แบบจำลองการปรับเปลี่ยนพฤติกรรมในกลุ่มเสี่ยงสูงต่อโรคเบาหวานชนิดที่ 2 โดยการเข้าค่าย อำเภอเมือง จังหวัดร้อยเอ็ด ประเทศไทย

นางสุระ สุพรหมอินทร์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต
สาขาวิชาพัฒนาระบบสาธารณสุข
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2552

ลิขสิทธิ์ของ จุฬาลงกรณ์มหาวิทยาลัย

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

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

Mrs. Sura Suphomin

A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Public Health Program in Health Systems Development

College of Public Health Sciences

Chulalongkorn University

Academic Year 2009

Copyright of Chulalongkorn University

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Thesis Title	MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING, MUEANG DISTRICT, ROI ET PROVINCE ,THAILAND
By	Mrs. Sura Suphomin
Field of Study	Health Systems Development
Thesis Advisor	Prathurng Hongsranagon, Ph.D.

Accepted by the College of Public Health Sciences, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

..... Dean of the College of Public Health Sciences

(Professor Surasak Taneepanichskul, M.D.)

THESIS COMMITTEE

..... Chairman

(Associate Professor Somrat Lertmaharit, M.Sc., M. Med. Stat.)

..... Thesis Advisor

(Prathurng Hongsranagon, Ph.D.)

..... External Examiner

(Assistant Professor Wiroj Jiamjarasrangsi , M.D., Ph.D.)

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

สุระ สุพรหมอินทร์: แบบจำลองการปรับเปลี่ยนพฤติกรรมในกลุ่มเสี่ยงสูงต่อโรคเบาหวานชนิดที่ 2 โดยการเข้าค่าย อำเภอเมือง จังหวัดร้อยเอ็ด ประเทศไทย (MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING MUEANG DISTRICT, ROI ET PROVINCE ,THAILAND

อาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก : อ.ดร.ประเทือง หงสรานากร, 94 หน้า

วัตถุประสงค์ของการศึกษาครั้งนี้ เพื่อศึกษาความแตกต่างของพฤติกรรมของผู้เสี่ยงสูงต่อโรคเบาหวานชนิดที่ 2 ที่ได้รับการเข้าค่ายอบรมปรับเปลี่ยนพฤติกรรมสุขภาพและผู้ที่ไม่ได้รับการเข้าค่าย การศึกษานี้เป็นการศึกษาแบบกึ่งทดลอง กลุ่มตัวอย่างที่ใช้ในการศึกษาครั้งนี้ ได้แก่ ประชากรกลุ่มเสี่ยงสูงต่อโรคเบาหวานชนิดที่ 2 ที่อาศัยในเขตอำเภอเมือง จังหวัดร้อยเอ็ด (โดยมีคะแนนตั้งแต่ 6 คะแนนตามเกณฑ์ประเมินความเสี่ยงของวิชัย เอกพลากร และคณะ) อย่างน้อย 6 เดือน มีอายุระหว่าง 40-59 ปี กำหนดกลุ่มตัวอย่างโดยความสมัครใจด้วยการเลือก 2 ตำบล ซึ่งมีกลุ่มทดลองโดยการเข้าค่ายจำนวน 30 คนและกลุ่มเปรียบเทียบโดยการรับเอกสารแผ่นพับจำนวน 30 คน รวมเป็นกลุ่มตัวอย่างทั้งสิ้นจำนวน 60 คนตามเกณฑ์ที่กำหนด แบบสอบถามที่ใช้ได้ผ่านการทดสอบความตรงเชิงเนื้อหาจากผู้เชี่ยวชาญ และผ่านการทดสอบความเชื่อมั่นด้วยค่าครอนบาคอัลฟาที่ 0.859 การเก็บข้อมูลช่วงก่อนและหลังการทดลองกระทำโดยการตอบแบบสัมภาษณ์ การชั่งน้ำหนัก การวัดส่วนสูง การวัดเส้นรอบเอว และการคำนวณหาดัชนีความหนาแน่นของร่างกายในเดือน ธันวาคม 2552 และวัดผลหลังการทดลองภายในระยะเวลา 15 วัน สำหรับการวิเคราะห์ข้อมูลได้ใช้สถิติเชิงพรรณนาด้วยการแจกแจงค่าความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน และการทดสอบความแตกต่างด้วยสถิติ Paired t-test และ Unpaired t-test

