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The Effects of Health Conservation Program in Community-dwelling Vulnerable Diabetic Elderly

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취약계층 당뇨병 노인을 위한 건강보존프로그램의 효과

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Abstract This study was conducted to develop and apply the health conversation program to determine its effectiveness. The study employed a pretest-posttest nonequivalent control group design. There were 25 subjects in one intervention group and 22 subjects in the control group. The program included a 4-week, 12-session education program in health conversation for professionally retired elderly mentors and an 8-week, 24-session program for vulnerable elderly diabetics provided by mentors who were older persons trained in diabetes management. Data were collected from December 2015 to May 2016 and subsequently analyzed by an independent t-test using SPSS 20.0. Biochemical variables and physical variables were assessed by blood test and Inbody 230 (Biospace). Psychosocial variables were assessed by questionnaires. The health conservation program led to significantly decreased FBS ($p<0.01$), TC ($p<0.01$), TG ($p=0.04$), SBP ($p=0.03$), waist ($p<0.01$) and symptoms of depression ($p=0.01$), and significantly increased social support ($p=0.02$). These results indicated that the health conservation program is effective at increasing social support and decreasing FBS, TC, TG, SBP, waist, and symptoms of depression in community-dwelling vulnerable diabetic elderly; accordingly, health conservation programs should be applied to improve quality of life of vulnerable diabetic elderly.

요 약 본 연구의 목적은 지역사회 취약계층 당뇨병노인을 위한 건강보존프로그램을 개발하고 프로그램을 적용하여 그 효과를 검증하는 것이다. 건강보존프로그램은 전문직 은퇴노인이 멘토로서 취약계층 당뇨병노인 멘티에게 건강보존을 위한 프로그램을 제공하는 것이다. 본 연구는 유사실험연구로서 비동등성 대조군 전후 설계이며 대상자는 실험군 25명, 대조군 22명이다. 본 프로그램은 전문직 은퇴노인을 대상으로 4주, 12회기 건강보존에 관한 멘토 교육 프로그램과 8주, 24회기의 취약계층 당뇨병노인을 위한 멘토링 프로그램을 포함한다. 혈액학적 변수와 신체적 변수는 혈액검사와 Inbody 230(Biospace)를 활용하여 측정하였고 정신사회적 변수는 설문지를 통하여 측정하였다. 자료수집기간은 2015년 12월부터 2016년 5월까지이며 자료분석은 SPSS 20.0.를 사용하여 독립 t-test로 하였다. 건강보존프로그램을 통해 실험군이 대조군보다 공복시 혈당($p<0.01$), 총콜레스테롤($p<0.01$), 중성지방($p=0.04$), 수축기 혈압($p=0.03$), 허리둘레($p<0.01$)와 우울증상이 유의하게 감소되었고 사회적 지지는 유의하게 증가되었다. 본 연구의 결과는 건강보존프로그램이 취약계층 당뇨병노인의 사회적 지지를 효과적으로 증가시키며 공복시 혈당, 총콜레스테롤, 중성지방, 수축기 혈압, 허리둘레와 우울증상을 효과적으로 감소시키는 것을 알 수 있다. 그러므로 취약계층 당뇨병노인의 삶의 질 향상을 위해 건강보존프로그램을 활용할 것을 제언한다.

Keywords : Diabetes, Elderly, Fasting blood sugar, Mentors, Vulnerable

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1. Introduction

1.1 Necessity of the Research

With increasing elderly population in Korea, the number of vulnerable elderly increased rapidly. The proportion of the elderly among 1,550,000 recipients of national basic livelihood guarantees was 27.0% which was much higher than other age groups [1]. Also, the prevalence rate for diabetes mellitus among elderly population aged above 65 is up to 30%, portraying a severe health problem as the elderly population continues to rise [2].

