conducted after asking permission and a letter of introduction from the deputy research of Ahvaz Jundishapour University of Medical Sciences, department of nursing and midwifery (ETH Code-536) and the chairmen of Abadan city’s hospitals and referring to the emergency of Abadan city’s hospitals (Iran) and by sampling method of convenience.

In the study by Park et al. (33) the sample size was estimated at 17 people in each group, with a test power of 90%. In this current study, sampling was conducted after presenting the participants with the necessary information about the research aim and asking them for written testimonials for participating in the study. They were reassured that their registered personal information would not be revealed. They were also advised that the study was based on the formula of a sample volume, and what the criteria were for entering the study. Each group consisted of 25 participants who met the following criteria: being over 18 years old; suffering from hypertension, which was confirmed by a specialized physician; having the ability to answer questions and participate in educational sessions; starting at

least 6 months' treatment for controlling blood pressure (30, 34); controlling their blood pressure by at least one pill; were not suffering from any specific and weakening disease; average or weak following toward treatment; having a cell phone; and having the ability to read SMS. The criteria for exiting the study included: suffering from any kind of disease that interfered with the process of research, such as chronic kidney failure, brain, a heart attack; any medicinal dependency except for hypertension treatment; non-participation in two sessions of education; no sending without text short message to the server within 2 days.

To prevent any bias in the study results and to ensure that the study participants did not get in touch with each other and transfer information between themselves (two groups of interference and one group of control), each group was selected randomly (by drawing lots) from three hospitals in Abadan city. The sampling was conducted by the researcher among the patients suffering from hypertension using the convenience sampling method and regarding characteristics of under-research units and criterion for entering in study.

In this study, each of the three groups were similar to each other in terms of age, gender, level of education, marital status, and duration of suffering from hypertension. Questionnaires were filled out by the researcher in the form of interviews and those patients whose answer points were average or low regarding following the treatment (points between 22 and 65) could enter the study. Their blood pressure was taken by observing the measurement indexes. During the research, the blood pressure apparatus was calibrated daily. After finishing these steps, the necessary explanation about the method of teaching was presented to the participants.

After coordinating with the participants in the face-to-face education group who entered in study from the Taleghani hospital of Abadan, the sessions were regulated as eight educational sessions of 30 minutes each, twice a week in two groups of eight participants and one group of nine participants. The same educational content that was presented in the face-to-face group was sent in the form of SMS for the distance education group who entered the study from the Shahid Beheshti hospital. Within 4 weeks, the control group received two fluent and attractive sentences in the form of an SMS between 8 a.m. and 8 p.m. daily for preventing from mental disturbance, every second message had the same subject and researchers tried to come to a conclusion about every discussed subject rapidly, on the same day, or ultimately within 3 days. Every day, the first message was sent in the form of semi-predicative and semi-interrogative text in order for people to prepare mentally; therefore, the first question was answered in the following message and this made the partic-

ipants prepare for the next message. To make sure they received and read the messages, researchers asked the participants to send back an empty message after receiving two daily messages. They were also asked to send in any cell phone costs. Participants of the control group were selected among the eligible patients referred to 17 Shahrivar hospital of Abadan.

After finishing the education program, all three groups were given 2 months to implement the learned information into their daily lives (24, 35). Participants of both interference groups were contacted once a week on a day they were informed about it and researchers answered their probable questions; moreover, the participants were provided with a phone number so they could give the researcher a call anytime there was a problem. After mentioned time, questionnaires were filled in again for the three groups by the researcher at the same place. It is noticeable that during this study, three participants of the face-to-face interference group exited from the study because they did not participate in more than two educational sessions.

