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EFFECTIVENESS OF A DIABETES SELF-MANAGEMENT SUPPORT INTERVENTION IN VIETNAMESE ADULTS WITH TYPE 2 DIABETES.

Thanh Tran Ngọc Dang[1, 2,*], Wannee Deoisres[1], Pawana Keeratiyutawong[1], and Linda Baumann[3].

[1]*Faculty of Nursing, Burapha University, Chon Buri, Thailand.*
[2]*Faculty of Nursing and Medical Technology, Pham Ngoc Thach University of Medicine, Ho Chi Minh City, Vietnam.*
[3]*School of Nursing, University of Wisconsin-Madison, Wisconsin, USA.*

ABSTRACT

A randomized control-group pretest-posttest design study was conducted to evaluate the effectiveness of a diabetes self-management support intervention in Vietnamese adults with type 2 diabetes at the outpatient clinic of a general hospital in Ho Chi Minh City, Vietnam. Participants with glycosalated hemoglobin (HbA1c) level greater than 7% were recruited and randomly assigned into the intervention (n=42) or the control group (n=44). Social cognitive theory was used as the framework to guide the intervention. Participants in the intervention group attended a weekly four session diabetes education program emphasizing confidence-enhancing skills for self-management of type 2 diabetes. Then, they were supported by telephone over five months by peer leaders who had type 2 diabetes and controlled blood glucose well (HbA1c level of 7% or less). Participants in the control group received usual care and a diabetes self-care booklet. Outcome measures included diabetes social support, diabetes self-efficacy, diabetes self-care behaviors, and HbA1c collected at baseline, three and six months post-intervention. Participants in the intervention group showed statistically significant improvement in diabetes social support, diabetes self-efficacy, diabetes self-care behaviors and HbA1c level compared with the control group at three and six months post-intervention [$F(2, 168) = 16.53$; $F(2, 168) = 23.87$; $F(2, 168) = 43.45$; and $F(2, 168) = 41.39$, $p = 0.000$, respectively]. The findings showed the effectiveness of this diabetes self-management support intervention for improving health outcomes in adults with type 2 diabetes. Therefore, implementing this program at general hospitals is recommended.

Keywords: Self-management, peer support, type 2 diabetes, Vietnamese, social cognitive theory.

*Corresponding author. E-mail address: dangtranngocthanh81@yahoo.com

INTRODUCTION

Type 2 diabetes is an increasingly prevalent chronic illness worldwide. In Vietnam, 1.7 million people have diabetes and this number is expected to grow to 3.4 million by 2030 (Shaw et al., 2010). The rate of diabetes in rural provinces is 3% to 6.8% (Chien, 2007; Hieu and Hoan, 2007) and in cities it is remarkably higher (Ta et al., 2010). World Health Organization (WHO) reported that diabetes was the seventh cause of death from non-communicable diseases in Vietnam in 2002 (WHO, 2008). The major strategy to stay healthy and prevent complications for patients with type 2 diabetes is to control blood glucose. However, studies in Vietnam indicate that most patients do not achieve acceptable glycemic control due to poor diabetes-specific knowledge, negative attitudes about diabetes, non-adherence to lifestyle modification, and lack of motivation to make behavior changes (Hoang, 2008; Huyen, 2008).

Self-management is a cornerstone of diabetes because people with diabetes provide 95% their own care. Diabetes self-management educational programs conducted in Vietnam showed improvement in knowledge, attitudes, practices, and metabolic control (Binh, 2005; Dung, 2008; Hoan et al., 2005). However, these studies had methodological weakness such as single group designs, no theoretical base, and short-term evaluation. Therefore, it is difficult to draw the conclusions about the intervention effect.

Self-efficacy, a central concept of social cognitive theory, has consistently been as an important concept associated with the improvement in health behaviors and metabolic outcomes in several diabetes self-management interventions (Bandura, 1997; Trief et al., 2009; Wu et al., 2011). However, because of the complexity of diabetes self-management, progressive goal setting and skill practicing are often advocated to build self-confident and support behavior change (Funnell et al., 2007). According to Fisher et al. (2012), although self-management of diabetes is essential to reducing the risks of associated disabilities, effective self-management is often short-lived. Therefore, research should provide the kind of ongoing support that is needed for sustained self-management of diabetes.

