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Comparison between the Impact of Video Instructions and Traditional Training on FBS Control in Type 2 Diabetics, Hamadan: A model based intervention

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ABSTRACT

Background: Diabetes is a chronic progressive disorder that imposes negative effects on various aspects of an individual's life. This study was conducted to compare the effect of video instructions in comparison with traditional training on glucose control in type 2 diabetic patients of Hamadan.

Methods: In this experimental study, 120 patients with type 2 diabetes who referred to diabetes center of Hamadan were divided into two groups: intervention and control. Data collection tool was a questionnaire based on health belief model completed by interviewing before, immediately after, and three months after the intervention. In addition, the serum levels of HbA1c were measured before and three months after the study. Intervention was conducted on three groups of 20 participants using video playback as well as question and answer sessions. Data were analyzed by $SPSS_{21}$ using Friedman, Wilcoxon and Mann-Whitney tests.

Results: This study revealed a significant difference in the median of knowledge, perceived threat, perceived benefits, and barriers in the intervention group immediately and three months after the intervention. HbA1c levels decreased after the intervention but this change was not significant. Three months after the intervention, in the intervention group both physicians and video were the most effective cues to action.

Conclusion: Instructional videos for diabetes education can have a positive impact on healthy lifestyle in Patients with type 2 diabetes. It was concluded that decrease in HbA1c level needs longer intervention period; more than three months.

Keywords: Health Belief Model, Instructional Video, Type 2 Diabetes, Self-Efficacy

Introduction

Diabetes as the most common metabolic disorder is associated with a range of serious complications which has a strong negative impact on various aspects of life and results in reduced quality of life and premature mortality.[1-3] Type 2 diabetes is associated with obesity, overweight, inactivity, and is very common in individuals aged over 40 years.[4, 5] It has been predicted that the prevalence of type 2 diabetes in later decades will have a significant growth and will be the main issue of public health with the prevalence of 439 million people in 2030.[4] Third national surveillance of risk factors for non-communicable diseases has reported the prevalence of diabetes in Iran as 7.7%, however due to increasing life expectancy in Iran, there is no doubt that the prevalence of diabetes will increase in the coming years.[6] Various studies have proven that early detection and proper care of diabetes based on patient education and self-care can prevent acute and chronic complications.[7]

Various methods are used for health education including lecture, discussions in small groups (focus groups), role playing, drama, video, and printed materials.[8] Face to face method has previously been considered as the main approach for diabetes education, but other methods of education such as videos and Web-based training can be applied, because this kinds of education in particular can play an important role in delivering contents that are not possible through face-to-face method.[9] A wide range of instructional media for interactive health communication are considered such as the internet and video that can be useful in providing health information, reminder information, and establish the ability to behavior change.[10] Instructional video, which is a form of persuasive communication, can be a useful tool in promoting public health.[11] Several studies in various fields of health care have emphasized the greater effectiveness of video tape than other educational methods including lecture, instruction booklet, and a slide show.[12-14] Since many health problems are closely related to human behavior, behavioral theories and models can be used in identifying and understanding the factors influencing behaviors and determining how these factors work.[15] Health belief model which has been chosen as the theoretical framework of this study is one of the most popular models in health education which mainly focuses on preventive measures and adopts behaviors to avoid illnesses and diseases. It is also used to determine the relationship between health beliefs and behavior.[16] In various studies, the efficiency of Health belief model in describing and predicting the behavior proves preventive health.[16] According to this model, a person must believe that he/she is vulnerable to the risk of a problem (perceived susceptibility), understand the depth, seriousness, and various complications of this risk (perceived severity). He/she also needs to realize benefits and barriers of adopting positive health behaviors, such as self-care behavior (perceived benefits and perceived barriers.[10]

In the present study, the health belief model was used in writing the scenario and contents of the produced training videotapes. So, this study was conducted to compare the instructional video with traditional training on Fasting Blood Sugar (FBS) control in type 2 diabetic patients in Hamadan.

Methods

This study was an educational intervention carried out with experimental methods. The sample included 120 patients with type 2 diabetes who were referred to Hamadan diabetes centers and were divided randomly into two groups: intervention and control. Patients' inclusion criteria in this study were as follows: the patient volunteered to participate in the study, type 2 diabetes diagnosed during the last two years, and the ability to participate in the various stages of program. Patients were excluded if they were not willing to continue the test, or could not participate in video demonstration sessions due to any problems.