The vulnerable class had a higher prevalence of diabetes compared to those with income level in upper 25%, and the practice rate of lifestyle changes for health promotion was comparably lower[3]. Among low-income diabetics, the number of patients whose diabetes had been controlled within the management goal was less than 50%, and the check-up rate of diabetic complications was lower than that of diabetics in the general population[4]. Therefore, health care for low-income diabetics is necessary. In addition, vulnerable elderly, who received the national basic livelihood guarantees and were categorized in the near-poverty group, were more likely to be exposed to health risk factors than the general elderly, and had less ability to cope with them, so physical and mental health were likely to deteriorate[4]. Also, vulnerable elderly women with diabetes regard diabetes as their own mistake or karma [5]. They depended only on pharmacotherapy, and lacked understanding of disease management. Furthermore, health behaviors for lifestyle changes and disease management, such as diet management and self-monitoring of blood sugar, were the obstacles to self-management due to economic problems [5-7].

Biochemical tests regularly checked by elderly diabetics had included fastingbloodsugar, glycated hemoglobin, total cholesterol, triglyceride, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol. Although biochemical indicators such as changes in blood sugar and lipid metabolism were important as a therapeutic index for diabetes, an approach to measure and improve behavioral indicators are needed as well. The treatment methods for most elderly diabetics were dependent on drugs, and drug dependence was higher than young adults and middle-aged people[8]. In addition to proper diet, regular exercise, regular blood sugar testing, medication and insulin administrations were needed for a long time, so self-management of diabetics was absolutely necessary[9].

The health problems of vulnerable elderly needed active prevention activities linked to the community and new strategies to manage their own health, rather than simple daily life maintenance and treatment-centered approach. The health problems of vulnerable elderly diabetics needed to be approached based on community resources rather than individual-centered community[5]. Also, it was necessary to develop interests and changes in the community to solve health problems, rather than relying on outside experts to solve health problems of vulnerable elderly. For self-management of vulnerable elderly diabetics, mentoring with the professionally retired elderly improved human resource development and productivity in the community through mutual benefits. It was necessary to train elderly health mentors because this enabled active communication among the community[9].

Most of the mentoring programs in Korea and abroad are developed for adolescents, and there are only few mentoring programs available for the elderly[10]. However, the elderly have a high need for mentoring, and they prefer the mentors of similar age and same gender. In the case of the elderly, it is possible to solve social and psychological distress such as depression through the similar age mentor, and it is especially effective to prevent the loneliness and alienation feeling of the elderly [11].

Mentoring is performed by an experienced mentor who acts as a friend, mentor, role model, guide,

adviser, and counselor in a continuing relationship to maximize the proper growth and development of less experienced mentee. Mentoring benefits mentees with skills related to career development, psychological stability, and role model, and the mentors also experience the learning and growth experienced by the mentees [12,13].

Until now, most of the diabetes care intervention programs have been conducted by experts who are researchers[14]. However, the purpose of this research is to examine the effect of the health conservation program provided by professionally retired elderly with the opportunity to use their accumulated experience and professional skills for social benefit.

1.2 Purpose

The purpose of this research was to examine the effects of the health conservation program in community-dwelling vulnerable diabetic elderly. Significant differences in biochemical variables, physical variables and psycho social variables were hypothesized between the experimental and control groups. We hypothesized that, in the experimental group with the health conservation program, biochemical variables(FBS, TC, TG), physical variables(SBP, DBP, waist, BMI, total weight without fat, muscle mass, body fat) and psycho social variables(depressive symptom, social support) would show greater improvement than the control group over time.

2. Methods

2.1 Research Design

The current study was a quasi-experimental design, using a pretest/posttest nonequivalent control group, to examine the effects of the Health Conservation program on community-dwelling vulnerable diabetic elderly.

2.2 Sample and setting

The subjects of this research were vulnerable elderly diabetics of 65 years old or older in D city who understood the purpose of the research and agreed with written consent to participate.