To-date, evidence has been mixed about how best to support patients in self-management (WHO, 2007). However, social support plays a vital factor in contributing to the facilitation of diabetes self-care behaviors (Rees et al., 2010). A literature review by Funnell (2010) concluded that, while health professionals could fill the role of providing ongoing support and strategies to improve behavior change, peer supporters who are nonprofessionals but have diabetes were equipped to provide the psychosocial support in the long-term. However, WHO (2007) reported that it is often too costly if health professionals provide support for patients in mastering and sustaining complex self-care behaviors in long-term. Especially, in the Vietnam context where many hospitals are faced with a shortage of health professionals and other resources to assist people in their basic needs for behavior change (Beran et al., 2009). Therefore, peer support has become a promising approach to sustain behavior change. Peer support is a form of self-management support that can take many forms – phone calls, text messaging, group meetings, home visits, and face-to-face contacts. Among that, the mobile phone has been shown beneficial for the management of diabetes in the developing world (Kahn et al., 2010, Liang et al. 2011)

In summary, diabetes self-management support has been shown improvement in health outcome for patients with type 2 diabetes in several low and middle-income countries (Fisher et al., 2012). To-date, no study has tested whether a self-management approach with support from peer would be culturally acceptable and beneficial for Vietnamese patients. To fill the gap of knowledge, social cognitive theory was used as the framework for an intervention where patients attend group educational sessions and receive telephone support from peer leaders who also have diabetes.

The purpose of this study was to evaluate the effectiveness of the self-management support intervention for enhancing diabetes social support, diabetes self-efficacy, diabetes self-care behaviors, and decreasing HbA1c level in Vietnamese adults with type 2 diabetes.

Hypothesis: Adults with type 2 diabetes who receive the diabetes self-management support intervention will have higher mean scores of diabetes social support, diabetes self-efficacy, diabetes self-care behaviors, and lower HbA1c level than adults in the control group across the three time points.

MATERIALS AND METHODS

Research design: A randomized control-group pretest-posttest design was conducted at the diabetes outpatient clinic in 115 People hospital in Ho Chi Minh City, Vietnam.

Inclusive Inclusion criteria: Participants were recruited using following criteria, i.e., 30 years old or older, diagnosed with type 2 diabetes for one year or more, taking oral diabetes medication, having an HbA1c value in the most recent three months greater than 7%, no significant cognitive problems, no major complications, and having a telephone. Besides, participants who were selected to act as peer leaders had to meet the same above criteria, except a HbA1c level in the most recent three months equal to or less than 7 %, a willingness to help other people, and have good interpersonal and communication skills. The participants who acted as peer leaders were selected by the diabetes health care providers at 115 People hospital.

Sample: From meta-analysis of diabetes self-management programs, effect size of outcome variables was at a moderate magnitude (Fan and Sidani, 2009). Therefore, in this study, the power level was set at 0.8, $\alpha = 0.05$, and a moderate effect size. A sample size of 36 was aimed for in the experimental and control groups (Cohen, 1988). An attrition rate of 40% were expected, 51 participants were needed for each group. Participants were selected by the systematic random sampling method and were randomly assigned to either the control or intervention group by flipping a coin.

Protection of right of human subjects: The research proposal was approved by the Institutional Review Board, Faculty of nursing, Burapha University, Thailand, and 115 People hospital in HCMC, Vietnam. Written consent was obtained by participants. Confidentiality of the participants was assured. All data were stored in a secure place and were only utilized for the purpose of research.

Instruments: Data obtained included physiologic measurements, questionnaires on demographic information, diabetes self-care behaviors, diabetes self-efficacy, diabetes social support, and telephone logs.

Physiologic measurements. Body Mass Index (BMI) was calculated by dividing weight in kilograms by the square of height in meters. Waist circumference (WC) was determined by locating the upper hipbone and placed a measuring tape around the abdomen. HbA1c level was obtained from the medical record.
Demographic information. This information consisted of questions about gender, age, educational level, marital status, occupation, and diabetes duration.

