MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING, MUEANG DISTRICT, ROI ET PROVINCE, THAILAND

Sura Suphomin*, Prathurng Hongsranagon and Piyalak Pakdeesamai

College of Public Health Sciences, Chulalongkorn University, Bangkok 10330, Thailand

ABSTRACT: The objective of this study was to 1) study the behavior differences between high risk toward diabetes type II patients who attended and who did not attend the 'Change in Health Behavior' Camping Program 2) study the effect of the interventions on physiological parameters (BMI and waist circumferences). It was a quasi-experimental research in nature. The sample groups in this research were those with high risk toward diabetes type II patients who had more than 6 scores. The sample groups were between 40-59 years of age, resided in Mueang district, Roi Et province. Voluntary method was used to recruit the sample groups from 2 Tambons. The experimental group consisted of 30 samples who were recruited to attend the mentioned camping program. On the other than, another 30 samples of the comparison group received only brochures, thus; a total of 60 samples was in compliance with the regulations. The results indicated that in the post- experiment, the mean of waist circumference, knowledge and health behaviors between the experimental and the comparison groups were different with statistical significance at the level of 0.05. Within the experimental group, the mean of waist circumference, body mass index (BMI), knowledge, and health behaviors were different both in the pre- and post-camping with statistical significance at the level of 0.05. On the other hand, the comparison group had the mean of knowledge during the pre- and post of the receipt of brochures with statistical significance at the level of 0.05. Consequently, the use of camping program on 'Change in Health Behavior' by applying the group process and empowerment of related activities while in the camping program are proper for health promotion behaviors as well as for the reduction of risk factors toward diabetes mellitus type II among general population and other high-risk groups. The success of the program through training, practice on obesity assessment , learning through group activity , skill building-up for menu arrangement for daily energy use, exercise training, delivery of commitment to health promotion – peer group promoting healthy behaviors among colleagues. With an application of the program, it can prove to be both beneficial and appropriate to the community in the reduction of risk factors toward diabetes mellitus whose illness which is a vital problem to Thailand.

Keywords: Behavioral change/ High risk/Diabetes type II patients/Camping, Roi Et province, Thailand

INTRODUCTION: Incidence of diabetes mellitus (DM) has been increasing constantly around the world[1]. In 2006, one hundred and eighty million people on earth were estimated to be diagnosed with DM and this estimation will be increased in two-fold which will be equivalent to a number of 366 million patients in 2031.[2] The incidence rate of type II DM in Thailand is rapidly growing as same as in other countries. There have several research papers on DM prevalence at many points of time by using different types of DM screening methods or DM examinations. However, there are still some limitations in considering for an occurrence of changes such as they should fast (no food and drink) for at least 8 hours before taking the test or the testing of sugar level in urine.[3] Upon comparing research evidences using similar methods, it was found that an incidence rate of DM is increasing, therefore; education on prevention of disease and health promotion toward DM protection is an urgent issue for Thailand. More critically, only half of those were aware of their DM status. This reflects that half of the patients were not yet examined to find out their DM status for proper treatment.[4] Currently, there is no medicine to cure DM, consequently; surveillance system and prevention of DM are still considered effective means for the issue. These

* To whom correspondence should be addressed.
Email: surasu@Hotmail.com Tel. 084-5184807

preventions can be in a form of diet control and exercise to reduce risks and intensity of disease occurrence and to delay an incidence of DM-related complications.[5] The incidence rate of type II DM in Mueang district, Roi Et Province and Roi Et Province are rapidly growing in Thailand. If the population does not change their lifestyles to promote their healthy behaviors, they might become patients with chronic disease in the future[6, 7]. The purpose of the current study was thus the model for behavioral change in high risk toward diabetes type II patients by camping, Mueang District, Roi Et province. The objective of this study was to 1) study the behavior differences between high risk toward diabetes type II patients who attended and who did not attend the 'Change in Health Behavior' Camping Program 2)study the effect of the interventions on physiological parameters (BMI and waist circumferences).