ผลการศึกษาพบว่า กลุ่มทดลองและกลุ่มเปรียบเทียบมีค่าเฉลี่ยของเส้นรอบเอว ความรู้และพฤติกรรมสุขภาพหลังการทดลอง แตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 ส่วนกลุ่มทดลองมีค่าเฉลี่ยของเส้นรอบเอว ดัชนีมวลกาย ความรู้ และพฤติกรรมสุขภาพ ก่อนและหลังการได้รับโปรแกรมการเข้าค่าย แตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 ตามลำดับ ในขณะที่กลุ่มเปรียบเทียบมีค่าเฉลี่ยของความรู้ก่อนและหลังการได้รับเอกสารแผ่นพับ แตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 ผลการศึกษาดังกล่าวแสดงให้เห็นว่า การใช้โปรแกรมการปรับเปลี่ยนพฤติกรรมโดยการเข้าค่ายที่ประยุกต์ใช้กระบวนการกลุ่มและการเสริมพลังอำนาจในการทำกิจกรรมที่เกี่ยวข้องระหว่างการเข้าค่ายนั้น มีความเหมาะสมต่อพฤติกรรมการสร้างเสริมสุขภาพและสามารถลดปัจจัยเสี่ยงต่อการเกิดโรคเบาหวานชนิดที่ 2 ในกลุ่มประชาชนทั่วไปและกลุ่มอื่น ๆ ที่มีความเสี่ยง หากนำโปรแกรมนี้ไปประยุกต์ใช้ น่าจะก่อให้เกิดประโยชน์และมีความเหมาะสมกับชุมชนในการลดปัจจัยเสี่ยงต่อโรคเบาหวานอันเป็นปัญหาที่สำคัญของประเทศไทยได้

สาขาวิชา พัฒนาระบบสาธารณสุข ลายมือชื่อ นิสิต.....

ปีการศึกษา ...2552..... ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....

5179164953 : MAJOR HEALTH SYSTEMS DEVELOPMENT
KEYWORDS : BEHAVIORAL CHANGE/ HIGH RISK / DIABETES TYPE II PATIENTS/ CAMPING / ROI ET PROVINCE, THAILAND

MRS. SURA SUPHOMIN : MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING , MUEANG DISTRICT, ROI ET PROVINCE ,THAILAND : THESIS ADVISOR PRATHURNG HONGSRANAGON, Ph.D , 94 pp.

The objective of this research was to study the behavior difference between high risk toward diabetes type II patients who attended and who did not attend the 'Change in Health Behavior' Camping Program. 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 score points according to the risk evaluation criteria by Mr. Wichai Ekplakorn and his team. The sample groups were between 40-59 years of age, resided in Mueang district, Roi Et province, for at least 6 months in duration. Voluntary method was used to recruit the sample groups from 2 tampons. The experimental group consisted of 30 samples that were recruited to attend the camping program. On the other hand, another 30 samples of the comparison group received only brochures, thus; a total of 60 samples which was in compliance with the regulations. The questionnaires were tested for their content validity by the experts and for reliability value at 0.859 by the use of Cronbach's Alphas coefficient. The volunteers replied the questionnaire interview during pre- and post- experiment, together with the measurement of weight, height, waist circumference, and body mass index (BMI), during the month of December 2009, and 15 days after the experiment ended, and post-evaluation is conducted. The data was analyzed through the use of descriptive statistics in terms of frequency, percentage, mean, and standard deviation while the difference of point average was tested through the use of Paired t-test and Unpaired t-test.

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, 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. 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 is a vital problem to Thailand.

Field of Study : Health Systems Development Student's Signature .....

Academic Year : 2009..... Advisor's Signature .....

Acknowledgement

The thesis has been successfully completed with excellent support from Dr. Prathurng Hongsranagon whom I gratefully thank for her suggestions on the research, love, compassion and mental support to me during the entire process of the research. Sincere thanks to Ajarn Piyalamporn Havanond for her great support and valuable suggestions in statistical data analysis for my study.

I would also like to express my gratitude to my examination committee, Associate Professor Somrat Lertmaharit, M.Sc., M. Med. Stat. and Assistant.Profesor. Dr.Wiroj Jiamjarasrangsi,M.D., for their guidance which has enabled me to furnish this thesis.

Grateful thanks to Doctor Wachara Eamratsameekool and officials at the Research Office and Health System Development, Roi Et Provincial Public Health Bureau, who have always given me value-added suggestions and true support.

Grateful thanks to father, mother, husband, children and cousins of mine who have provided great mental support.