A questionnaire developed based on the health belief model was applied for data collection, including the following sections: demographic characteristics (age, gender, education, occupation, marital status, duration of diabetes, etc.), knowledge

(6 questions), perceived susceptibility (5 items), perceived severity (5 items), perceived benefits (7 items), perceived barriers (5 items), self-efficacy (3 items) and cues to action (1 item). Content validity method was used to assess the validity, so that a questionnaire was developed based on Health belief model and scientific resources. Then, in order to determine the validity, the questionnaire was offered to 10 experts of health education, they were asked to express their views on the content of questionnaire considering the research purpose. Finally, errors and ambiguities of the questionnaire were modified according to their comments and its validity was confirmed. To determine the reliability of the questionnaire, it was completed by 30 patients with type 2 diabetes (other than groups participating in the study), the result showed that the questionnaire had acceptable internal consistency (Cronbach's alpha 0.83).

The main method of education in the experimental group was based on an instructional video entitled as "healthy lifestyle in people with type 2 diabetes". For production of the video, the initial scenario was written by researchers based on Health Belief Model (HBM) model as well as the guidelines of the Ministry of Health and Medical Education related to the type 2 diabetes care. Then, other stages for execution of the video were conducted by director and other executives at the Media Lab of Health School in Hamadan University of Medical Sciences. Diabetic patients and staffs of Hamadan Diabetes Center cooperated in this study. Validity of video post-production was approved by health education specialists, nutritionists, and endocrinologists.

Initially the list of diabetic patients referred to Hamadan Diabetes Center was obtained from the head of the center. Next, patients who met the inclusion criteria were coded and randomly divided into two intervention and control groups. Participants in both intervention and control groups completed a questionnaire based on the HBM model about diabetic patients' lifestyle. Further, HbA1c index of all participants were measured at the baseline free of charge in an accredited laboratory and approved by University of Medical Sciences. Then, the intervention group was divided into three equal groups each containing 20 members, for each group an instructional video entitled as "healthy lifestyle in people with type 2 diabetes" was displayed approximately for half an hour at the amphitheater of Diabetes Research Center of Hamadan in the presence of researchers. For each group, after showing every part of the video, a Question-Answer-Relationship method was conducted and patients expressed their doubts and questions which were consequently answered by researchers. At the end of the session one CD of the video was delivered to the intervention group and they were asked to watch it again at home. The diabetic patients in intervention group completed the questionnaire immediately and 3 months after the video playback session. The control group also completed a questionnaire about the same time in two steps with intervention group. It is worth noting that HbA1c level was measured only twice for the intervention and control groups; before and 3 months after the intervention. During this period, the control group received the traditional training in the Diabetes Center.

In the present study, the ethical issues such as individual freedom and informed choice to participate in the study, explaining ambiguous points of study for participants, and confidentiality of personal information by researchers were observed. Written informed consent forms were obtained from participants. Research Council and Ethics Committee of Hamadan University of Medical Sciences approved the study.

Data were analyzed through $SPSS_{21}$ software, descriptive statistics measures, Friedman, Wilcoxon and Mann-Whitney tests were applied for further investigation. Assumption of data normality was also examined by Kolmogorov- smirnov test.

Results

The average age of patients in the intervention group was 52.04 (10.25) and in the control group was 53.23 (9.66) years. The results showed that 69.8% of diabetic patients in the intervention group

and 57.8% in the control group were under diploma. The majority of participants in both intervention and control groups were married. The mean duration of diabetes in the intervention group and control group were 15.07 (8.38) and 12.78 (9.15) months, respectively. The results indicated that there were no significant differences between the two groups in terms of age, gender, education level, economic status, and duration of diabetes.

Mann-Whitney test results represented that there were no significant differences between median of knowledge, perceived susceptibility, perceived benefits and barriers of intervention, as well as control groups before education. However, immediately after and three months after the intervention, significant differences in median scores of these variables between the two groups were observed (P-value < 0.05).

According to results of Friedman test, the changes in median of knowledge, perceived susceptibility, perceived severity, perceived benefits, and barriers during the time of the study were significant exclusively in the intervention group (P-value < 0.001). But the changes of self-efficacy score over the time of the study were not significant (P-value < 0.091). Moreover, changes in scores of all the aforementioned variables over the time of study in the control group were not statistically significant (Table 1).

In the intervention group, paired comparisons of severity and perceived benefits before and immediately after the intervention, before and 3 months after intervention, as well as immediately and 3 months after intervention were statistically significant. Additionally, comparison of knowledge and perceived barriers immediately and 3 months after intervention, as well as comparison of perceived susceptibility before and three months after intervention were not significant (Table 2).