Diabetes self-care behaviors. The summary of diabetes self-care activities [SDSCA] (Toobert et al., 2000) was used to measure diabetes self-care behaviors. Participants were asked how many of the last seven days they performed five aspects of self-care activities including healthy eating, exercise, foot care, self-monitoring blood glucose [SMBG], and medications on a scale of 0 –7. After reversing two items having negative meaning, the summed number of days for five dimensions was calculated. The highest possible score was 70, with a higher score indicating a higher level of self-care performance. In this study, the Cronbach's alpha of SDSCA was 0.70.

Diabetes social support. Diabetes Support Scale (DSS) (Barrera et al., 2002) was used to measure social support and consists of 12 items with three domains: emotional support, advice, and information. Participants rated the support they had received over the preceding three months on a seven-point scale from one (strongly disagree) to seven (strongly agree). After reversing six items worded negatively,

researcher calculated the average of the scores for all 12 items. The highest possible score was 84, with a higher score indicating higher support received by participants. In this study, the Cronbach's alpha of DSS was 0.93.

Diabetes self-efficacy. The diabetes management self-efficacy scale [DMSES] (van der Bijl et al., 1999) was used to measure diabetes self-efficacy. It is a summated five point rating scale ranging from "definitely no" (1) to "definitely yes" (5). Sixteen items of DMSES were measured to measure patient's confidence in performing diet, physical activity, SMBG, foot care, and medical treatment. The highest possible score was 80, with a higher score indicating higher confidence in the diabetes management tasks. In this study, Cronbach's alpha of DMSES was 0.80

Telephone logs: Both peer leaders and participants in the experimental group were asked to keep an interaction log of every contact that included, i.e., date and time of contact, minutes of contact, and who initiated the contact. Peer leaders were also asked to record topic discussed, result discussed, whether a referral to a healthcare provider was suggested, and plan for next contact. Regarding participants in the experimental group, they were asked to record weekly their behavioral goals, changes achieved, mood, and a statement about the helpfulness of the interaction with peer leaders.

Procedure:

Experimental group: After participants were assigned to the experimental group, they read and signed a consent form, and completed the baseline measurement (T1). The researcher and two nursing assistants who have experience with diabetes patients provided the education. A classroom in Pham Ngoc Thach University of Medicine (five minutes of walking from research setting) was used to provide education sessions because the research setting was reconstructed during the implementation of this study. Participants were assigned to five groups of nine to twelve participants. Three to five peer leaders were invited to participate in each group. Peer leaders and participants had to attend at least three of the four sessions to continue with the study. The topics of four sessions were basic knowledge of diabetes and self-monitoring blood glucose, medications and healthy eating, exercise and complications, and stress management and relaxation techniques of how to seek help from others with roles of peers and peer leaders.

At the beginning of first session, participants received a booklet that covered topics to help patients establish self-care plans and adopt positive lifestyle behaviors (American Diabetes Association, 2005; International Diabetes Federation, 2011). The DVD showing a role model of patient how to live well with diabetes was viewed by participants at the first session. At each session, verbal persuasion was used to target knowledge gaps and misinformation, and to promote positive attitudes toward diabetes self-management such as describing and discussing the benefits of exercise, healthy food, taking medicine, SMBG, and foot care. Participants were asked to share their daily experiences living with diabetes. Patients acted as role models to demonstrate how to perform diabetes self-care skills. Then, participants had opportunities for performance accomplishment while the researcher provided encouragement on individual's efforts.

At the end of each education session, participants completed a goal setting contract. Participants were asked to choose the most important behaviors that they want to change for short-term and long-term and were encouraged to identify what barriers prevented change, how they overcome that barrier, and their confidence on the 0 - 5 scale to achieve their plan. To enhance their chances of success, before every education session, participants were asked to report their achievement. Feedback was given on the participant's goals.

At the fourth session, two to three participants in the experimental group were matched with one peer leader based on location of residence, age, and interests. Then, they practiced in role-play how to support each other by using communication skills, problem solving, encouraging optimism and hope. Also, participants in the experimental group and peer

leaders were instructed how and when to call each other as well as how to use the name telephone log. Peer leaders or participants in the experimental group were expected to make at least one contact per week for the first two-month and biweekly for the next three months. Peer leaders were asked to contact the researcher if they had any difficulties with the interactions with peers. The researcher called peer leaders monthly to give support and guide them in overcoming barriers encountered. The task of peer leaders was to provide several items, i.e., informational support in daily management of diabetes, listening and encouragement to overcome social or emotional barriers and to remain motivated to reach their goals, and advice to connect with diabetes care providers for any clinical issues about diabetes management.

