A Study on Efficacy of Empowerment Training among Diabetes Patients

Hsiangchi Wu [1], Sooneng Tan[2*], Chinghui Yeh[3], Szuming Wu [4]

1,2 Department of Kinesiology, Health, and Leisure Studies, National University of Kaohsiung, 3 Department of Business Management, National Sun Yat-sen University,4Department of Mechanical Engineering, Cheng Shiu University. *corresponding author: Tan, Soon-Eng. E-mail: wu533833@gmail.com

ABSTRACT: OBJECTIVES — The main purpose of this research is to evaluate the effectiveness of the treatment for diabetic patients by empowerment intervention [1]. RESEARCH DESIGN AND METHODS —The research sample enrolls 30 patients with type 2 diabetes from one family medicine outpatient department of regional teaching hospitals in south Taiwan. The subjects are randomly assigned into experimental group and control group. Data is collected from July 2010 to December 2010 (7~12) and the effectiveness is re-evaluated three months later [2]. The intervention model is based on empowerment theory and application of diabetes self-management. The intervention of empowerment program which contains major six components: 1. self-management support 2.clinical information systems 3.delivery system design 4.decision support 5.health care organization 6.to make use of community resources. Data collection includes patient's demographic information, physical examination, serum relevant biochemical parameters, and life quality [3]. RESULTS — After completing such a program, experimental group shows significant improvement than that of the controlled group in the score of life quality (The 36-Item Short Form Health Survey ,SF-36) , and serum relevant biochemical parameters including glycated hemoglobin, cholesterol, and uric acid ($p<0.05$) [4]. CONCLUSIONS — Application of empowerment, intervention of empowerment by medical professional team and program would improve the treatment outcome of diabetes mellitus, life quality in diabetic patient and significantly improving the ability of self - management [5].

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1. Introduction

Diabetes is a chronic disease that changes the way that the body used glucose for energy and leads to lower health-related quality of life. It is associated with an impaired glucose cycle, unstable blood glucose concentration, altering metabolism, and glucose metabolic cycle. Treatment goals for type 2 diabetic patients are related to effective control of blood glucose, blood pressure ,body weight ,uric acid level [6] and lipids to minimize the risk of long-term consequences and complications associated with diabetes. Management of this disease may include carefully managing diet, exercising, body weight control, taking oral diabetes medication, using some form of insulin, maintaining proper circulation in extremities and may be further complicated by other external factors such as stress, trauma, poor healing wound, and other physiological factor unique to individual patients.

Well serum glucose level control and keeping health is particularly important for anyone with diabetes.In spite of the great strides that have been made in the treatment of diabetes in recent years, many patients do not achieve optimal outcomes and still experience unresolved complications that result in a decreased length and quality of life. The medical professional team wants to give the best recommended level of diabetes care within the present status. Because our health care system is designed to deliver acute, symptom-driven care, it is poorly configured to effectively treat chronic diseases such as diabetes that require the development of a collaborative daily self-management plan. Traditionally, the success of patients to manage their diabetes has been judged by their ability to adhere to a prescribed therapeutic regimen [7].

A great deal of effort has been spent in developing methods for measuring compliance and techniques and strategies to promote adherence. The multiple daily self-care decisions that diabetes requires mean that being adherent to a predetermined care program is generally not adequate over the course of a person's life with diabetes and let patient having the self – care ability to creat tailored by empowerment may be a good idea. Patients wound be able to set goals and make frequent daily decisions .The self-management style is effective and fit their philosophy, values and lifestyles, while taking into account multiple physiological and personal psychosocial factors. To manage diabetes successfully, intervention strategies that enable patients to make decisions about goals, therapeutic options, and self-care behaviors and to assume responsibility for daily diabetes care are effective in helping patients care for themselves. [8]

This is particularly true when the self-management plan has been designed to fit patients' clinical diabetic condition, but has not been tailored to fit their priorities, control goals, wealth, staple food, resources, racial culture, and lifestyle[9].The control goals are suggested in clinical practice guidelines released by various national and international diabetes agencies. The targets are:

- Hb_{A1c} of 6% to 7.0%
- Preprandial blood glucose: 4.0 to 6.0 mmol/L (72 to 108 mg/dl)
- 2-hour postprandial blood glucose: 5.0 to 8.0 mmol/L (90 to 144 mg/dl) [10].