The selection criteria of the subjects are as of the following: the subjects were the recipient of national basic livelihood guarantees and were near poverty group that did not reach 120% of the minimum cost of living; have been diagnosed with diabetes type 2 by a doctor; scored 24 or less on Mini-Mental State Examination (MMSE-K); do not have a history of difficulty participating in exercise programs such as cerebral stroke, acute myocardial infarction, and malignant tumor treatment; and do not participate in other health-related programs.

The research sample size was calculated using G*power program, with a power of a test in 80%, a significance level of 0.05 and an effect size of 0.05[15]. A minimum of 27 people was required for each group, and the experimental group and the control group were selected as 30 people for each group in consideration of 10% dropout rate. In addition, data were collected from 25 people of the final experimental group and 22 people of the final control group.

The selection of the mentor was made through the announcement about the recruitment of mentoring program among professional retirees. Among the applicants who voluntarily participated, 7 people were selected after going through a mentor competency evaluation.

2.3 Intervention

The health mentoring program of this research was designed to utilize the health care of elderly diabetics in the vulnerable class and the community connection of the elderly who were professionally retired. Therefore, this program was developed and applied to solve the health problems of vulnerable elderly diabetics.

2.3.1 Mentor Education

Among the mentor applicants, seven people with highest mentor competency test scores were selected. The Mentor applicants were the elderly who were professionally retired, and they volunteered through the announcement about recruitment at the S Community Health Center in D city. The program was conducted 3 times a week for 4 weeks, totaling to 12 session, and ti was held on every Tuesday, Thursday and Friday from 10:00 to 10:50 in the program room on the second floor of the annex of the S Community Health Center.

In session 1, the purpose and operation method of this research was explained in detail, and the opening ceremony was performed with the introduction of mentors and researchers. In session 2, professional lectures of a pedagogics professor about attitudes of educators, educational goals and education methods were held. In session 3, mentors gave simulated demonstrations of what they learned about various teaching methods and how to use learning materials, and expert evaluation and feedback were also made. In session 4 through 6, the understanding of diabetes progressed with the outline of diabetes, the method of measuring blood sugar, and the pharmacotherapy. In session 7 through 8, the necessity of the meal therapy and the practical work of the diet planning were carried out to learn about the diabetic diet. In session 9 through 11, the necessity of exercise therapy and the practical work of exercise were carried out to learn about the diabetic exercise. In session 12, the mentor's simulated demonstration and completion ceremony were held.

2.3.2 Mentoring program

Thirty elderly diabetics, who were registered in the B Community Welfare Center in D City, were selected as the mentee in vulnerable class. The program was conducted 3 times a week for 8 weeks, totaling to 24 sessions, and it was held on every Tuesday, Thursday and Friday from 10:00 to 10:50 in children's library on the first basement level of the B Community Welfare Center. The mentoring program was conducted with mentor's lectures, group discussions, mentor's demonstrations and mentee's practice.

In session 1, the mentoring program guidance and the opening ceremony were held. In session 2, an appropriate understanding of diabetes progressed with the symptoms and diagnoses of diabetes. In session 3, it involved diabetes blood sugar self-monitoring. In session 4 through 6, it involved the management of diabetic complications. In session 7 through 8, it was proceeded with the diabetic diet. In session 9, it involved pharmacotherapy. In session 10 through 11, it involved exercise therapy. In session 12, it was conducted on the use of community resources. In session 13 through 23, exercise therapy consisted of warm-up, main exercise, and cool-down. In session 24, the completion ceremony and the sharing of feelings undertaken.

2.4 Measurement

2.4.1 Biochemical Variables

The subject's blood test was performed after fasting more than 12 hours after the previous dinner, and was measured with a drop of blood (32μL) using a Cholesterol Meter(Accutrend Plus) in the capillary blood vessel of the finger. The reason why it took from 12 seconds to 3 minutes was as follows: 12 seconds on fasting blood sugar(FBS), 3 minutes on total cholesterol(TC), and 3 minutes on triglyceride. The instrument recognized the condition of the test paper, and measured it by the code test paper method.