All participants in the experimental group were invited to attend the three and six month post-intervention meetings. Travel expenses (40.000 dong, equal to 2 USD) were paid for participants to attend each post-intervention meeting. Peer leaders and participants in the experimental group were provided top up cards to refill their money balance for calling during five months. The peer partner monthly payment was 100,000.00 dong (equal to 5 USD) and 200,000.00 dong for a peer leader (equal 10 USD).

Control group: After participants were assigned into control group, they signed a consent form, and completed T1 measures. Upon completion, they received the booklet of diabetes self-care and appointments for obtaining T2 and T3 post-measurements. At the meeting, they had chances to ask questions related to diabetes self-care and the booklet. The participants in the control group were appointed to follow up at the diabetes outpatient clinic on different dates from the participants in the intervention group to prevent subject contamination.

Data collection: T1 measurement included the questionnaires and the physiologic measurements (BMI, BP, WC, and HbA1c). T2 and T3 measurements were obtained by inviting participants in the control group and intervention group to attend separate three and six-month post-intervention meetings. Telephone interaction logs of peer leaders and participants in the experimental group were collected at the three and six-month post-intervention meetings. The flowchart of data collection is illustrated in Figure 1.

Qualitative data: At the end of the program, a short-group interview was conducted with peer leaders and participants in the experimental group to address the following questions: "What was your (participants') opinion about the intervention? and "Were you (participants) satisfied with the program?" The recorded interviews were transcribed into text format and analyzed using a thematic framework approach (Ritchie and Spencer, 1994).

Data analysis: Descriptive statistics were used to analyze data from telephone logs. The Chi-square test and Independent t-tests were used to examine the difference of demographic and physiological characteristics, and outcome variables between two groups at baseline. Two-way repeated measures ANOVA were used to test the hypothesis.