MATERIALS AND METHODS: The data form this study was collected in Mueang district, Roi Et province, through the selection of 2 from 15 sub-districts. Participants from Dong Lan sub-district were recruited to attend the camping program while another group of participants from Na Poe sub-district received only brochures. Research period was in December 2009 and research population was voluntarily participated in the study. The sample groups in this research were those with high risk toward diabetes type II patients who were selected from a registry list of those with high risk toward type II Diabetes Mellitus according to risk assessment who had more than 6 scores according to the criteria of Wichai Ekplakorn.[8] Sample size for this study was 30(*Formula*[9] $n / group = 2\sigma^2(Z_\alpha + Z_\beta)^2 / (\mu_1 - \mu_2)^2$

According to the research by Onprom S[10]. For the experimental group being recruited to attend the camping program on the "Change in Health Behavior" while and other 30 were for the comparison group who received only brochures, totaling 60 samples according to its regulations. Voluntary method was used to select the sample groups who were both male and female aged between 40 -59 years old, with body mass index (BMI) more than or equal to 25.0 to 29.9 kg. / m^2 for male and female. (considered as an obesity according to the guideline made by the Department of Health, Ministry of Public Health, Thailand)[11], and waist circumference was equal to or over 90 centimeters for male and 80 centimeters for female. Data was collected by a face – to - face interview through a structured questionnaire. Measurement of knowledge and behavior was conducted by using questionnaire (30 questions). For physiology assessment, a body check on weight, height, and waist circumference was used. For data analysis that was done through SPSS software version 17.0, several statistical tests, such as parametric (t – test) was used to find out the normal distribution. Additionally, the personal data of the sample group was analyzed to distribute frequency, percentage, mean, median, and standard deviation.

RESULTS: The study was on the behavior differences between high risk toward diabetes type II patients who attended and who did not attend the 'Change in Health Behavior' Camping Program. The result can be mainly discussed as follows: the distribution of general data between the two groups (the experimental and comparison groups) was similar (distribution test of range and inter quartile range). The majority of each group was female who finished their primary school, married, and earned their living as farmers/gardeners. An average age of the two groups was 50 years old with average household's monthly income at baht 5,000. On the other hand, the average household's monthly expense of the experimental and comparison groups were baht 5,000 and baht 4,000, respectively. For the aspect of physiology in both groups, the average BMI was 27 kg/m^2 and the waist circumference was 90 centimeters.

Table 1: Comparison on health behaviors in relation to knowledge in the pre- experiment between the experimental group and the comparison group

Knowledge	Experimental group (n=30)		Comparison group (n=30)		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diabetes Mellitus related Knowledge	7.36	1.49	6.03	1.99	2.932	0.050*
2.Diet	3.93	0.90	4.10	1.24	-0.594	0.555
3.Exercise	4.00	0.00	3.90	0.40	1.361	0.184
Total	15.30	1.87	14.03	2.84	2.034	0.046*

* Significance level of 0.05

Table 2: Comparison on health behaviors in relation to knowledge in the post-experiment between the experimental group and the comparison group

Knowledge	Experimental group (n=30)		Comparison Group (n=30)		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diabetes Mellitus related knowledge	9.36	1.09	7.23	1.85	5.429	<0.001*
2.Diet	4.76	0.56	4.00	1.08	3.434	0.001*
3.Exercise	4.73	0.58	4.60	0.85	0.706	0.483
Total	18.86	1.65	15.83	2.91	4.958	<0.001*

* Significance level of 0.05

Table 1-2 indicate that in pre- experiment the experimental group had more knowledge on Diabetes Mellitus than the comparison group and its difference in mean value is at statistical significance of the level of 0.05. However, in post-experiment the two groups had difference in mean value with the statistical significance at the level of 0.05 while there was no difference in mean value for the aspect of exercise.

Table 3: Comparison on health behaviors in relation to behavior in the pre- experiment between the experimental group and the comparison group

Behavior	Experiment group (n=30)		Comparison group (n=30)		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diet	11.23	2.19	11.86	1.92	-1.189	0.239
2.Exercise	10.53	2.54	10.43	2.58	0.151	0.880
Total	21.76	3.30	22.30	3.74	-0.585	0.561

Table 4: Comparison on health behaviors in relation to behavior in the post- experiment between the experimental group and the comparison group

Behavior	Experimental group (n=30)		Comparison group (n=30)		t	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diet	13.03	1.37	11.40	2.09	3.569	0.001*
2.Exercise	12.50	6.42	9.40	2.15	2.507	0.015*
Total	25.53	6.46	20.80	3.79	3.460	0.001*

* Significance level of 0.05

Table 3-4 indicate that in pre- experiment, the two groups had no difference in mean value. However, in post-experiment, the two groups had differences in mean value with statistical significance at the level of 0.05.

