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Original Article

Development of a diabetes education program based on modified AADE diabetes education curriculum

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Abstract: To assess the feasibility and acceptability of a diabetes education program tailored to patients with type 2 diabetes in communities and the preliminary outcomes of the intervention. Methods: Two-phase, one group, mixed-method study design was used. Modified American Association of Diabetes Educators (AADE) diabetes education curriculum was used as the framework for the program. Patients with diabetes participated in classes and diabetes conversation map discussion. Feasibility and acceptability of the program were evaluated by the ability to recruit and retain participants and their satisfaction with the program. Diabetes knowledge test and the summary of diabetes self-care activities (SDSCA) were used to evaluate the knowledge and behavior changes of the patients. Results: 40 patients completed the program and the attrition rate was 11.1%. All participants were "very satisfied" with the program. Significant improvement in diabetes knowledge and blood glucose monitoring and foot care were reported. Conclusion: The diabetes education program based on modified AADE diabetes education curriculum combined with diabetes conversation map may be effective in patients with type 2 diabetes. Practice Implications: Flexible time schedule and a control group should be designed in the future study.

Keywords: AADE diabetes education curriculum, diabetes education, diabetes conversation map, community, type 2 diabetes

Introduction

Due to the rapidly changing lifestyle in China, diabetes has become a major public health problem. The age-standardized prevalence of diabetes was 9.7% accounting for 92.4 million adults with diabetes [1] of whom 90% were type 2 diabetes [2]. Poorly controlled diabetes inflicts devastating complications that diminishes the quality and length of life of patients. So diabetes requires continuing medical care and patient self-management education to prevent acute complications and to reduce the risk of long-term complications.

Changsha is the Capital city of Hunan province. Diabetes has been reported to be one of the most common chronic diseases that influences the health of urban residents in Changsha [3]. Community Health Services (CHS) integrate prevention, medication, health education and recovery for the residents. One of the key functions of a community health agency is to explore effective modes of diabetes management so as to prevent chronic complications of diabetes [4]. However, some health workers in the community of Changsha cannot provide systematic and standardized diabetes education because of their limited knowledge [5]. The purpose of American Association of Diabetes Educator (AADE) diabetes education curriculum is to support diabetes educators in the teaching of self-management concepts, with the ultimate goal of helping patients achieve behavioral changes necessary to manage their health conditions [6]. So the purpose of this study was to plan and implement a diabetes education program based on modified AADE diabetes education curriculum.

Materials and methods

Materials

AADE diabetes education curriculum: AADE diabetes education curriculum has 8 modules, it

begins with introduction to diabetes and following this is a module for each of the AADE 7 Self-Care Behaviors™, including healthy eating, being active, taking medications, monitoring, problem solving, healthy coping and reducing risks. It places equal emphasis on the content to be taught and the facilitation of behavior change. It is not based upon one single conceptual framework. Instead, a variety of theories and principles are used to guide the delivery of the education, such as Knowles' principles of adult learning, Gardner's theory of multiple intelligences, and behavior change models and theories, including the patient empowerment model, the health belief model, and social cognitive theory [6] (see the curriculum for primary references).

International conversation map: The International Conversation Map™ education tools were developed by Healthy Interactions in collaboration with the International Diabetes Federation (IDF) and sponsored by Eli Lilly. The program has trained and equipped diabetes educators in over 90 countries in 31 languages [7]. A Conversation Map tool combines a series of images and metaphors on a 3-foot (.91 meters) by 5-foot (1.52 meters) tabletop display. Conversation Map programs create transformational, face-to-face learning experiences that help people achieve Personal Health Engagement. The Conversation Map educational session uses several components to facilitate the interaction between educators and patients. It shows promise in changing patient attitudes toward diabetes, improves self-efficacy, and leads to better clinical outcomes.

Methods

Two-phase, one group, mixed-method study design was used. Phase 1 involved program development and phase 2 was program implementation and evaluation.

Program development: The author and a bilingual diabetes educator developed the Power Point Presentation according to the instructional plan of AADE diabetes education curriculum. We deleted the contents of type 1 diabetes and gestational diabetes, omitted carbohydrate counting, reserved the questions designed to ask patients (the AADE curriculum provided many questions for the educators to identify participant thoughts and feelings about the module) and modified the control goals according to the guidelines for Chinese (clinical goals, such as blood sugar, were different in China when compared to the US). The module of "healthy eating" was modified according to the diet culture of Changsha.