The physician was introduced as the most impressive cue to action before education within the intervention group (88.4%), but immediately and three months after the intervention the most impressive cues were the physician and instructional videos. Also, in the control group the most effective guide to action in all three periods was the physician.

According to paired T-test in the intervention group the average of HbA1c decreased from 7.82 to 7.75, but this change was not statistically significant (P-value > 0.05). There was no statistically significant difference in the control group in this regard (P-value > 0.05).Furthermore, according to the independent T-test, the average of HbA1c between the intervention and control groups before and after educational program did not have any significant difference.

Table 1. Comparison of knowledge and HBM structures before, immediately after, and 3 months after intervention in the intervention and control groups

Variables	Measuring time to intervention	Intervention group Median (IQR*)	control group Median(IQR*)	Mann-Whitney test results
Knowledge	Before	4 (2)	4 (2)	P-value = 0.359
	Immediately after	5 (1)	4 (2)	P-value < 0.001
	Three months after	5 (2)	4 (2)	
	Friedman test	P-value < 0.001	P-value = 0.785	P-value < 0.001
Perceived susceptibility	Before	20 (1)	20 (4)	P-value = 0.301
	Immediately after	22 (5)	20 (3)	P-value < 0.001
	Three months after	20 (3)	19.50 (0.6)	
	Friedman test	P-value < 0.001	P-value = 0.295	P-value = 0.005
Perceived severity	Before	20 (3)	19 (5.75)	P-value = 0.012

	Immediately after	24 (5)	20 (3.75)	P-value < 0.001
	Three months after	20 (2.50)	20 (4.75)	
	Friedman test	P-value < 0.001	P-value = 0.106	P-value < 0.001
Perceived benefits	Before	28 (1)	28 (6)	P-value = 0.075
	Immediately after	31.5 (7)	28 (3.88)	P-value < 0.001
	Three months after	28 (4.75)	27.5 (4)	P-value < 0.001
	Friedman test	28 (1)	P-value = 0.382	
Perceived barriers	Before	16 (6)	15 (5.88)	P-value = 0.628
	Immediately after	20 (9)	15.5 (3)	P-value = 0.004
	Three months after	20 (3.75)	15 (4)	P-value < 0.001
	Friedman test	P-value = 0.003	P-value = 0.330	
Perceived self-efficacy	Before	12 (2.75)	10 (3.75)	P-value = 0.027
	Immediately after	12 (5)	11 (3)	P-value = 0.002
	Three months after	12 (2.75)	11 (3)	P-value = 0.056
	Friedman test	P-value = 0.155	P-value = 0.091	

*Interquartile Range = Q3 − Q1

Table 2. Comparison of knowledge and HBM structures at different measuring times in the intervention group

Variables	Before vs. Immediately after intervention	Before vs. 3 months after intervention	Immediately vs. 3 months after intervention
Knowledge	P-value < 0.001	P-value = 0.005	P-value = 0.306
perceived susceptibility	P-value < 0.001	P-value = 0.084	P-value = 0.002
Perceived severity	P-value < 0.001	P-value < 0.001	P-value = 0.009
Perceivedbenefits	P-value < 0.001	P-value < 0.001	P-value = 0.002
Perceived barriers	P-value = 0.007	P-value = 0.004	P-value = 0.850

Discussion

Education is a process which can provide the knowledge, motivation, and support needed to adopt and maintain healthy behaviors and lifestyle for individuals.[17] In this regard, the use of instructional videos has been introduced by some experts as one of the important methods in education. In this study, instructional video was applied compared with the traditional training to teach self-care and prevention of diabetes complications in diabetic patients. The results showed that the knowledge of diabetic patients educated with instructional video was significantly higher than people in control group with traditional training. Moreover, although the difference between knowledge score immediately after and three months after the video playback in intervention group was not significant, but before education it was significantly higher. Therefore, the findings indicated that the electronic method is more effective than traditional methods to increase awareness. A research in Russia using demonstration video showed a significant difference in the level of knowledge about AIDS before and after education.[18]

The results of this study indicated that the instructional video has been effective in increasing the perceived susceptibility of diabetic patients. Abbaszadeh et al. (2011) and colleagues demonstrated that education via instructional video increased perceived susceptibility among the infarction patients. This finding is consistent with the results of this study.[19] Increased perceived susceptibility can lead to adopt the self-care behaviors by patients.