In this study, the tool of collecting data consisted of three questionnaires. The demographic information registration questionnaire consisted of 15 questions and was provided in two parts. The personal information part examined age, gender, nationality, marital status, and level of education. The disease history part examined the duration of suffering from hypertension, the number of pills taken, and the type of medicine taken. The second questionnaire related to following the medicinal diet and the medicinal diet questionnaire (N = MMAS-8) applied (MMAS-4 is the most recent version of it). This questionnaire consisted of eight questions, and yes/no answers were regulated for seven of them. The score for a "yes" answer was 1, and for a "no" answer was 0. In the final question, answers were regulated as a 5-point Likert scale, which gives a score of 0 to answers of "never" or "rarely" and a score of 1 to other answers. A final point of 0 - 2, and points over 2, were considered as following medicine and not following, respectively (36).

Second part of questionnaire is related to following the remedial diet. It was regulated in the form of 22 questions and was based on presented recommendations for therapeutic lifestyle changes and a dietary approach to stop hypertension. Question numbers 1 - 5 examined the amount of following recommended diet by patient. Answers were regulated as the 5-point Likert scale, and the options were scored as 1 - 5 in accordance with the accuracy of each patient's function. Points were estimated as weak, average, good, and excellent by obtaining 15 - 30, 31 - 45, 46 - 60, and 61 - 75 points, respectively. Question number 16 was allocated to the patient's physical activity and was scored by

a 5-point Likert scale. Patients were considered as weak, average, good, and excellent by obtaining scores of 1, 2, 3, 4, and 5, respectively. Questions 17 - 22 examined the amount of lifestyle modifications required, such as stopping smoking, stopping or reducing alcohol intake, controlling stress, losing weight, and taking painkillers. Questions 17 - 21 were scored by a 5-point Likert scale. In question number 22, each patient's body mass index (BMI) of 10 was in the normal range of 18 - 25 and obtained 5 scores and a BMI over normal obtained 1 score. Ultimately, patients estimated as weak, average, good, and excellent obtained scores of 6 - 11, 12 - 17, 18 - 23, and 24 - 30, respectively.

The third questionnaire was related to testing the patients' awareness of their disease and consisted of 27 questions of three options: "yes", "wrong" and "I do not know" answers; scores of 2, 0, and 1 were allocated to each answer, respectively. Ultimately, obtaining scores of 0 - 17, 18 - 35, and 36 - 54 were considered as weak, average, and good, respectively.

After translating the main form of the questionnaire of following the medicinal diet by two experts of the English language, its Persian translation was delivered to three other English experts to translate it to the source language to ensure its accuracy. Then, the questionnaires (demographic, evaluation of awareness, following medicinal diet) were delivered to 10 members of the Ahvaz nursing and midwifery faculty. A final version was then regulated after any necessary modifications and was given to 10 participants to determine the stability of this type of data-collecting tool. After its collection, the interior correlation of data was examined by Cronbach's alpha coefficient that 85% coefficient indicating reliability of tool. In order to confirm the stability of the blood pressure measurement apparatus, other mercurial pressure gauge for arms with the Alpeka 2 brand applied and two blood pressure measured by any apparatus compared with each other daily and in order to estimate the stability of weight, a 1 kg weight control used daily. In this study, SPSS software Version 20 and analysis tests of one way variance applied for analysis of datum, the Toki test and the Chi-square test for two-by-two comparisons, and the paired T-test for the comparison of quantity variables before and after interference were used.

#### 4. Results

A total of 72 patients entered into this study: 22 participated in the face-to-face group; 25 in the distance (SMS) group; and 25 in the control group. The findings of [Table 1](#) show demographic characteristics in three under-study group. The mean of age in the face-to-face group, the distance group, and the control group was 54.45 11.60, 55.52

9.51, and 55.32 9.22, respectively. The mean of treatment duration with pills to decrease blood pressure in the face-to-face group, the distance group, and the control group was 2.18 1.39 years, 2.46 1.31 years, and 2.06 1.23 years, respectively. According to [Table 1](#), and based on the conducted analysis, there was no significant statistical difference among the groups in terms of gender ( $P=0.82$ ), age ( $P=0.92$ ), mean of treatment duration with pills to decrease blood pressure ( $P=0.54$ ), marital status ( $P=0.60$ ), and level of education ( $P=0.54$ ).