Grateful thanks to Doctor Rujira Suriyavanagul, Doctor Wanchai Utthakorn and Doctor Wachara Eamratsameekool who reviewed and revised the research questionnaire as well as the 'Change of Health Behavior' camping program for me.

Grateful thanks to the Head of the Health Center, other related officials from the Department of Social Medicine and the research participants who provided excellent collaboration for my data collection.

Any values and advantages occurred from this thesis, the researcher would like to consider them as a gratitude to my father, mother, teachers and all supporters.

Finally, if there are any mistakes found in any steps of the research, the researcher would like to express her apologies for the matter.

CONTENTS

page

ABSTRACT IN THAI……..iv

ABSTRACT IN ENGLISH……...v

ACKNOWLEDGEMENTS…….vi

CONTENTS…….vii

LIST OF TABLES……xi

LIST OF FIGURES…….xii

LIST OF ABBREVIATIONS……...xiii

CHAPTER I INTRODUCTION……1

1.1 Background and rationale……..1

1.2 Research questions…….3

1.3 Research objectives……4

1.4 Hypothesis…….4

1.5 Conceptual framework of the research……..4

1.6 Definitions of technical terms and variables……..7

CHAPTER II LITERATURE REVIEW ……11

2.1 Knowledge related Diabetes Mellitus……..11

2.2 Concepts and theories used in the research…….....22

2.2.1 Concept and theory on health behavior……..……..22

2.2.2 Concept on lifestyle modification……...23

2.2.3 Important theory on behavior that can be applied to the modification of behavior…….23

2.2.4 Concept on empowerment……...24

2.2.5 Concept on group process ……...24

2.2.6 Model of behavior change……24

2.3 Related research……..25

page

CHAPTER III METHODOLOGY……...……..31

3.1 Research design……..……..31

3.2 Research site …….. 31

3.3 Research period ……...31

3.4 Research population and sample group ……..31

3.5 Size of the sample group……..34

3.6 Research tools ……..……..…….…….……35

3.7 Pre-testing……...….36

3.8 Data collection and compilation ……37

3.9 Quality inspection of research measurement tool …….…….....… 38

3.10 Data analysis……..……..…….…….39

3.11 Review of ethical research involving human by Ethical Review Committee (ERC) ……..……...……39

3.12 Limitations of research……..……....40

3.13 Expected benefits from the research…….....40

CHAPTER IV RESEARCH RESULTS……...41

4.1 Symbols used for results presentation.....41

4.2 Structure of results presentation.....41

4.3 Results found through the process of data analysis……..…42

CHAPTER V CONCLUSIONS AND RECOMMENDATIONS ……..……54

5.1 Study objectives ……54

5.2 Summary of the results……55

5.3 Discussion of the results……..56

5.4 Recommendations……...……59

page

REFERENCES……61

APPENDICES……..67

APPENDIX A Questionnaire on health behavior……..67

APPENDIX B The camping program agenda……...……83

APPENDIX C Budget …….…….....89

APPENDIX D Administration & Time schedule…….……...90

APPENDIX E Certification of Research Inspection Tools……...93

BIOGRAPHY……..……...…….…....94

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

LIST OF TABLES

Table		Page
Table 2.1	Risk factors of type 2 Diabetes Mellitus and risk scores.....	15
Table 2.2	Interpretation of risk score of Diabetes Mellitus type 2 and suggestions.	16
Table 3.1	Numbers of population and sample group,Mueang District, Roi Et…….....	32
Table4.1	Numbers and percentages by general data of the sample group.....	42
Table4.2	Comparison on health behaviors in relation to body in pre- experiment between the experimental group and the comparison group…….	46
Table4.3	Comparison on health behaviors in relation to body in post- experiment between the experimental group and the comparison group…….	46
Table4.4	Comparison on health behaviors in relation to knowledge in pre-experiment between the experimental group and the comparison group..	47
Table4.5	Comparison on health behaviors in relation to knowledge in post-experiment between the experimental group and the comparison group..	48
Table4.6	Comparison on health behaviors in relation to behavior in pre-experiment between the experimental group and the comparison group..	48
Table4.7	Comparison on health behaviors in relation to behavior in post-experiment between the experimental group and the comparison group..	49
Table4.8	Comparison on health behaviors related to body in the experimental group in pre- and post- experiment……...	50
Table4.9	Comparison on health behaviors related to body in the comparison group pre- and post- experiment…….....	50
Table4.10	Comparison on health behaviors related to knowledge in the experimental group pre- and post- the experiment……	51
Table4.11	Comparison on health behaviors related to knowledge in the comparison group pre- and post- experiment……...	51