2. Materials and methods

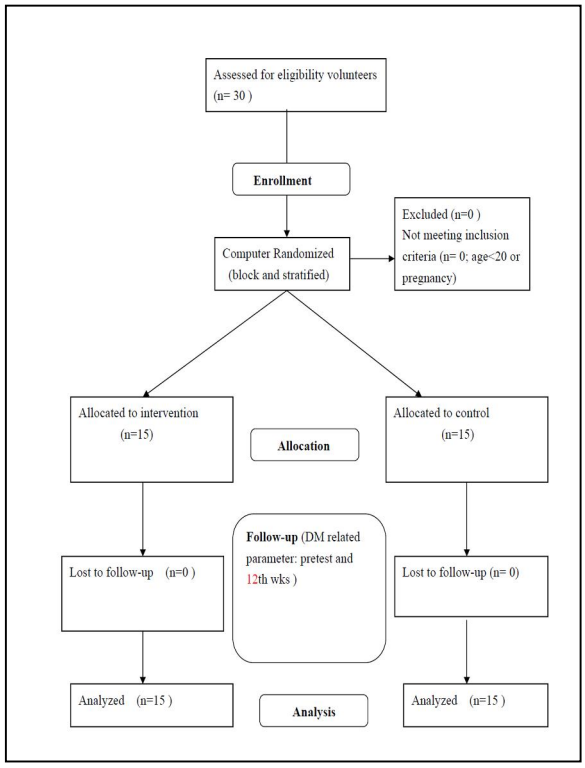

Figure 1: Flow diagram. The study team collected 30 patients with type II Diabetes by Quasi-Experimental design in Family Medicine clinic of a Regional Teaching Hospital. Random assignment is aused for assigning subjects to different treatments and no treatment.

In older patients, clinical practice guidelines by the American Geriatrics Society states for frail older adults, persons with life expectancy of less than 5 years, and others in whom the risks of intensive glycemic control appear to outweigh the benefits, a less stringent target such as Hb_{A1c} of 8% is appropriate. The HbA1c data is the ratio of glycated hemoglobin in relation to the total hemoglobin. Persistent raised plasma glucose levels cause the proportion of glycated hemoglobin to go up. The diabetic control of glycated hemoglobin over a period originally thought to be about 3 months (the average red blood cell lifetime). In the non-diabetic, the HbA1C level ranges from 4.0-6.0%; patients with diabetes mellitus who manage to keep their HbA1C level below 6.5% are considered to have good glycemic control. [11].

The study team collected 30 patients with type II Diabetes by Quasi-Experimental design in Family Medicine clinic of a Regional Teaching Hospital. Random assignment is aused for assigning subjects to different treatments and no treatment. The thinking behind random assignment is that by randomizing treatment assignment, then the group attributes for the different treatments will be roughly equivalent and therefore any effect observed between treat groups can be linked to the treatment effect and is not a characteristic of the individuals in the group.(figure1)

Participants are randomly assigned in additional treatment of empowerment of 30 minutes every 4 weeks for totally 12 weeks in experimental group by medical staff. The subjects in control group received usual care of clinical treatment program at the outpatient department for 12 weeks [12].

The empowerment intervation includes six major parts: 1. self-management support. 2. clinical information systems. 3 delivery system design. 4. decision support. 5. health care organization. 6. community resources.

The research members collect all references and guideline to design including six fundamental aspects of chronic illness care: self-management support、clinical information systems、decision support、health care organization、and community resources. Every two weeks, we give the patients of experimental groups a topic of empowerment intervention and recheck the life quality, glucose level, and etc

There seems to be no significant difference in age, sex, height, body weight, BMI (body mass index), education level, rate of hypertension, rate of smoking, rate of drinking, history and frequency of exercise, serum relevant biochemical parameters, liver function , and etc (table. 1).