Based on existing findings shown in [Table 2](#), and using the one-way ANOVA test, there was no significant difference among the mean of points of following the remedial diet, physical activity, lifestyle, following medicinal diet, systolic and diastolic blood pressure, and awareness among the groups before interference ( $P>0.05$ ). However, based on the one-way ANOVA test, there was a significant difference among the points of following diet, physical activity, life style, following medicinal diet, systolic and diastolic blood pressure, and awareness among the groups after interference ( $P<0.05$ ). As observed in [Table 2](#), applying the paired T-test made a significant statistical difference between the mean difference of points before and after interference in the study groups mentioned realms in ( $P<0.05$ ) and this indicates the positive effect of interference in both the face-to-face and the distance educational groups, while these changes were not observed in the control group.

With regard to systolic blood pressure, the degree of resultant changes from patients in the distance education group was more than the face-to-face group; however, the Toki test did not show a significant difference between the two groups ( $P=0.295$ ). In the same realm, the mean difference of the face-to-face education group indicated a decrease in systolic blood pressure compared with the control group, but the Toki test of  $P=0.467$  did not indicate a significant difference between them. The mean difference of the distance education group's systolic blood pressure compared with the control group indicated that the amount of the distance education group's systolic blood pressure decreased more than the control group. The Toki test of  $P=0.019$  also indicated a significant difference between these two groups; therefore, we can conclude that, in the realm of systolic blood pressure, just educating a distance education group was effective and made a difference compared with the control group. However, these changes are not observed in the face-to-face education group compared with the control group.

With regard to diastolic blood pressure, the degree of resultant changes from patients in the distance education group was more than the face-to-face group; however, the Toki test of  $P=0.016$  showed a significant difference be-

**Table 1.** Demographic Characteristics in Three Study Groups<sup>a</sup>

| Group Characteristics     | Face-to-Face Education Group, No. (%) | Distance Education Group, No. (%) | Control Group, No. (%) | P Value |
|---------------------------|---------------------------------------|-----------------------------------|------------------------|---------|
| <b>Gender</b>             |                                       |                                   |                        | 0.82    |
| Female                    | 13 (1/59)                             | 13 (52)                           | 15 (60)                |         |
| Male                      | 9 (9/40)                              | 12 (48)                           | 10 (40)                |         |
| <b>Marital status</b>     |                                       |                                   |                        | 0.60    |
| Single                    | 5 (7/22)                              | 9 (36)                            | 8 (32)                 |         |
| Married                   | 17 (3/77)                             | 16 (64)                           | 17 (68)                |         |
| <b>Level of education</b> |                                       |                                   |                        | 0.54    |
| Illiterate                | 4 (2/18)                              | 5 (20)                            | 4 (2/18)               |         |
| Primary school            | 5 (7/22)                              | 6 (24)                            | 9 (36)                 |         |
| Guidance school           | 3 (6/13)                              | 4 (16)                            | 7 (28)                 |         |
| High school               | 10 (5/45)                             | 10 (40)                           | 5 (20)                 |         |

<sup>a</sup>Chi-square test.

**Table 2.** Comparison of Mean of Points and Points Mean Difference of Medicinal Following, Systolic and Diastolic Blood Pressure and Awareness Before and After Interference in Three Education Group of Face-to-Face, Distance and Control Based on Paired T-Test<sup>a</sup>