2.4.2 Physical Variables

Body composition analysis including body fat mass, muscle mass, and lean body mass was measured by using Inbody 230(Biospace, Korea) which utilizes the bio-electrical impedance.

The waist circumference was measured using a tape measure in the upright posture at the midpoint between the lowest rib and the pelvic iliac crest. The hip

circumference measured the widest part of the hip circumference. According to the Asia-Pacific standards, men over 90cm and women over 85cm were classified as obese[16]. The waist-hip ratio was calculated as the ratio between the waist and hip circumference.

Blood pressure was measured using an automatic blood pressure monitor(CH-452, Japan). First, the subjects stabilized for at least 10 minutes in sitting or lying position on a chair. In addition, the upper arm was set at the same height as the heart. Finally, blood pressure was measured after placing the lower part of the blood pressure cuff around the upper arm so as to be positioned 2cm above the brachial artery palpation site. The mean value of blood pressure was obtained by measuring twice at intervals of 5 minutes.

Body mass index(kg/m2) was calculated by the formula defined by WHO[16]. According to Asia-Pacific standards, it was classified as underweight (BMI<18.5 kg/m2), normal (18.5 kg/m2≤BMI<23 kg/m2), overweight (23 kg/m2≤BMI<25 kg/m2), and obese (BMI≥ 25 kg/m2).

2.4.3 Psychosocial Variables

Depressive Symptoms was developed by Kee[17] in Geriatric Depress Scale Short Korea Version (GDSSF-K). GDSSF-K consisted of a 15-item dichotomous scale (1=Yes, 0=No) with a total score ranging from 0 to 15. The higher the scores, the more severe the depression was. The scores were classified as 4 or less as normal, 5 to 9 as mild depression, and 10 to 15 as severe depression. At the time of development, 'Cronbach`s α' was .83. In this research, 'Cronbach`s α' was .76.

Social support was provided by Lim et al[18]. in Medical Outcome Study Social Support Survey (MOS-SSS) which was developed by Sherbourne and Steward[19].

This tool consisted of 19 items such as emotional, informational, material, affectionate, and positive interactions. It was a 5-point scale from 'not at all (1 point)' to 'always (5 points)' and the score ranged from 19 to 95. The higher the scores, the higher level of social support.

At the time of development, 'Cronbach's α' was .97. In this research, 'Cronbach's α' was .88.

2.5 Analytic strategy

SPSS version 20.0 for Windows was used for data analysis(SPSS, Inc., an IBM Company, Chicago, IL, USA).

The general characteristics of the subjects were analyzed by actual numbers and percentages. Biochemical indicators, physical indicators, depressive symptoms, and social support scores were analyzed by mean and standard deviation.

Chi-square test and Fisher's exact test were used to test for homogeneity between the two groups.

Hypothesis testing was performed using Independent t-testing.

2.6 Ethical Considerations

This study was approved by the Institutional Review Board (CUIRB-2015-0055L) through the university's biomedical research ethics committee, and complied with the guidelines of the committee. We explained to the subjects, before collecting any data, the purpose and goals of the research, and the fact that the subjects could withdraw their participation at any time. Moreover, we have acquired their written consent that the collected data shall be used only for research purposes, and the fact that the research guarantees the participants' anonymity and autonomy. After the experiment, the control group also received the diabetes education materials provided to the experimental group.

3. Results

3.1 Homogeneity test between two groups

Table 1 shows the homogeneity test of general characteristics; community-dwelling vulnerable diabetic

elderly participanted in this study. There were 25 participants in the experimental group and 22 participants in the control group. The mean age of community-dwelling vulnerable diabetic elderly was 75.44 years(SD=5.65) for the experimental group and 73.59 years(SD=4.56) for the control group. Although 92.0% of the experimental group and 100.0% of the control group were females, gender difference was not significant between the two groups(p>.05). 68.0% of participants in the experimental group and 77.3% of participants in the control group had religions. 56.0% of participants in the experimental group and 63.6% of participants in the control group had graduated college. And 48.0% of participants in the experimental group and 54.6% of participants in the control group lived alone. There were no significant differences in general characteristics between the two groups.