Upon completion of the Power Point Presentation, we conducted two focus group meetings to investigate the patients' needs and preferences. All the participants were from the diabetes club of Xiangya Hospital. The author used a prepared semi-structured interview guide to lead the discussion, while the assistant moderator took notes about nonverbal communications and patients' responses and handled logistical issues. Each focus group lasted about one hour. All the participants had previous experience of diabetes education and they believed diabetes education was effective and necessary. They thought all the modules were helpful for diabetics and suggested that the educators group the patients according to the duration of diabetes or diabetes education experience. They thought that the newly diagnosed patients should receive the basic and survival knowledge and skill for managing diabetes. They also felt it would be better if the program took place in the communities, involved the families of the patients and included small gifts, it may attract more participants. No more than 40 participants were thought to be the appropriate size for a group and patients' felt that quizzes following the lecture may emphasize the key concepts. They also felt that class teaching alone would not be interesting and that patient interaction would prove useful.

Based on the recommendations of the focus group, we designed 10 questions following each lecture to evaluate the immediate outcomes such as learning skills. Small gifts were prepared for the correct answer. Five experts, two diabetologists, two diabetes educators and one dietitian were asked to review the PPT for accuracy, clarity and acceptability. The experts thought that the module of "Introduction to Diabetes" was too simple and suggested adding the complications and control objectives. They agreed to have a group discussion around diabetes conversation map to facilitate interaction. Finally, the program was composed of

Table 1. Schedule

Time	Lecture	Conversation
2010, 10-15	Introduction to diabetes	What is diabetes
2010, 10-29	Healthy eating	Healthy eating
2010, 11-12	Being active	Being active
2010, 11-26	Monitoring	Starting insulin
2010, 12-3	Taking medications	Starting insulin
2010, 12-17	Reducing risks	What is diabetes
2011, 1-14	Problem solving	Living with diabetes
2011, 1-28	Healthy coping	Living with diabetes

Table 2. Frequency distribution of demographic data (n=40)

Demographic data	Frequency
Gender	
Male	40%
Female	60%
Age M (SD)	71.05±5.85
Length of diabetes	10.83±6.36
Treatment	
Oral agents	72.5%
Insulin	15%
Oral agents and insulin	12.5%

eight one-hour lectures and group discussions through diabetes conversation map.

Program implementation and evaluation: We put posters in Wangyuehu community to recruit the participants. It was said that we would conduct a diabetes education program in the community and welcome patients to participate. The health care providers also called some patients to participate in the project. Participants who were type 2 diabetics (according to 1999 WHO diagnostic criteria), and did not have cardiovascular or psychosocial complications were recruited. All participants signed the informed consent. Free blood glucose testing was provided to all participants and small gifts were prepared for the quizzes. The lecture was conducted every 2 weeks, a research assistant observed the module implementation and evaluated the class. The educators were physicians, dietitians and diabetes specialist nurses. Problem based learning and empowerment were used to facilitate patient interaction. At the end of the class, 10 quizzes were provided to evaluate the immediate outcome: the learning skill. Every lecture lasted 50 minutes.

After a short break, the participants were divided into 4 groups to discuss the concepts that were mentioned in the class around the map and all participants were guided to set SMART behavior goals, such as "I will monitor fasting blood glucose 3 times a week" as shown in **Table 1**.

Outcome measurements: The feasibility was measured by the ability to recruit and retain participants and their satisfaction with the program. Participant satisfaction with the program was measured using the 5-point Likert-type scale. Diabetes knowledge test [8] was used to evaluate the knowledge, the summary of diabetes self-care activities (SDSCA) [9] and goal attainment (the ability to achieve individual diabetes self-care goal at 80% or more on a scale of 0-10) [10] were used to measure behavior change.

Data analysis

The qualitative data was built into the program design. Descriptive statistics such as means and standard deviation, frequencies were used to describe and summarize central tendency and variability of demographic variables. Difference in means between pretest and posttest was computed using a paired t test with SPSS13.0 software. Statistical differences were determined by $\alpha=0.05$, $p<0.05$.

Results

All the participants were above 60 years old of age and were retired (**Table 2**).

45 participants agreed to join the program and 40 participants completed the 8 modules and 32 participants completed both the class as well as the diabetes conversation. The attrition rate was 11.1%. Adverse climatic conditions (in winter) were the reason for the attrition. Time conflict was the main reason for patients not attending the conversation as the conversation began at 11 am.

All participants were very satisfied with the program, they thought that the content was easy and would like to join a similar education program and recommend the program to their friends and relatives.

All educators completed the lecture in one hour, however their interaction with the patients

Table 3. Behavior variables at baseline and at the end of intervention ($\bar{\chi}$±S)

	Baseline	After intervention	t	P
Total score of behavior	38.97±3.15	42.87±3.83	-4.93	0.00
Healthy eating	18.50±2.56	19.44±2.01	-1.78	0.08
Being active	5.79±1.11	6.35±1.88	-1.66	0.10
Blood glucose monitoring	4.78±1.67	5.92±2.09	-2.51	0.01
Foot care	4.55±1.64	5.33±1.45	-2.25	0.03
Taking medications	5.34±1.05	5.83±1.31	-1.69	0.09

was not frequent. There were 40 patients in the class and the educator could not meet everyone's needs and sometimes the patients did not know how to answer or ask questions. However, during the conversation, the patients were more active since the theme of the discussion was mentioned in the lecture. The educators suggested that the module of "Taking Medications" be divided into two sections including oral hypoglycemic agents and insulin respectively.