| Group/Realm                     | Before Interference |                   |               | After Interference  |                |              | Comparison of Points' Mean (M) <sup>c</sup> |               |               |
|---------------------------------|---------------------|-------------------|---------------|---------------------|----------------|--------------|---|---------------|---------------|
|                                 | Face-to-face        | Distance          | Control       | Face-to-Face        | Distance       | Control      | Face-to-Face                                | Distance      | Control       |
| <b>Following diet</b>           | 90/40 (93/6)        | 32/41 (44/7)      | 44.56 (5.94)  | 51.81 (10.89)       | 56.64 (12.63)  | 44.48 (5.33) | 10.90 (8.53)                                | 15.32 (9.25)  | 0.08 (1.28)   |
| <b>P value</b>                  |                     | 0.13 <sup>b</sup> |               | 0.0001              |                |              | 0.0001                                      | 0.0001        | 0.759         |
| <b>Physical activity</b>        | 1.18 (0.39)         | 1.4 (0.65)        | 1.48 (0.78)   | 2.14 (0.95)         | 2.6 (1.15)     | 1.48 (0.71)  | 0.90 (1.84)                                 | 1.2 (0.86)    | 0.0001 (0.28) |
| <b>P value</b>                  | 0.23 <sup>b</sup>   |                   |               | 0.0001 <sup>b</sup> |                |              | 0.0001                                      | 0.0001        | 1.00          |
| <b>Lifestyle</b>                | 16.24 (4.83)        | 17.88 (0.02)      | 16.48 (4.76)  | 20.55 (5.03)        | 24.92 (4/06)   | 16.52 (4.50) | 3.81 (4.11)                                 | 7.04 (4.40)   | 0.04 (0.98)   |
| <b>P value</b>                  | 0.56 <sup>b</sup>   |                   |               | 0.0001 <sup>b</sup> |                |              | 0.0001 <sup>b</sup>                         | 0.0001        | 0.84          |
| <b>Following medicinal diet</b> | 5.91 (1.54)         | 5.88 (1.23)       | 5.88 (1.39)   | 4.77 (1.54)         | 4.44 (1.19)    | 5.84 (1.50)  | 1.14 (0.88)                                 | 1.44 (0.77)   | 0.04 (0.98)   |
| <b>P value</b>                  | 0.99 <sup>b</sup>   |                   |               | 0.002 <sup>b</sup>  |                |              | 0.0001                                      | 0.0001        | 0.84          |
| <b>Systolic blood pressure</b>  | 139.09 (15.71)      | 138.8 (19.09)     | 139.4 (18.73) | 131.36 (19.41)      | 122.92 (25.15) | 138 (9.79)   | 10.72 (10.77)                               | 15.88 (25.06) | 1.4 (11.86)   |
| <b>P value</b>                  | 0.99 <sup>b</sup>   |                   |               | 0.025 <sup>b</sup>  |                |              | 0.003                                       | 0.004         | 0.56          |
| <b>Diastolic blood pressure</b> | 89.56 (12.04)       | 85.2 (6.07)       | 85.4 (10.40)  | 84.77 (9.57)        | 79 (5.40)      | 84.40 (4.46) | 4.77 (9.93)                                 | 6.2 (8.81)    | 100 (9.13)    |
| <b>P value</b>                  | 0.29 <sup>b</sup>   |                   |               | 0.008 <sup>b</sup>  |                |              | 0.035                                       | 0.0001        | 0.56          |
| <b>Awareness</b>                | 40.73 (9.76)        | 40.56 (7.25)      | 42.08 (6.34)  | 45.60 (9.93)        | 47.92 (4.81)   | 42 (5.83)    | 4.86 (4.12)                                 | 7.36 (3.90)   | 0.08 (1.47)   |
| <b>P value</b>                  | 0.75                |                   |               | 0.015               |                |              | 0.0001                                      | 0.0001        | 0.78          |

<sup>a</sup>Values are expressed as mean ± SD.  
<sup>c</sup>Difference Before and After Interference.  
<sup>b</sup>One way ANOVA test.

tween the two groups. In the same realm, the mean difference between the face-to-face education group and the control group indicated a decrease in diastolic blood pressure of this group compared with the control group. However, the Toki test of  $P = 0.982$  did not indicate a significant difference between them. The mean difference between the distance education group's diastolic blood pressure and the control group indicated that the amount of the distance education group's systolic blood pressure decreased more than the control group. The Toki test of  $P = 0.021$  also indicated a significant difference between these two groups.