3.2 Effects of Health Conservation Program

An independent t-test of mean difference(post-test score minus pretest score) showed that the Health Conservation program had significant effects on biochemical variables (FBS(t=-4.13, p<.001), TC(t=-4.75, p<.001), TG(t=-2.19, p=.040)), physical variables(SBP (t=-2.26, p=.030), waist(t=-3.78, p<.001)), psychosocial variables(depressive symptoms(t=-2.88, p=.010), social support(t=2.43, p=.020)) in the experimental group.

Table 1. Homogeneity test between two groups

(N=47)

Characteristics		Exp. (n=25) n(%) or M±SD	Con. (n=22) n(%) or M±SD	χ^2/t	p
Gender	Male	2(8.0)	0(0.0)	1.84*	.278
	Female	23(92.0)	22(100.0)		
Age(yrs.)	65～74	12(48.0)	12(54.5)	0.20	.438
	≥75	13(52.0)	10(45.5)		
	Mean age	75.44±5.65	73.59±4.56	1.22	.228
Religion	Have	17(68.0)	17(77.3)	0.50	.353
	Have not	8(32.0)	5(22.7)		
Education	≤High school	11(44.0)	8(36.4)	0.66	.720
	≥College	14(56.0)	14(63.6)		
Living arrangement	With spouse	13(52.0)	10(45.5)	0.20	.905
	Alone	12(48.0)	12(54.6)		

Exp=experimental group; Con=control group; *Fisher's exact test

However, there were no significant differences on physical variables(DBP(t=-0.81, p=.420), BMI(t=-1.42, p=.170), Total weight without fat(t=-1.07, p=.290), muscle mass(t=-1.14, p=.260), body fat(t=1.18, p=.250)) between the two groups (Table 2). Further examination of the group score discovered positive changes in the experimental group.

Table 2. Effects of health conservation program

(N=47)

Variable		Group	Pre test Mean±SD	Post test Mean±SD	Diff. Mean±SD	t (p)
Biochemical Variables	FBS	Exp.	159.00±32.85	136.40±19.96	-22.60±25.50	-4.13 (<.001)
		Con.	145.64±17.57	145.96±15.82	0.32±10.30	
	TC	Exp.	225.28±38.17	187.52±23.21	-37.76±39.66	-4.75 (<.001)
		Con.	228.68±34.31	243.82±27.06	15.14±36.21	
	TG	Exp.	220.28±70.97	180.44±55.31	-39.84±80.98	-2.19 (.040)
		Con.	213.32±38.58	212.27±26.97	-1.05±34.15	
Physical Variables	SBP	Exp.	146.44±2.73	140.20±2.58	-6.24±9.87	-2.26 (.030)
		Con.	142.77±2.91	142.96±2.75	-0.18±9.59	
	DBP	Exp.	80.56±1.90	79.44±1.79	-1.12±9.81	-0.81 (.420)
		Con.	74.41±2.03	75.09±1.91	0.68±4.94	
	Waist (cm)	Exp.	91.20±1.52	89.04±1.46	-2.16±1.97	-3.78 (<.001)
		Con.	91.36±1.62	92.00±1.56	0.63±3.05	
	BMI (kg/m2)	Exp.	25.64±3.99	25.37±4.26	-0.83±1.20	-1.42 (.170)
		Con.	24.06±2.33	24.19±3.56	0.12±2.96	
	Total weight without fat (kg)	Exp.	40.35±1.21	39.39±1.11	-0.96±4.18	-1.07 (.290)
		Con.	38.05±1.29	38.37±1.19	0.31±3.98	
	Muscle mass (kg)	Exp.	21.72±0.71	21.11±0.67	-0.61±2.40	-1.14 (.260)
		Con.	20.34±0.76	20.53±0.71	0.19±2.38	
	Body fat (kg)	Exp.	20.72±1.14	20.37±1.30	-0.34±2.59	1.18 (.250)
		Con.	19.58±1.22	18.0±1.39	-1.55±4.14	
Psychosocial Variables	Depressive symptom	Exp.	8.60±2.26	6.84±1.65	-1.76±2.39	-2.88 (.010)
		Con.	8.27±1.58	8.14±1.21	-0.23±1.11	
	Social support	Exp.	61.48±17.62	66.16±15.85	4.68±12.18	2.43 (.020)
		Con.	62.50±10.58	60.41±6.73	-2.09±6.30	