Table4.12 Comparison on health behaviors related to behavior in the experimental group pre- and post- experiment……... 52

Table4.13 Comparison on health behaviors related to behavior in the comparison group pre- and post- experiment……... 52

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

LIST OF FIGURES

Figure		Page
Figure1	Conceptual Framework.....	5
Figure2	Intervention.....	6
Figure3	Research Model: Quasi - Experimental Research……..……..	31
Figure4	Sampling Method ……..……...……...……..	33

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ADA	American Diabetes Association
BMI	Body Mass Index
DM	Diabetes Mellitus
WHO	World Health Organization
GDM	Gestational Diabetes Mellitus
IFG	Impaired Fasting Glucose
Kg/m^2	Kilogram / square meter
CM	Centimeter

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER I

INTRODUCTION

1.1 Background and Rationale

Incidence of Diabetes Mellitus (DM) has been increasing constantly around the world. The International Diabetes Federation (IDF) and the World Health Organization (WHO) announced their warning by stating that since 2000 there has been an increase in DM among world population and this type of disease is considered a major issue of public health around the globe since it yields negative effects on health and quality of life of mankind. 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. (Wild S, Roglic G, Green A, Sicree R, King H, 2004). Since there are multiple evolutions on environment, society and culture, behaviors and lifestyles of human beings have been modified accordingly. Consequently, the number of diabetic patients has been extremely increased in all countries. There is an accelerating trend of DM prevalence as the number of the world population is still growing, especially among adults (middle-age) and elderly. Epidemiological data by WHO indicated that the number of diabetic patients is exceptionally heightened around the world (World Health Organization, 2000).

The incidence rate of type II DM in Thailand is largely growing in the same rate as other countries. There have been 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. Upon comparing research evidences using similar methods, it was found that an incidence rate of DM is increasing. During 1996-1997, a survey on DM was conducted nationwide in Thailand by the National Health Interview and Examination Survey. The result revealed that the prevalence rate was 4.4. In addition,

one research conducted in 2000 with data collection of DM throughout Thailand also found that the prevalence rate of DM among the population aged over 35 years old were 9.6% or a number of 2.4 million people. More critically, only half of those (4.8%) 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. (Siripitayakunkit, A., 2005). Currently, there is no medicine to cure DM, therefore, surveillance and prevention of DM is still considered an important issue. These 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 (Knowler WC, Barrett-Connor E, Fowler SE. 2002). Therefore, the study on prevention and health promotion toward an incidence of DM is viewed as an urgent yet healthy public policy of Thailand. The program can also build- up an awareness and strengthen the population to change their lifestyles to prevent an incidence of DM. It is agreed that an appropriate model of change in health behaviors among those with high-risk toward type II DM should be provided (Supornsilchai, C., 2005). The data from DM screening among those with high-risks toward DM in Roi Et province indicated that in the past three years (2006-2008), with a prevalence rate of DM at 1.85, 2.29 and 2.77. Such data revealed an annually increasing trend. (The report on non-communicable diseases, 2008). The data from DM screening among those with high-risks toward DM in Mueang District, Roi Et province, revealed that in the past three years (2006-2008), with a prevalence rate of DM at 2.05 , 2.12 and 3.43. While the data from Roi Et Municipality in Roi Et province specified that the number of registered diabetic with a prevalence rate of DM at 3.40, 3.05 and 3.26. The data reflects an increasing trend annually. Such an increasing trend can be caused by several factors such as DM heredity and inappropriate behaviors (taking sweet, salty and fatty food, without performing proper exercise regularly, tobacco smoking and drinking alcohol). These factors cause an oversized waist circumference and over-standard BMI. If the

population do not change their lifestyles to promote their healthy behaviors, they might become patients with chronic disease in the future (A report: non-communicable disease, 2008).

Having considerable numbers of above mentioned risk factors toward DM among population with high-risk toward DM, careful prevention for those with high-risk from becoming diabetic patients is significantly required. Throughout the cited research papers, there were differences appeared in the concepts, target groups, modes of intervention, activity process as well as required budgets. 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 emphasis was on the differences between the experimental group receiving DM knowledge through the camping program and the comparison group receiving only brochures. As a result, the researcher decided to only focus on the model for behavioral change in high risk toward diabetes type II patients to prevent their occurrence of DM. The research also aimed to discover the data that can be essential for the development of sustainable and practical methods to change diet and exercise-related behaviors among the research population. Through the camping program, it was expected that diet and exercise-related behaviors of the research participants (the sample groups) should be enhanced including an improved nutrition leading to a risk reduction toward type II DM. The experimental group attending the camping program were participative in learning through group activities, learning activities, empowerment, and skill building-up within 2 day-curriculum.