Table 5 : Comparison on health behaviors related to physiology in the experimental group in pre and post experiment

Physiology	Pre		Post		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.BMI	27.12	1.75	26.59	1.96	6.126	<0.001*
2.Waist circumference	90.26	7.80	87.46	7.72	8.146	<0.001*

* Significance level of 0.05

Table 6: Comparison on health behaviors related to physiology in the comparison group in the pre and post experiment.

Physiology	Pre		Post		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.BMI	27.66	1.55	27.51	1.56	0.514	0.611
2.Waist circumference	91.06	20.86	92.76	10.76	-0.383	0.705

Table 5-6 indicate that the waist circumference and BMI of the experimental group had differences in mean value with statistical significance at the level of 0.05 in pre and post experiment. However, the BMI and waist circumference of the comparison group had no statistical differences in mean value.

Table 7-8 indicate that the overall knowledge of the experimental group in pre- and post- experiment had differences in mean value with statistical significance at the level of 0.05. However, the overall knowledge of the comparison group had differences in mean value with statistical significance at the level of 0.05. However, there was no difference in mean value in the aspect of diet.

Table 7: Comparison on health behaviors related to knowledge in the experimental group in the pre- and post- experiment

Knowledge	Pre		Post		T	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diabetes Mellitus related knowledge	7.36	1.49	9.36	1.09	-6.085	<0.001*
2.Diet	3.93	0.90	4.76	0.56	-4.631	<0.001*
3.Exercise	4.00	0.00	4.73	0.58	-6.886	<0.001*
Total	15.30	1.87	18.86	1.65	-8.976	<0.001*

* Significance level of 0.05

Table 8: Comparison on health behaviors related to knowledge in the comparison group in the pre and post experiment

Knowledge	Pre		Post		t	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diabetes Mellitus related knowledge	6.03	1.99	7.23	1.85	-4.093	<0.001*
2.Diet	4.10	1.24	4.00	1.08	0.532	0.599
3.Exercise	3.90	0.40	4.60	0.85	-4.826	<0.001*
Total	14.03	2.84	15.83	2.91	-4.539	<0.001*

* Significance level of 0.05

Table 9: Comparison on health behaviors related to behavior in the experimental group in the pre and post experiment

Behavior	Pre		Post		t	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diet	11.23	2.19	13.03	1.37	-4.352	<0.001*
2.Exercise	10.53	2.54	12.50	6.42	-1.764	0.088
Total	21.76	3.30	25.53	6.46	-3.151	0.004*

* Significance level of 0.05

Table 10: Comparison on health behaviors related to behavior in the comparison group in the pre- and post-experiment

Behavior	Pre		Post		t	P
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
1.Diet	11.86	1.92	11.40	0.38	1.000	0.326
2.Exercise	10.43	2.58	9.40	2.15	1.988	0.056
Total	22.30	3.74	20.80	3.79	1.864	0.073

Table 9-10 indicate that in pre- and post-experiment, the overall behaviors of the experimental group had differences in mean value with statistical significance at the level of 0.05. However, there was no difference in mean value in the aspect of exercise. However, the overall behaviors of the comparison group in pre- and post- experiment had no difference in mean value.

DISCUSSION: The experimental group was assumed that demonstration and practice during the camping program could enable the experimental group perceiving knowledge and improving skills through direct-experiences, so they could apply such knowledge and skills in improving their behaviors than that of the comparison group. This can be concluded that through utilization of theories regarding a group process[12] and an empowerment[13], the experimental group who attended the camp program and got practicing on several activities such as BMI calculation, calculation of energy required daily, demonstration on nutrition, food exchange, choosing food as per the nutrition principle for those having high risks toward Diabetes Mellitus, a principle for exercise as well as yoga, resistive exercise band and aerobic performed a better health behaviors by applying a knowledge gained from the camp program comparing the comparison group who had only a self-study from the brochures. It was found that behaviors on diet in post- experiment were better than in pre-experiment. Furthermore, the health behaviors related to knowledge was changed dramatically in the post-experiment, because knowledge related DM, diet and exercise provided by the experts through the camp program was more effective than the self-study. Since, during the camp program, the samples could raise questions that were responded immediately by the experts. Based