Comparison of the two groups in terms of perceived severity after the intervention showed a significant difference, which is indicative of a more positive effect of instructional video program compared to traditional training on further understanding about complications of diabetes by patients. These findings are consistent with studies that compared the effectiveness of HBM model-based instructional video in both intervention and control groups. They have suggested that the instructional video was more effective in increasing participants' knowledge about complications of diabetes.[19, 20] Moreover, educational interventions based on health belief model in Iran have increased the perceived sensitivity and severity in the intervention group compared with the control group.[21, 23-25]

In this study, consistent with other studies,[21, 23, 25] a significant difference was observed between the two groups' scores which indicates the impact of instructional video on increasing perceived benefits for the intervention group. After watching instructional video, patients in the intervention group understood greater benefits of the healthy diet, better glycemic control, weight control, and foot care. In another study, the average score of perceived benefits related to nutrition and exercise has increased in the intervention group.[19]

The results showed that perceived barriers before the intervention were not significantly different in the two groups, but immediately after and three months after intervention, they were significantly lower in the intervention group than the control group. This means that the instructional video was effective in reducing patients' perceived barriers. In other interventions, consistent with the results of this study, educational programs have significantly reduced the perceived barriers.[21, 23-25] Contrary to the results of this study, in a study carried out using the booklets and interviews, perceived barriers did not change in diabetic patients.[26]

The results of the present study showed that although average score of self-efficacy in the intervention group increased immediately after the video watching, but it was not statistically significant. This can be explained by the fact that intervention through instructional video if not accompanied with other educational methods, cannot be successful in changing the self-efficacy of individuals. In other studies, different educational methods have been used to increase the self-efficacy and according to their results, these methods have been successful in increasing self-efficacy of patients.[21, 23-25, 27] Results of this study regarding the self-efficacy are corresponding to a study carried out by Baghianimoghadam et al. (2014) and colleagues entitled as "the effect of instructional SMS based on HBM on adoption of self-care behavior of patients with type 2 diabetes".[28]

In this study, instructional video in addition to being a learning media has been considered as a cue to action for diabetics. Before the intervention, 32% of the cases mentioned an instructional video as their cue to action but three months after intervention 70% of them have accepted it as a cue to action. In each study, individuals' cue to action can vary based on the type of intervention. For example, in the study of Sharifirad et al. (2006) staffs of diabetes center as well as physicians have been introduced as the most important cues to action before the intervention. However, given the nature of the program after the intervention, the most important cues changed to family members and booklets.[25] In the present study, regardless of instructional video, the most important external cues to action were physicians and health care workers.

In this study, the HbA1c in the intervention group decreased from 7.82 to 75.7; however, the difference was not statistically significant. There was also no significant difference between the mean of HbA1c in the intervention and control groups before and after education. In the study of Baraz Pardenjani et al. (2008), education through instructional video could not make significant changes in the amount of sodium, potassium, creatinine, and albumin.[29] Also, in a study[30] which

conducted to compare the effect of instructional video with oral training on satisfaction and postoperative complications in patients' conducted coronary angiography, no significant difference was observed between the two groups. In other similar studies,[21, 31] HbA1c levels decreased after the intervention. Probably a combination of traditional and electronic education methods such as lecture, question and answer, as well as instructional video in reducing HbA1c and blood sugar control is more effective than using only instructional video.

One limitation of this study was lack of performance measurement. To address this limitation, HbA1c, as a very important indicator in the control of blood sugar status was measured which can be considered as one of the strengths of the study.

Conclusion

The findings of this study suggest that use of instructional video based on health belief model can help diabetics to raise their awareness, perceived sensitivity and severity about complications of a disease, as well as the perceived benefits and barriers related to the self-care behaviors. In addition, this video was able to reduce the level of HbA1c, although this decrease was not significant, but further decrease of HbA1c may require long-term interventions. Finally, educational methods, such as lecture and group discussion along with instructional video are suggested to educate diabetic patients.

Conflicts of Interest

The authors declare that there is no conflict of interest in this work.

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Authors' Contribution

Conceptualization, S.M.M.H., F.B., and M.R.M.; Methodology, S.M.M.H., F.B., S.M., M.R.M., and M.F.; Investigation, F.B., S.M., M.R.M., M.KH., and M.F; Formal analysis, M.F., F.B.; Writing – Original Draft, F.B. and M.KH.; Writing – Review & Editing, F.B. and S.M.M.H.

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