1.2 Research Question

What are the differences of health behaviors related to diet and exercise between high-risk toward Diabetes Mellitus Type II patients who attended and who did not attend the camping program on the ‘Change of Health Behavior’?

1.3 Research Objectives

1. To study the diet and exercise related behaviors' differences between high risks toward diabetes mellitus type II patients who attended and who did not attend the camping program on the 'Change of Health Behavior'.

2. To study the effect of the interventions on physiological parameters (BMI / waist circumferences.

1.4 Hypothesis

Knowledge and behaviors in diet and exercise-related of high risk toward Diabetes Mellitus type II patients who attended the camping program on the 'Change of Health Behavior' could be better improved than those who did not attend the camping program.

1.5 Conceptual framework of the research

The research studied the 'Change in Health Behaviors' among high risk toward Diabetes Mellitus type II patients where the experimental group attended the camping program according to the model for behavioral change and the comparison group only received the brochures through postal mail.

Variables in the research

The researcher defined the variables as follows:

Independent variables : personal factors such as gender, age, education level, marital status, occupation, household's monthly income and household's monthly expense.

Dependent variables : knowledge, health behavior, health check-up's results of the experimental group who attended the camping program implemented based on the model for behavioral change in high risk toward diabetes type II patients and the comparison group who received only brochures.

Population: The research population was a group of people who were registered as a high-risk toward Diabetes Mellitus patients during DM screening process in 2009 who resided in the research area for more than 6 months as of September 2009. The risk assessment criteria by Mr. Wichai Ekplakorn was used to recruit both male and female whose age was between 40-59 years (Ouprom, S., and Oba, N., 2007). In addition, their BMI had to be in the range of 25-29.9 kilogram / square meters which are considered as 'obesity' (Department of Health, Ministry of Public Health, 2009) and waist circumference of male and female had to be equal or over 90 centimeters and 80 centimeters, respectively. Those who were recruited received more than 6 points according to the risk assessment criteria.

Research area: Mueang District, Roi Et province.

Intervention : Camping program on the 'Change in Health Behavior'