RESULTS

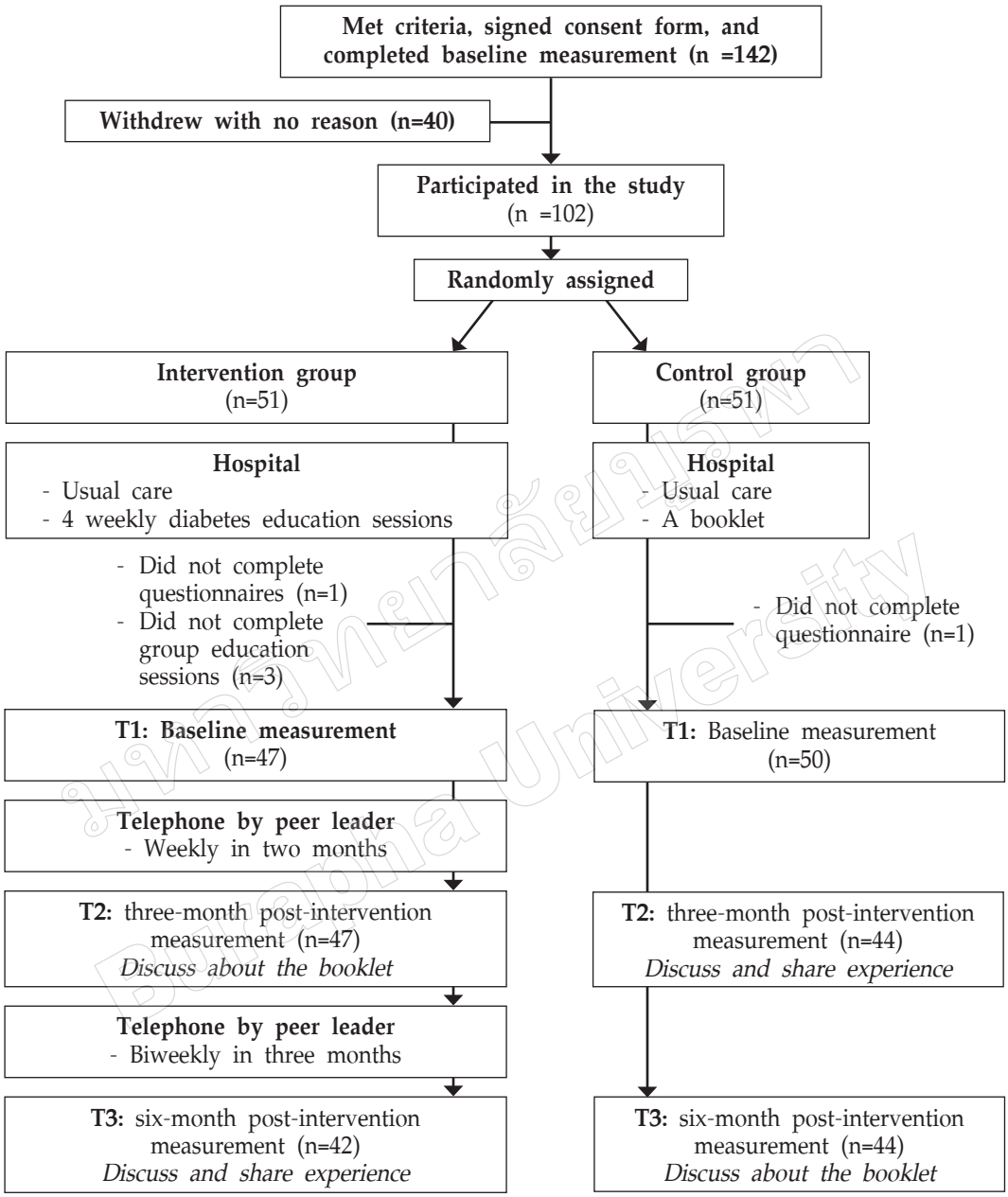
Participants

One hundred forty two participants met the study criteria and 102 agreed to participate and were randomly assigned to either the control group or experimental group. The final sample of the experimental group was 42 and 44 in the control group.

Forty two participants with type 2 diabetes were met the criteria to become peer leaders and 20 agreed to participate in the study, where three of them did not complete the education sessions, so 17 were matched with participants in the experimental group to provide five months of telephone support.

From analysis of the telephone logs, each peer leader called a median of two participants in the experimental group (range 2 – 3). Each participant in the experimental group received on average 6.51 calls (range 1–15 calls, S.D. = 3.62). The calls lasted on average 13.59 minutes (range 5 – 42.5 minutes, S.D. = 8.8 minutes), with first calls lasted on average 14.42 minutes.

Figure 1. Sampling



Differences in demographic and physiological characteristics between the experimental and control group at baseline were examined. No significant differences were found between the intervention and control groups on demographic and physiological data ($p > 0.05$)

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Effect of the intervention

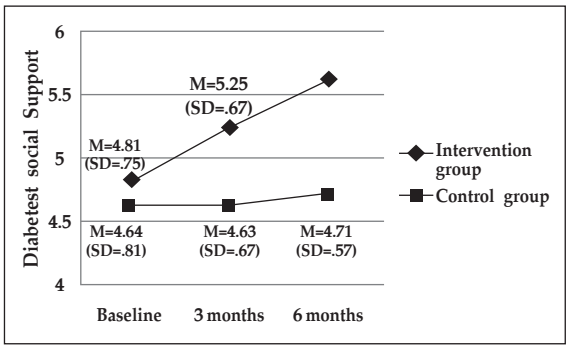
Two-way repeated measures ANOVA was used and showed that there were significant differences in the mean score of diabetes social support, diabetes self-efficacy, diabetes self-care behaviors, and HbA1c level in at least one pair of the three time points (see Table 1). Pair wise comparison showed significant differences between baseline and three months, baseline and six months for all outcome variables. There were no differences in diabetes self-care behaviors and diabetes self-efficacy means score between three months and six months (see Figure 2). Interaction between group and time on diabetes social support, diabetes self-efficacy, diabetes self-care behaviors, and HbA1c was significant (see Table 1). Independent t-test of all four variables showed significant between the intervention group and the control group at three and six month's post-intervention (see Figure 2).