Exp=experimental group; Con=control group; FBS=fasting blood sugar; TC=total cholesterol; TG=triglyceride; SBP=systolic blood pressure; DBP=diastolic blood pressure. Diff=Mean difference.

4. Discussion

This research attempted to develop the Health Conservation program for vulnerable elderly diabetics, and to test the program's effectiveness on biochemical variables, physical variables and psychosocial variables.

The Health Conservation program educated the

retired elderly through Health Conservation connections, unlike programs that had been conducted by existing experts for vulnerable elderly diabetics[14]. Therefore, a bond of sympathy was formed through the mentors of similar age, and psychological support and proper health behavior were maintained and strengthened. The variables that differed statistically from the control group after applying the Health Conservation program were the FBS, TC and TG of the biochemical variables, the waist circumference and blood pressure of the physical variables, and depression symptoms and social support of the psychosocial variables.

The purpose of the treatment of diabetes in the elderly is to prevent the complications such as atherosclerosis, neuropathy and retinopathy by maintaining optimal blood sugar level through drug treatment[20]. However, recent studies have reported that cardiovascular disease mortality is not reduced by thorough blood sugar control and lowering glycated hemoglobin[21]. Besides blood sugar control near normal range, the risk of cardiovascular disease in diabetics is caused by multiple causes such as high blood pressure, total cholesterol in the blood vessels, and triglycerides[14]. Therefore, it is necessary to apply a program that integrally considers biochemical variables, physical variables and psychosocial variables.

In the Health Conservation program of this research, there were statically significant differences in FBS, TC and TG of the biochemical variables, and waist circumference and blood pressure of the physical variables. Abdominal obesity, caused by an increase in waist circumference, increases the synthesis of triglycerides such as leptin and resistin in visceral fat, causes atherosclerotic changes, and secretes substances that cause decreased insulin sensitivity. As a result, metabolic syndromes such as blood pressure and triglyceridemia are known to affects clinical characteristics[22]. Therefore, active management for the improvement of abdominal obesity not only affects abdominal obesity but also positively affects hypertriglyceridemia, hypertension, high-density lipoprotein cholesterol reduction, and blood sugar disorder, and may have affected the results of this program[23].

The management status for low-income diabetics who received community-based home visiting health service was examined in the research[4]. Only 7.8% of the respondents said that they had received a glycated hemoglobin test within the last year. Compared with the 24.0% reported by the US Healthy People-Diabetes[24], it showed an extremely low test rate. Also, only 8.1% of the respondents said that they received a foot test within the last year. Compared with the 55.0% reported by the US Healthy People-Diabetes[24], this was a low test rate. In the questionnaire about self-monitoring of blood sugar, only 18.9% of the respondents answered that they performed blood sugar measurement periodically using blood sugar self-monitoring device. In this study, 90.7% of the respondents were near poverty group, and 83.8% of the respondents who were the recipients of national basic livelihood guarantees, answered that they had never received the glycated hemoglobin test or did not know about the glycated hemoglobin test[4].