The personal characteristic questionnaire includes information about persons participated in the study as follows: age, gender, height, weight, frequency of taking exercise habit, education level, medical and illness history , coping strategies, attitudes in diabetes, and knowledge about diabetes [13]. The 36-Item Short Form Health Survey (SF-36) [14] is used to elevate the life quality of diabetic patients. The SF-36 is shown to have good internal consistency, stability, and concurrent validity. The research team consults the specialists of the 36-Item Short Form

Health Survey (SF-36) in order to get the using permit [15].

The 36-Item Short Form Health Survey Questionnaires [16] are sent to patients family members in the first week and the end of empowerment course. SPSS version 12.0 (SPSS Inc, Chicago, IL, USA) is used to analyze the data. (table2).

3. Results

Post empowerment, the experimental group have improve data with significance including: HbA1c, cholesterol, uric acid level, life quality ($p<0.05$). The control group has elevated glucose level with significant change post 12 weeks follow.

Paired- Samples t test was took to examine the pre-test and post-test serum biochemical parameters and it showed improvement with significance on post-test for the intervention group [17].In within-group comparisons, the subjects in the experimental group, statistically significant improvement was observed in the glycated hemoglobin, cholesterol, and uric acid , and the SF36 scores ($p<0.05$).

There was no significant difference in other items included preprandial glucose、renal function (Creatinine) 、liver function(GPT) 、Triglyceride [18].(table3).

Table 1: The major basic characteristics of the recruits the study team use

Basic data	Experimental group	Control group	p-value
age	65.13(14.56)	57.07(12.80)	0.12(NS)
Sex(female)	40%	40%	1.00(NS)
Body weight	73.69(12.87)	72.35(12.68)	0.78(NS)
BMI	27.07(3.68)	27.55(3.78)	0.73(NS)
Glucose(preprandil)	162.60(34.58)	169.93(57.59)	0.68(NS)
HbA1c	7.41(1.11)	7.70(1.84)	0.60(NS)
cholesterol	194.33(50.87)	191.07(38.40)	0.84(NS)
TG	158.20(77.87)	217.40(156.86)	0.20(NS)
Uric acid	5.52(1.19)	6.52(1.20)	0.03*
Creatinine	0.89(0.23)	0.84(0.20)	0.51(NS)
GPT	30.4(17.44)	29.2(19.91)	0.86(NS)
Hypertension	13.3%	13.3%	1.00(NS)
Hyperlipidemia	26.7%	26.7%	1.00(NS)
Without habit of smoking	93.3%	80.0%	0.60(NS)
Without habit of drinking	86.7%	86.7%	1.00
Without habit of taking Semen Arecae	93.3%	100%	1.00
Without habit of taking fruits and vegetable	20%	26.7%	1.00
Without regular exercise	6.7%	6.7%	1.00
36-Item Short Form Health Survey (SF-36)	56.4(7.03)	58.0(7.21)	0.543

Table 2: Basic data and analysis of serum relevant

Basic data and analysis of serum relevant biochemical parameters	Average	Standard Deviation
Age	61.10 y/o	14.08
Body weight	73.02 kg	12.58
BMI	27.31	3.67
Glucose level(before)	166.27 mg/dl	46.82 mg/dl
Glucose level(after)	172.27 mg/dl	65.59 mg/dl
HbA1c(before)	7.55%	1.50%
HbA1c(after)	7.08%	1.37%
Uric acid(before)	6.02 mg/dl	1.28 mg/dl
Uric acid(after)	5.67 mg/dl	1.37 mg/dl
cholesterol(before)	192.7 mg/dl	44.32 mg/dl
cholesterol(after)	182.8 mg/dl	51.59 mg/dl
Triglycerides (before)	187.8 mg/dl	125.35 mg/dl
Triglycerides (after)	218.33 mg/dl	225.79 mg/dl
GPT(before)	29.8IU/L	18.4 IU/L
GPT(after)	29.07 IU/L	14.85 IU/L
Creatinine (before)	0.87 mg/dl	0.22 mg/dl
Creatinine (after)	1.16 mg/dl	1.68 mg/dl
Life quality	57.2 mg/dl	7.04 mg/dl
Life quality(after)	78.2 mg/dl	18.0 mg/dl