on the result, knowledge received through lecturer by expert, demonstration on nutrition and exercise, practice on obesity assessment, skill building-up for menu arrangement for daily energy use, exercise training could allow the experimental group to transform knowledge to a better. On the other hand, the knowledge in the comparison group after their self-study of brochures was higher than what they had in pre- experiment. It could be assumed that the content in the brochures was as well useful for them.

RECOMENDATIONS: The result indicated that the camping program on the "Change of Health Behavior" for high risk toward DM type II could motivate the samples to perceive the importance for self-care and change more in their behavior in diet and exercise. They have maintained their nutrition by reducing quantity of food that is risky toward Diabetes mellitus as well as by increasing level of correct and proper exercise. Additionally, they were received a motivation from their friends as 'friends helping friends' As a result, any organizations dealing with health and public health should promote the camping program for the "Change of Health Behavior" for high risk toward DM type II as an application in other areas. This model is the only one which is the best in Thailand as this model can give a better result within 15 days. Those better results were such as positive changes in diet and exercise, reduced waist circumference and BMI. Of important, the intervention should be able to ensure the sustainability of health promotion behaviors with the periodical follow-up and an interval evaluation. It is also recommended that there should be a promotion campaign for the high risk group toward Type II DM to conduct more exercise activities in order to reduce weight and waist circumference that effect on DM type II prevention within one's own community.

ACKNOWLEDGEMENTS: My hearty gratitude to the College of Public Health Sciences, Chulalongkorn University, for giving me the opportunity to study in an excellent place where I learned a bunch of new things. I would like to express my sincere gratitude and appreciation to my thesis advisor for her guidance, kindness, and encouragement throughout the period of my study. Thanks extend also to Associate Professor Somrat Lertmaharit, M.Sc., M. Med. Stat and Assistant Professor. Dr.Wiroj Jiamjarasrangsi , M.D , Ph.D for their advice.

REFERENCES:

1. World Health Organization. 2000. Prevalence of diabetes mellitus Diabetes. Geneva :World Health Organization.

2. Wild S, Roglic G, Green A, Sicree R, King H. 2004. Global prevalence of diabetes estimates for the year 2000 and projections for 2030. Diabetes Care 27 : 1047 -53

3. Diabetes Association of Thailand the Patronage of her Royal Highness Princess, The endocrine society of Thailand, National Health Security Office. Diabetes Management Guideline . 2008. Bangkok: Roogsil printing house (1977) limited

4. Srirpittayakunkit A. 2005. Diabetes Mellitus in Thailand. Weeklyepidemiological Surveillance. Report, 36(47), 826-828

5. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA,*et al.* 2002. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. Feb 7;346(6):393-403.

6. Summary Report on incommunicable disease. 2008. Annual Report. Roi-Et province, Roi-Et Public Health Office. (September 2009)

7. Summary Report on incommunicable disease. 2008. Annual Report. Roi-Et province, Mueang district. (September 2009)

8. Ekplakorn V, *et al*. 2005. Diabetes risk score. [Online]. Available from: http://library. hsri. or. th/[2009, July 13]

9.Jirawatkul A. 1993. Biological Statistic. 2nd ed. Khon Kaen: KLang Nana Wittaya Printing House

10. Ounprom S, Oba N. 2007. Results received from the program 'Health Education towards health promotion among adult populations with high-risks towards diabetes mellitus. Master's Thesis, Nursing Science Program in Community Nurse Practitioner, Faculty of Nurse, Naresuan University.

11. Health Education Division, Department of Health Service Support. 1999. Concept, Theory, and Utilization for Health Education and Health Behavioral Development. Kongsuk Printing House, Ministry of Public Health.

12. Behavioral Theory. 2009. [Online]. Available from: http://gotoknow. org/[2009, July 06]

13. Charoenpan J, Tonskul C. 2006. Health elated Behavior. Mahasarakham: Faculty of Public Health, Mahasarakharm Univers