Table1. Repeated measures ANOVA of dependent variables.

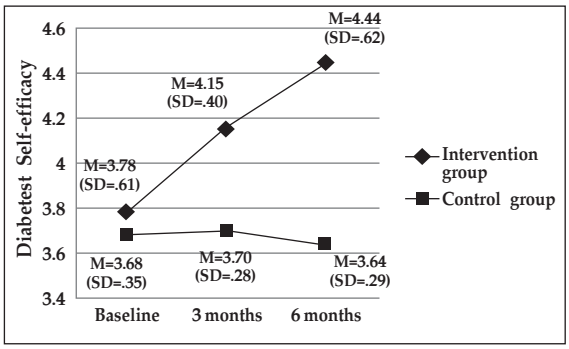
Variable	Intervention group						Control group						Group	Time	Groupx Time
	Time 1		Time 2		Time 3		Time 1		Time 2		Time 3		F	F	F
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD			
DSS	4.81	.75	5.25	.69	5.62	.68	4.64	.81	4.63	.67	4.71	.57	18.252*	22.851*	16.535*
DMSES	3.78	.61	4.15	.40	4.44	.62	3.68	.35	3.70	.28	3.64	.29	33.464*	19.696*	23.878*
SDSCA	3.99	.73	4.78	.69	5.20	.55	4.08	.69	4.15	.79	4.02	.88	16.263*	38.450*	43.456*
HbA1c	7.96	.67	7.48	.56	7.11	.49	7.85	.34	7.76	.40	7.94	.43	50.992*	9.680*	41.390*

*Significance at $p < 0.05$
DSS = Diabetes social support;
DMSES = Diabetes management self-efficacy scale
SDSCA = Summary of diabetes self-care activities

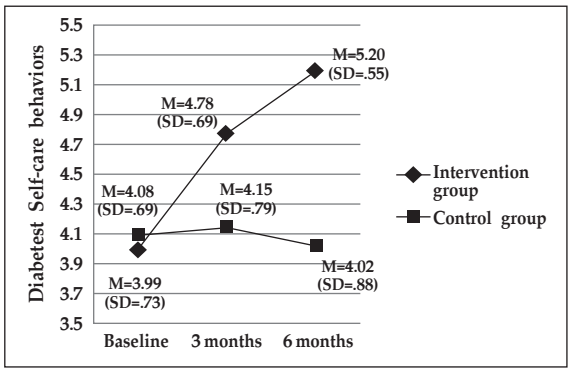
Figure 2. Comparison of the mean outcome variables over time.



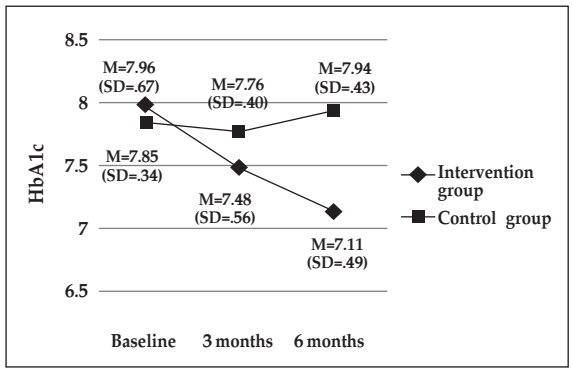
Baseline: t=.991, p>.05; **3 months:** t=4.094, p<.05; **6 months:** t=6.735, p<.05;



Baseline: t=.973, p>.05; **3 months:** t=5.859, p<.05; **6 months:** t=7.517, p<.05;



Baseline: t=.552, p>.05; **3 months:** t=3.634, p<.05; **6 months:** t=7.468, p<.05;



Baseline: t=.928, p>.05; **3 months:** t=2.621, p<.05; **6 months:** t=7.024, p<.05;

Qualitative data from interview at the end of the intervention

Participants in the experimental group and peer leaders expressed satisfaction with the intervention and reported that the program is very useful and meaningful to them. Data from the interview reflected three themes, i.e., behavioral changes to live healthier, peer leaders as a motivating factor, and received barriers to provide support.