HbA1C=glycosylated hemoglobin ,GPT= Glutamic Oxaloacetic Transaminase

Table 3: Serum biochemical parameters of treatment conditions compared to non-intervention conditions

	Before intervention	Post intervention	p-value
	Average (Standard Deviation)	Average (Standard Deviation)	
	N1=15,N2=15	N1=15,N2=15	
Glucose 1	162.60(34.58)	151.73(72.13)	0.570
Glucose 2	169.93(57.59)	192.8(52.96)	0.012*
HAb1C 1	7.41(1.11)	6.53(0.89)	0.014*
HAb1C 2	7.70(1.84)	7.63(1.56)	0.836
Cholesterol 1	194.33(50.87)	166.80(38.63)	0.004**
Cholesterol 2	191.07(38.40)	198.80(59.50)	0.487
TG1	158.20(77.87)	160.67(71.42)	0.908
TG2	217.40(156.86)	276.00(305.59)	0.301
Uric acid 1	5.52(1.19)	4.90(1.10)	0.030*
Uric acid 2	6.52(1.20)	6.43(1.20)	0.608
Cr1	0.89(0.23)	1.44(2.37)	0.365
Cr2	0.84(0.20)	0.89(0.24)	0.131
GPT1	30.4(17.44)	27(14.40)	0.222
GPT2	29.2(19.91)	31.1(15.50)	0.699
Live Quality (SF-36 score)1	58.0(7.21)	91.13(15.55)	0.000**
Live Quality (SF-36 score)2	56.4(7.03)	65.27(8.45)	0.001**

Note: 1 = experimental group , 2 = control group. HbA1C=glycosylated hemoglobin ,TG=Triglyceride, Cr=Creatinine ,GPT= Glutamic Oxaloacetic Transaminase. *$p<0.05$; ** $p<0.05$

5. Discussion

There are many limitations in our study. First, total number of patients is only 30 persons, there is a recommendation for future researches to get more patients joining the related research. The second limitation relates to the focus on empowerment models and there is a lack of principles and guidelines to carry out the method procedure [19].

In the past, patient education was generally prescriptive and therapeutic goals were set by medical professionals without discrimination .Most health professional training is based on a medical model designed to treat acute health care problems and relatively ignores chronic diseases management and health management ability for long time.

In empowerment model, the patients are the authority responsible for the treatment programs, self-health management, and the treatment outcomes. As chronic illnesses become more prevalent, and lead in high medical costs .Perhaps this health care model of empowerment model can be extended to most chronic disease patients as well. This approach is based on the belief that patients have an obligation to follow the direction of themselves and that the benefits of compliance outweigh the impact of these recommendations on patient quality of life [20].

Education is designed to promote compliance or adherence using motivational and behavioral strategies in an effort to get patients to have the ability of creating health style. The model was effective in diabetes care about patient compliance cause of diabetes related management program. A new approach of think outside the box was needed that recognized that patients are in control of and responsible for the daily self-management of diabetes and that, to succeed, a self-management plan had to fit patients' goals, priorities, and lifestyle as well as their diabetes.

This approach is based on six fundamental aspects of chronic illness care six major: self-management 、support 、self-management support 、clinical information systems 、delivery system design 、decision support 、health care organization 、community resources.

The choices that patients make each day as they care for diabetes have a greater impact on their outcomes than those made by their doctors. In addition, patients are in charge of their self health-management behaviors and implement because the care programs are made by theirselves.

Finally, because the implications, complications, and consequences for these decisions accrue directly to patients, they have both the right and the responsibility to manage diabetes in the way that is best suited to the context and culture of their lives [21].

6. Conclusion

The study puts efforts and concern on the research and techniques in empowerment interventions which help diabetic patients deal with self health care. Post empowerment intervention, the related data including life quality and serum biomarkers of experimental patients is significant improved ($p<0.05$). The clinical physicians would take empowerment into consideration about the diabetic treatment program cause the research result. Application of empowerment, intervention of empowerment by medical professional team would improve life quality in diabetic patient and management [22]. The Diabetes empowerment Process has satisfactory treatment outcome for diabetic patients. Further studies are needed to test applicability of the empowerment to other populations [23].