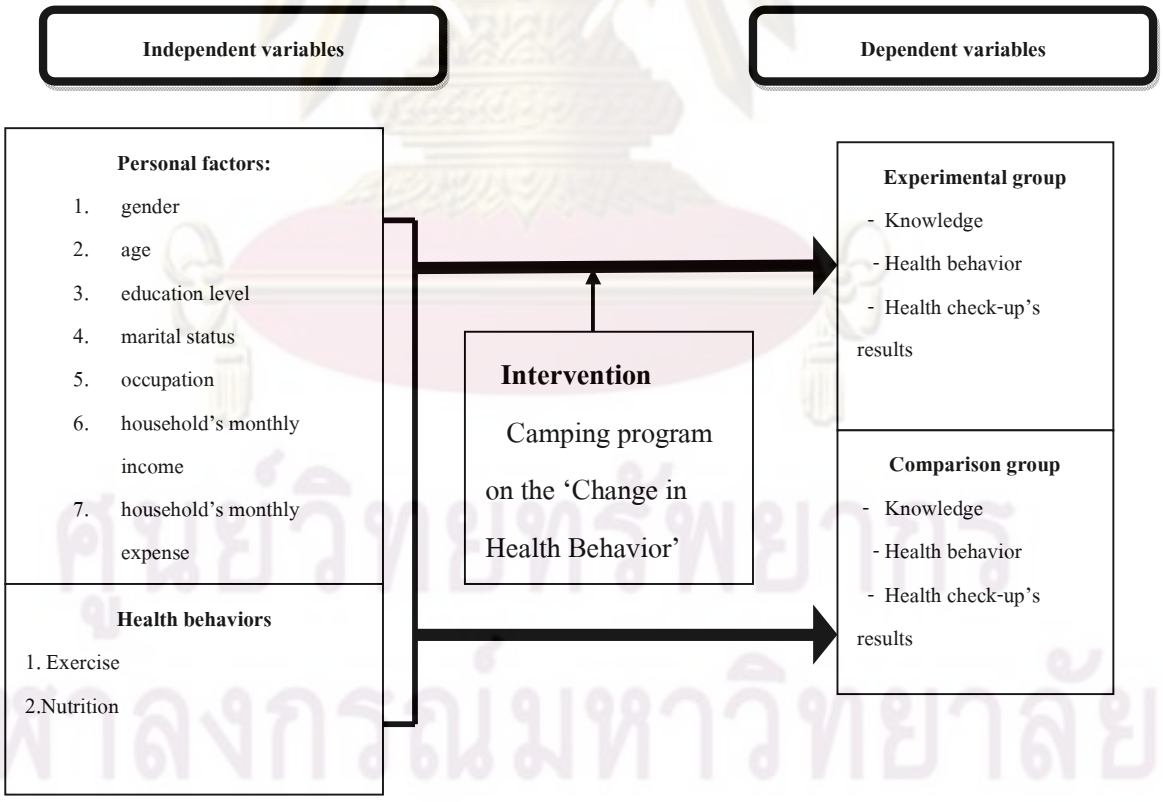

Figure 1 Conceptual Framework

Figure 2 Intervention

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

1.6 Definition of technical terms and variables

1. Age – a complete year of age of the research participants.

2. Education level – the highest level of education obtained by the research participants.

3. Marital status – status of marriage of the research participants which are single, living with sexual partners, widow/widower or divorced/separate.

4. Mueang District – one of the districts situated in Roi Et province consisting of 15 sub-districts whose health care services are responsible by the Roi Et Hospital.

5. Occupation – Principal occupation of the research participants.

6. Income – total amount of household's monthly income earned by the research participants.

7. Expense – total amount of household's monthly expense spent by the research participants.

8. Behavior - The actions or reactions of a person in response to external or internal stimulus.

9. Health behavior – an action taken by a person to maintain, attain, or regain good health and to prevent illness. Health behavior reflects a person's health beliefs. Some common health behaviors are exercising regularly and eating a balanced diet.

10. Risk score - Assessment method should be adopted in Thailand to diagnose diabetic patients in Thai population as: risk assessment to prevent Diabetes Mellitus (Wichai Ekplakorn and Committee, 2005)

Age	Risk Score
- 45 – 49 years old	1
- 50 years old and above	2
Gender	
- Female	0
- Male	2

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Body mass index

- 23 – 27.5 kg/m^2 3

- above 27.5 kg/m^2 5

Waist circumference

- Male with more than 90 cm waist circumference 2

- Female with more than 80 cm waist circumference 2

- No 0

- Yes 2

Family history of Diabetes Mellitus (parents, brother/sister)

- No 0

- Yes 4

11. Knowledge – facts, guidelines, details and experiences learned and recalled by the research participants.

12. Changes in body found from health check-up results- include waist circumference**,** weight, body mass index (BMI) pre- and post- of the camping program for one month.

13. BMI – a ratio between body's weight (kilogram) and height in meter square (meters^2)

14. Waist circumference – a length of waist (in standing position by measuring over both sides of hip bones).

15. Diabetes Mellitus - a group of disease related to metabolism with a hyperglycemia caused by abnormality of insulin secretion system or insulin action.

16. Type II diabetes mellitus - this type of diabetes mellitus is caused by the body that has a resistance and has a production of insufficient insulin for the body. This type of diabetic patients can be cured by diabetes pill to reduce blood glucose level. However, in the later steps of the illness, an insulin injection may become essentially required to control blood glucose level. This type of diabetes mellitus is

usually found among adults aged 40-59 years-old with obese personality. In addition, it is usually found among female rather than male as well as among those whose direct line of family members are diagnosed as type II diabetic patients.

17. High risk toward Diabetes Mellitus patients - a group of patients who has been registered as a high-risk toward Diabetes Mellitus patients during DM screening process in 2009 who resided in the research area for more than 6 months as of September 2009. For this research, the recruited sample groups were both male and female aged between 40-59 years, except for those who were registered as diabetic patients and who could not take care of themselves (Ouprom, S., and Oba, N., 2007). In addition, their BMI had to be between 25-29.9 kilogram/square meters which is considered 'obesity' (Department of Health, Ministry of Public Health, 2009). The waist circumference of male and female in the sample groups had to be equal or over 90 centimeters and 80 centimeters, respectively.

18. Camping program - The 2 days-camping program "Change in Health Behavior" among the experimental group having high risk toward type II DM, Mueang District, Roi Et Province by using theories regarding a group process and an empowerment, the learning process included a group process by building a relationship, ice-breaking to enable the samples to accept new things; lecturing sessions on DM, metabolism, nutrition (eating) and exercise by different experts. In addition, each sample was learned individually through demonstration of a proper menu management based on energy that should be received each day, demonstration and practice of exercise, self-risk assessment by measuring waist circumference, weight and height, and calculation of BMI, and required weight and calories used daily (energy). For a practice on exercise during the camping program, each sample learned through aerobic, resistive exercise band and yoga, so each sample can choose the proper type of exercise for them. For the menu management, a group discussion and presentation also were used as key activities to exchange experiences among the group as well as to

develop a ‘friend helping friend network’ among the groups in order to meet purposes of sustainability and continuity.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER II

LITERATURE REVIEW

The current research relied on the following review of literature and concepts in relation to Diabetes Mellitus. They were presented in the following order.