Behavioral changes to live healthier: Participants in the experimental group perceived benefits from the intervention, which helped them get more diabetes specific information and change their behaviors.

"After attending this program, I eat more carefully. I know how to select foods with low carbohydrate".

"Before attending this program, we had no idea what HbA1c means but we all know it now".

"After attending this program, we know which physical activity is appropriate for our age and can be benefited to control blood glucose".

Peer leaders as a motivating factor: Peer leaders were perceived as good friends and essential in encouraging diabetes behaviors and in lifestyle modification. Peer leaders were also perceived as good emotional supporters who were willing to listen and share feelings with participants as well as linkage them to health care providers.

"Attending this program, peer leader provided opportunity for me to reflect on diabetes management and establish goals, such as healthier diet, increased exercise levels, and better medication adherence. Each time peer leader called me, it stimulated my thinking. As a result, I felt more confident in managing diabetes".

"I think peer leader is very friendly. She motivated me a lot and shared with me many useful information about diabetes. We were contacted very often by telephone".

"I feel like I am not the only person in this world having diabetes. Now when I have any issue I wanted to share, I called the peer leader".

Perceived barriers to provide support: Peer leaders indicated that they all enjoyed helping others. However, peer leaders found some difficulties associated with finding convenient times for calls, and the number of attempts needed to make a call. Twenty percent of peer leaders reported that they did not know how to talk deeply with their partners.

"...There are some matters like I am a leader but I do not know how to talk, and how to guide..."

DISCUSSION

Participants in the experimental group had higher diabetes social support mean score compared to the control group at three and six month post-intervention. This result is consistent with Huixia (2008) and Mckay et al. (2002) who showed that a diabetes self-management program with the support from peer leaders improved diabetes social support after three months follow-up measurement. Participants in the experimental group reported that they felt peer leaders would serve as a motivating

factor in both encouraging diabetes behaviors and in lifestyle modification. Participants in the experimental group felt stable, relaxed, and happy during the five months supported by peer leaders. Peer leaders always reminded participants in the experimental group to follow-up to see the doctor on time. Most participants valued having someone they could talk to about diabetes, who could offer them support and encouragement.

The diabetes self-efficacy score in the experimental group increased steeply at three and six months from the baseline and higher than participants in the control group over times. These results are consistent with previous studies, which showed that self-efficacy was improved at six months follow up (Dale et al., 2007; Wu et al., 2011).

The mean diabetes self-care behaviors in the experimental group increased to 4.78 at the three months and 5.20 at the six-month post-intervention. The finding is consistent with previous studies. Baksi et al. (2008) and Barlow et al. (2005) found changes in self-management behaviors in patients who received support from peer leaders. Patients who attended the education sessions had a chance to share feelings, experiences, practice self-care skills, set behavioral goals, receive feedback, and observe role models from peer leaders who had similar themselves-management needs. Especially, patients had an opportunity to receive ongoing telephone support from peer leaders after the diabetes education sessions. The combination of these approaches could develop patient's self-confidence in achieving daily diabetes self-care and enhance perception of social support in order to have adequate motivation and empowerment for sustaining their behavior change over time.

Participants in the experimental group had decreased HbA1c level compared with the control group at three and six month's post-intervention. Mean HbA1c levels in the experimental group decreased from 7.96 % to 7.48% and to 7.11% at three and six months, respectively. A target HbA1c should be negotiated individually, but a level of close to 7% is an acceptable level for the majority of people with type 2 diabetes. The result is consistent with previous studies (David et al., 2013; Liang et al., 2011) reporting that mobile phone interventions by peer leaders reduced HbA1c over six months follow-up duration for the peer coaches group.

Implications: This study showed that patients with type 2 diabetes who act as peer leaders can effectively work in conjunction with health care providers to provide advice, emotional and informational support for other patients with type 2 diabetes self-management. Besides, curriculum of diabetes self-management should be developed to prepare nursing students and advanced nurse practitioners. To increase the generalization, further research should be conducted in other general hospitals in Ho Chi Minh City. More research is needed to determine whether benefits of peer support can be sustained beyond six months since self-management is required for a lifetime. Also, more evidence is needed to understand how to best prepare and support peer leaders so that they can continue in this role over a longer period of time.

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