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References:

1. Anderson RM, Funnell MM, Butler PM, Arnold MS, Feste CC: Patient empowerment: results of a randomized controlled trial. Diabetes Care18: 943-949,1995
2. Arnold MS, Butler PM, Anderson RM, Funnell MM, Feste CC: Guidelines for facilitating a patient empowerment program. Diabetes Educ21: 308-312,1995
3. Anderson RM, Funnell MM, Nwankwo R, Gillard ML, Fitzgerald JT, Oh M: Evaluation of a problem-based, culturally specific, patient education program for African Americans with diabetes (Abstract). Diabetes50 (Suppl. 2): A195, 2001.
4. Norris SL, Engelgau MM, Naranyan KMV: Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trails. Diabetes Care 24:561 -587, 2001
5. Norris SL, Lau J, Smith SJ, Schmid CH, Engelgau MM: Self-management education for adults with type 2 diabetes: a meta-analysis on the effect on glycemic control. Diabetes Care 25:1159 -1171, 2002
6. Brown SA: Interventions to promote diabetes self-management: state of the science. Diabetes Educ 25 (Suppl.):52 -61, 1999
8. Skovlund SE, Peyrot M: on behalf of the DAWN International Advisory Panel. The Diabetes Attitudes Wishes and Needs (DAWN) program: a new approach to improving outcomes of diabetes care.Diabetes Spectrum 2005; 3: 136-41.

9. Weiss MA, Funnell MM. The Little Diabetes Book YOU Need to Read. Running Press. Philadelphia, 2007: 32-43.
10. Piette JD, Glasgow RE: Education and self-monitoring of blood glucose. In Evidence-Based Diabetes Care. Gerstein HC, Haynes RB, Eds. Ontario, Canada, B.C. Decker, 2001, p.207 -251
11. Funnell MM, Anderson RM, Arnold MS, et al. Empowerment: an idea whose time has come in diabetes education.Diabetes Educ 1991; 1: 37-41.
12. Polonsky WH: Listening to our patients' concerns: understanding and addressing diabetes-specific emotional distress. Diabetes Spectrum 9: 8-11, 1996.
13. Diabetes Attitude Scale (DAS-3). Michigan Diabetes Research and Training Center. Available from: URL: http://www.med.umich.edu/mdrtc/survey/request.htm
14. Teaching Letters prepared by Diabetes Education Study Group(DESG) of the European Association for the Study of Diabetes(EASD) Number 27: Physical Activity and Diabetes. Available from: URL: http://www.desg.org
15. Teaching Letters prepared by Diabetes Education Study Group(DESG) of the European Association for the Study of Diabetes(EASD) Number 3: Self-monitoring. Available from: URL: http://www.desg.org
16. Levinson W, Gorawara-Bhat R, Lamb J: A study of patient clues and physician responses in primary care and surgical settings. JAMA 284 : 1021-1027,2000
17. Tang TS, Gillard ML, Funnell MM, Nwankwo R, Parker E,Spurlock D. Developing a new generation of ongoing diabetes self-management support interventions. Diabetes Educ 2005; 31:91-7.
18. Cooper H, Booth K, Gill G. Using combined research methods for exploring diabetes patient education. Patient Educ Couns 2003; 51: 45-52.
19. Satman I, Yilmaz T, Sengul A, Salman S, Salman F, Uygur S.Population-based study of diabetes and risk characteristics in Turkey. Diabetes Care 2002; 25: 1551-6.
20. Weiss MA. Empowerment, a patient's perspective. Diabetes Spectrum 2006;2: 116-8.
21. Anderson RM, Funnell MM. The Art of Empowerment:Stories and Strategies for Diabetes Educators, 2nd ed. American Diabetes Association. Alexandria, 2005. 3.
22. Deneulin, Séverine, with Lila Shahani. 2009. An Introduction to the Human Development and Capability Approach: Freedom and Agency. Sterling, VA: Earthscan.
23. Potterfield, Thomas. "The Business of Employee Empowerment: Democracy and Ideaology in the Workplace." Quorum Books, 1999, p. 6.

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