2.1 Knowledge related to Diabetes Mellitus

2.2 Concepts and theories:

- Health behavior
- Behavioral change
- Critical behavioral science for change in health behavior
- Empowerment
- Learning process
- Model of behavior change

2.3 Other related research papers

2.1 Knowledge related to Diabetes Mellitus

Diabetes mellitus is a group of disease caused by abnormality in glucose utilization of body's nutrient such as carbohydrate, fat, protein and especially on carbohydrate as it can drive the body to reach the status of 'hyperglycemia' (Suthin Sriansadaporn and Wannee Nithiyanant, 2005). These diseases are caused by a defect in insulin secretion? or insulin action or both conditions (Harris, 2000). Prolonged high blood glucose can cause several important body organs to become malfunction and might manifest symptoms such as retinopathy, nephropathy, neuropathy, microangiopathy, and macroagiopathy (Suthin Sriansadaporn and Wannee Nithiyanant, 2005).

Causes of Diabetes Mellitus

Diabetes mellitus occurs when the pancreas does not produce enough hormone insulin or when the insulin produced does not work effectively. Insulin's main role is

to transport glucose to cells. When glucose can not be transported into cell due to insufficient or ineffectiveness of insulin, the glucose level in the blood will rise and come out of the body in urine. This is one of the symptoms of Diabetes Mellitus.

There are many causes of Diabetes Mellitus. Heredity is one of the major causes. In addition, malfunction of pancreas, such as inflamed pancreas as a result of drinking alcohol or surgery, can also cause the disease.

Diabetic patients will have glucose level higher than milligram per 100 milliliter (mg/dl) of blood. A normal person would have glucose level of only about 70 - 100 mg/dl blood (Withaya Srimada, 2000).

Symptoms of Diabetes Mellitus

2.1.2 Symptom and signs of Diabetes Mellitus

Important symptoms of diabetic patients can be found in the early phase. Thep Hima-Thongcam et al. (2007) explained the symptoms of diabetic patients as follows:

1. Polyuria occurs when the glucose concentration in the blood is raised beyond its renal threshold, reabsorption of glucose is incomplete, and part of the glucose remains in the urine. This increases the osmotic pressure of the urine and inhibits reabsorption of water by the kidney, resulting in increased urine production. The higher the blood glucose level, the more frequency of diabetic patient's passing urine. The patient would have to get up many times at night to get to toilet.

2. Polydipsia occurs as a result of dehydration due to frequent urination. This symptom can be alleviated by drinking a lot of plain water.

3. Weight loss - due to cells' inability to convert glucose into energy and dehydration, the body would use accumulated fat and protein in the tissues as energy. Thus, a diabetic patient would experience exhaustion and weight loss without proper reason.

4. Polyphagia occurs as a result of body usage of accumulated tissue. In order to alleviate this condition, a patient would experience frequent hunger and excessive food consumption (Thep Hima- Thongcam et al., 2007)

Types of Diabetes Mellitus

The American Diabetes Mellitus Association (ADA, 2004) and the World Health Organization (WHO, 1998) classified Diabetes Mellitus into 4 categories according to its causes and pathophysiology as follows: (Thep Hima-Thongcam et al., 2007)

1. Type 1 Diabetes Mellitus is characterized by complete loss of the insulin production in the body as a result of destruction of beta cells of the islets of Langerhans in the pancreas. When the body can not produce insulin, glucose cannot be transported into and used by the cells. This causes an excessive glucose sugar in the blood and lead to polyuria, polydipsia, weight loss and exhaustion.

2. Type II Diabetes Mellitus is characterized by insulin resistance which may be combined with relatively reduced insulin secretion to meet the demand of the body. The type II DM diabetic patients would have to take medications to reduce glucose level. However, in the later stage, the patients might have to use insulin injection to control their blood glucose level. Generally, type II DM can be found in above 40 years old persons who are overweight. It can be found in female more than male and in person who has family history of diabetes mellitus. The risk factors for type II DM are hypertension, abnormal blood cholesterol level, as well as female with history of Gestational Diabetes Mellitus, obesity and family history of Diabetes Mellitus, etc.