Therefore, we can conclude that as far as diastolic blood pressure is concerned, just educating the distance group was effective and made a difference compared with the control group. However, these changes were not observed in the face-to-face education group compared with the control group.

### 5. Discussion

Mean of following diet indicates significant difference among groups after interference. The minimum score ob-

tained from patients belonged to the face-to-face group; however, the maximum score belonged to the distance group. The results of this part conformed to the results of Hasanzadeh et al. (37) study on hemodialysis patients, Nasrabadi et al. (38) study on patients suffering from cardiac ischemic disease, and the studies by Bahrami Nejad et al. (39), Bobrow et al. (31) and Leon et al. (28) on patients suffering from hypertension. In the realm of following diet, the comparison of difference of means in the face-to-face group indicates an increase of mean which indicates significant difference; and distance education group with an increase of after-interference mean, in comparison with before-interference mean, indicates an increase in and effectiveness of education that these changes are perceptible in the distance education group compared with the face-to-face group. In the control group, the mean difference of the before- and after-interference scores indicated a decrease, which also indicated no significant change in scores. Based on whatever mentioned, these findings conformed to Mohammadi et al. (14) study and Hasanzadeh et al. (37) study, but did not conform to Bosworth et al. (40) study.

Moreover, after interference, the mean of physical activity indicated a significant difference among the groups. The minimum and maximum score obtained from patients in all group has been 1 and 5, respectively, which belonged to distance education group. The results obtained in this study conform to the results of the study by Bahrami Nejad et al. (39), in which physical activity indicated a significant increase. Moreover, this finding conformed to Mousavifar et al. (25) study on examining the effect of two methods of following (phone and mobile) on following medicinal diet in diabetic patients and its results indicated a significant statistical difference in the amount of both groups' exercise. Attention must be paid that worked realms of this research are different with present study and this can be a confounding factor.

In mean of after-interference lifestyle, the minimum score obtained from patients belonged to the control group, and the maximum score was obtained from the distance education group. The one-way ANOVA test indicated a significant difference among the groups. These findings did not conform to Nasrabadi et al. (38) study in which there were no significant differences between the two study groups and the control group regarding lifestyle after education. The present differences in the examined realms could be a reason for these differences between the two research results.

In this study, the mean of following the medicinal diet after interference indicates a significant difference among the groups. While the minimum score obtained from patients was observed in the face-to-face education and the

distance education groups, the maximum score belonged to the control group. It is noticeable that increasing obtained scores in this realm indicated no following and a score of 0 - 2 indicated following the medicinal diet by patients. This result conforms to the results of Mousavifar et al. (25) study, which stated that amount of following medicinal diet, improved in the test group, but did not conform to Mohammadi et al. (14) study on the role of education in improving nutrition, activity, and regularly taking pills in patients suffering from hypertension, which had stated that no statistical difference was observed between two groups after following. Certainly, it is noticeable that the criteria for examination of following the medicinal diet is different in two studies and may be the reason for this non-conformation were this criteria different. Moreover, in the realm of following the medicinal diet, the difference of means in the face-to-face education group indicates decrease in means and distance education group with decrease in after interference mean, compared with before-interference, and indicates an increase and the effectiveness of education, which is shown with a decrease in the no-following medicinal diet cases; certainly these changes were more perceptible in the distance education group compared with the face-to-face education group. In the control group, the mean difference between after-interference and before-interference indicated an increase of scores with no significant difference. These findings do not conform to Mohammadi et al. (14) study, but do conform to Mousavifar et al. (25) study.