In addition, price burden of drugs for the diabetic management of elderly diabetics, cost burden for measuring blood sugar level, and burden of cost and effort due to dietary therapy were found to be the obstacles to self-management[5,7]. Diabetes required sufficient knowledge of diabetics to implement self-care effectively, and it was necessary to apply active and effective education methods as knowledge acquisition method for disease management[25]. According to the recent American Diabetes Association (ADA) guidelines for the treatment of diabetes in the elderly, it was stated that the treatment of elderly diabetes should be individualized according to the patient characteristics[26]. In addition to drug therapy, continuous self-management was necessary to prevent diabetic complications. Self-management of diabetes required indispensable management of individual daily activities such as diet, exercise and weight control[25,

27].

Therefore, this study considered the characteristics of elderly diabetics, and linked the mentor and the mentee. Diabetes understanding education, dietary education, and exercise training were conducted using peer mentoring education methods through continuous sympathy. As a result, changes of biochemical variables such as FBS, TC and TG, and physical variables such as waist circumference and blood pressure appeared.

However, there were no changes in physical variables such as body fat mass, muscle mass, lean body mass and body mass index. The effective period was somewhat short at 8 weeks, and had no significant effect on some of the physical variables. In NCEP-ATP Ⅲ, a mediation period of 6 months or longer, and repeating the research by increasing the research period were recommended to reduce the TC and TG.

The mentoring program enabled the elderly to understand the symptoms they were experiencing. The emotional support was achieved from mentor and mentee. It was perceived as effective in educational and psychosocial interventions in that emotional support could be gained by feeling sympathy between mentor and mentee. Recently, this program attracted attention in medical institutions[28]. In particular, the elderly had a desire to depend on whom to reduce the feelings of loneliness and isolation. Social support was more meaningful for vulnerable elderly women than general elderly[29, 30]. Lifestyle habits that affect disease had been improved through the formation of social relations and mutual encouragement to replace the support of spouses and families[11].

The Health Conservation program linked the professionally retired elderly and the elderly diabetics in vulnerable class as a relationship between mentors and mentees. The participants were able to socialize happily by supporting the emotions and psychological state that other people could not feel. It also provided information on the activities and helped the participants to participate and perform voluntarily. It was a strategy that helped participants to recognize their situation accurately and to accept their situation as it is. In addition, information and management plan for diabetes were provided to improve social support.

The relationship between improvement of depressive symptoms and social support could not be excluded. As the size, contact frequency, and range of the structural aspects of social relation networks increased, the depression of the elderly women was reported to decrease[31]. In order to improve the depressive symptoms and health level of vulnerable elderly women, the absence of family or relatives should not be established as social isolation, and should be replaced with neighbors and local communities[5]. For this, the Health Conservation program served as an effective social support.

After applying the Health Conservation program, it was found that there was a significant improvement in the symptoms of depression. The factors, affecting the depressive symptoms of the elderly, included the number of accompanying diseases[32], physical factors such as means of daily life[33], psychological factors such as cognitive function[34], and social factors such as family support[35] and participation in social activities[32]. Exercise programs to relieve depressive symptoms included complex exercise programs[36] and regular walking exercise programs[37]. The mentee-mentor program of this research produced positive changes in biochemical and physical indicators due to diabetes. In addition, social support and exercise programs had an impact on improving depressive symptoms.

The effects of the Health Conservation program using the elderly who were professionally retired, changed the biochemical indicators of elderly diabetics such as FBS, TC and TG, and improved physical health such as waist circumference and blood pressure. Also, the program confirmed the effectiveness of social and mental health activities by reducing depression symptoms through social support.

Therefore, the Health Conservation program could

be applied to the vulnerable elderly diabetics, so that positive changes in health behavior could be expected. It was meaningful that social integration, communication and re-cultivating talented individuals were accomplished by reflecting the characteristics of mentees who were in the vulnerable class and the characteristics of mentors who were elderly who were professionally retired.

The limitations of this study were that health education program and exercise program were applied together, so it did not directly explain the causal relationship between what factors of the program had an impact on the outcome variables.

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