Diabetes knowledge test and the summary of diabetes self-care activities (SDSCA) were used to evaluate the knowledge and behavioral changes separately. At baseline and after intervention, the score of diabetes knowledge test were 10.55±3.62 and 17.13±2.30 respectively. Significantly improvement in diabetes knowledge ($p<0.5$) was noted. Significantly improvement in blood glucose monitoring and foot care activities were also reported (**Table 3**). 95% of the participants achieved their behavior goals.

Discussion

DSME is the core of diabetic therapy since available therapies can only be effective if the patients are able to follow proper diet and exercise regimens. A written curriculum reflecting current evidence and practice guidelines, with criteria for evaluating outcomes, should serve as the framework for a DSME program [11]. The American Association of Diabetes Educator (AADE) diabetes education curriculum is such a curriculum. This curriculum places equal emphasis on the content to be taught and the facilitation of behavior change.

Effective patient education materials should be culturally specific and linguistically appropriate. Therefore, language, reading levels, and cultural norms and beliefs should be of great concern when developing educational materials [11]. The AADE curriculum is designed to target people with diabetes in the USA. There is a vast difference between Chinese and American cultures, not only in life style and learning methods, but also in the way that educators educate patients. For example, the plate method and carbohydrate intake counting are not widely used in China. In order to teach patients how to select specific food from different kinds of food, Chinese educators divided food into 6 categories: grains, vegetables, eggs, meats, milk, fat/oils, and fruits. In China, one serving equals 90 calories, so the portion size is different from that in the United States. So the curriculum had to be modified to suit the Chinese population.

Behavior change, which is a unique outcome measurement for DSME [12], cannot be mandated or effected through didactic learning alone. An educational program that aims to promote self-management must involve the participant in the process as a full partner [13]. The International Conversation Map™ education tools serve as a facilitation tool for healthcare professionals to engage people with an interactive verbal and visual learning experience, which can enable them to better internalize information. Compared with traditional classroom teaching, diabetes conversation map was more effective in clinical improvement and behavior change [14]. With the lack of diabetes knowledge and the influence of traditional study habit, most patients preferred a combination of classroom teaching and conversation [15].

There were 40 participants in the class and it was very difficult for the educator to address individual attention. However, the group session provided an opportunity for discussion and interaction between the educators and the patients. During the conversation, we noticed that the behavior goals were very general, such as "being active or healthy eating". It was far from the SMART goal. To solve this problem, we gave them some examples of SMART goals, such as, "After dinner, I will walk around my residence community for half an hour at least five times a week". They were asked to write

similar sentences and SMART behavior goals were set based on this.

Although there were no significant differences in healthy eating, being active and taking medications, 95% of the participants expressed that they achieved their behavior goals. The possible reason was that "eating and exercise" were the two kinds of behavior that are not easy to change [16]. At the same time, there may also be participants who had good dietary habits as well as performed regular exercises before the program, and they did not have to change. However, the participants gained valuable information in blood glucose monitoring and foot care. Initial questioning, before commencement of the program, revealed that the patients just focused on fasting blood glucose and did not monitor the levels according to the doctors' suggestion. Following the intervention, they recognized the importance of blood glucose monitoring. The patients understood that the results of monitoring blood glucose levels can reflect the effectiveness of treatment and guide the adjustment of therapy [17]. A review of SMBG conducted by AADE concluded that "SMBG may be effective in controlling blood glucose for patients with type 2 diabetes" [18].

All participants who completed the program were more than 60 years old and retired. This could be due to the classes being scheduled on Friday and the younger individuals had to work during the weekdays. Although the prevalence of diabetes increased with increasing age, the prevalence of diabetes among adults who were 20~59 years of age was also found to be about 14.7% (1). Since this section of the population happens to be the principle or sole wage earners, plans have to be devised to accommodate this group in future diabetes education classes. One way to achieve this would be to conduct the program at night or on weekends.

There were some limitations in this study. First, we did not include a control group. Secondly, the duration of the intervention was only 4 months and finally, the outcome measurement did not include clinical improvement, for example HbA1c. However, the purpose of the study was to develop a diabetes education program that applied to patients in the community and to test its feasibility, acceptability and preliminary effects. The data collected from this study can be used to further develop the program.

Conclusion

The diabetes education program based on modified AADE diabetes education curriculum, and combined with diabetes conversation map can improve the knowledge, facilitate behavior change, and is appropriate for patients with diabetes.

Practice implications

For future studies, flexible time schedule, a control group and clinical outcomes should be included.

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Disclosure of conflict of interest

None.

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