The mean of measured systolic blood pressure showed a significant difference among groups after interference. The minimum measured systolic blood pressure of patients was 100 and its maximum was 165, which both belonged to the face-to-face education group. These findings conform to the results of Mohammadi et al. (14) study, Bara et al. (24) and Bahrami Nejad et al. (39) study. In the realm of systolic blood pressure, the comparison of the difference of means in the face-to-face education group indicates a decrease of 7.72 in means and in the distance education group with a decrease of 15.88 in after-interference mean, compared with before-interference mean. This indicated the effectiveness of education as it has shown that these changes were more perceptible in the distance education group compared with the face-to-face education group. In the control group, the mean difference between after-interference and before-interference indicated a decrease of 1.4 in scores; this also indicated no significant difference in scores. These results conform to the studies of Baraz et al. (24) Bosworth et al. (40) and Park et al. (33, 41).

The mean of measured diastolic blood pressure showed a significant difference among the groups after interference. The minimum measured systolic blood pres-

sure of patients was 60, which belonged to the face-to-face education group, and the maximum was 80, which belonged to the control group. This conforms to the results of the study by Doyle et al. (41). The results of Bosworth et al. (40) study in America showed that the amount of controlled blood pressure improved in the face-to-face interference groups, and increased in the control group. The present study's results conform to this finding. In Park et al. (33) study the aim was to get patients to decrease their blood pressure, lose weight, and decrease the level of their blood lipids. Their systolic and diastolic blood pressure considerably decreased in the interference group at the end of 8 weeks, but there was no distinct change in the control group. The present study also conformed to this finding. In the realm of diastolic blood pressure, the comparison of difference of means in the face-to-face group indicated a decrease of 4.77 in means and showed the effectiveness of education. Certainly, these changes were more perceptible in the distance education group compared with the face-to-face education group. In the control group, the mean difference between after-interference and before-interference indicated a decrease of 1 score, which showed no significant change in scores. These results do not conform to Bosworth et al. (40) study and Bahrami Nejad et al. (39) study.

The mean of measured awareness indicated a significant difference among the groups after interference. The minimum of patients' awareness was 20, which belonged to the face-to-face education group, and the maximum was 54, which belonged to both the face-to-face education group and the distance education group. In Park et al. (33) study statistical tests showed a significant difference between the mean of the total score of patients' awareness in terms of cardiac disease in two study groups, and in the control group and after education that this finding is conformed to results of present study but it is noticeable that examined underlying disease is different in two researches. In the realm of awareness of the disease, the comparison of difference of means in the face-to-face education group indicated an increase, and distance education group with an increase of 7.36 in after-interference mean, in comparison with before-interference. This indicates an increase and effectiveness of education because these changes are certainly perceptible in the distance education group compared with the with face-to-face education group. In the control group, the difference between the after-interference mean and the before-interference mean indicated no significant change in scores. The above-mentioned findings conform to the results of Nasrabadi et al. (38) study.

The limitations of the present study consist of different amounts of learning in under-research people, which can

affect taught material and result of study that researchers couldn't control it. Moreover, the emotional state of the participants while filling questionnaire had an effect on the research results, which the researchers couldn't control. It is suggested that other distance education methods on amount of following patients suffering from hypertension examine in the following studies.

### 5.1. Conclusion

In the two interference groups, the statistical tests showed a significant difference within 3 months after interference, which indicated the effectiveness of the education presented by the researcher. The results of the statistical data showed that there were more changes in the distance education group after 3 months following compared with the face-to-face education group. Therefore, we may conclude that distance education has a stronger educational effect regarding hypertension in the target group compared with the face-to-face education group. This important fact can relate to no-concentration within educational classes. In contrast, distance education allows people to refer to educational material whenever they can concentrate more, and they can refer to the material many times. The main aims in clinical nursing are to present a service to patients and help them to improve their health. Educating them accordingly has a considerable role in this.

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### Footnotes

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