3. Diabetes Mellitus can be caused by secondary genetic and other specific type which includes genetic abnormality of beta cells in the pancreas, genetic abnormality of insulin action, diseases of pancreas, side affect of medication or chemical substances, infectious diseases, malfunction of the immunity system, etc.

4. Gestational Diabetes Mellitus (GDM) - during pregnancy, female may experience higher-than-normal blood glucose level or level of insulin resistance. These abnormalities occur as a result of changes in hormone level in pregnant woman. During pregnancy, female's body would produce hormones that stimulate the growth of fetus. These hormones would resist insulin action and increase workload of beta cells as they have to produce sufficient insulin to meet the high blood glucose. Having successive pregnancy can reduce effectiveness of beta cells that leads to high blood glucose level. (Thep Hima-Thongcam et al., 2007)

Risk assessment of getting Diabetes Mellitus

There are two ways of evaluating the chances of getting Diabetes Mellitus. They are:

1. Risk assessment at a particular time: By using assessment form or risk assessment criteria which are made by prevalence case or cross-sectional study. Blood sample would be taken from a risky person to be checked for blood glucose level. There is a very high chance that DM would be found by using this method (prevalence case). In addition, this risk assessment method can also be used to screen and to identify person with DM even though there is no sign of disease since its early phase.

2. Risk assessment to prevent Diabetes Mellitus: By using assessment criteria to predict likely chance that a risky person will have DM in the future (incidence case). This method differs from the first method which diagnoses for DM at a particular time (prevalence case). For an incidence Diabetes Mellitus case, there is a lesser chance that DM would be found in a high risk person than in the prevalence Diabetes Mellitus case. Thus, it is important to adopt preventive measure and to reduce risky activities at the present time. Research supported that changing of lifestyle (lifestyle intervention or lifestyle modification) can help slowing down or preventing Diabetes Mellitus in the future (Sompong Suwanwalaigorn, 2008).

In Thailand, the approach to evaluate Diabetes Mellitus has been initiated for some time. The information of cohort study method determining several risk factors can easily be evaluated by filling-in the questionnaire without blood test and can also be applied in the community level. The information would be calculated using the risk score. The results can be used to accurately evaluate a chance for a person to get Diabetes Mellitus in the future (in the next 12 years). Thus, this assessment method should be adopted in Thailand to diagnose diabetic patients in Thai population as shown in table 1.

Table 2.1: Risk factors of type II Diabetes Mellitus and risk scores

Risky Factors	Diabetes Mellitus Risk Score
Age	
- 34 -39 years old	0
- 40 – 44 years old	0
- 45 – 49 years old	1
- 50 years old and above	2
Gender	
- Female	0
- Male	2
Body mass index	
- Below 23 kg/m^2	0
- 23 – 27.5 kg/m^2	3
- above 27.5 kg/m^2	5
Waist circumference	
-Male with below 90 cm waist circumference	0
- Female with below 80 cm waist circumference	0
- Male with more than 90 cm waist circumference	2
- Female with more than 80 cm waist circumference	2

Table 2.1 (Cont.)

Risky Factors	Diabetes Mellitus Risk Score
Hypertension - No - Yes	 0 2
Family history of Diabetes Mellitus (parents, brother/sister) - No - Yes	 0 4

ource: Wichai Ekplakorn and Committee, 2005 (The Diabetes Mellitus Association of Thailand, Clinical practice guidelines for Diabetes Mellitus, 2008, p. 2)

All the risk scores in each factor would be added up together. The interpretation of Diabetes Mellitus-risk chance and Diabetes Mellitus management guideline for a person with a score between 0 – 17 points are shown in table 2.

Table 2.2: Interpretation of risk score of Diabetes Mellitus Type II Diabetes Mellitus and suggestions

Total scores	**Risk of getting Diabetes Mellitus in the next 12 years**	**Risk level**	**Chance of getting Diabetes Mellitus**	**Suggestions**
Equal or less than 2 points	Less than 6 %	Low	1/20	- Exercise regularly - Control body weight to be on a suitable level - Check blood pressure - Take assessment test every 3 years

Table 2.2 (Cont.)

Total scores	**Risk of getting Diabetes Mellitus in the next 12 years**	**Risk level**	**Chance of getting Diabetes Mellitus**	**Suggestions**
3 – 5 points	6 – 10 %	Higher	1/12	- Exercise regularly - Control body weight to be on a suitable level - Check blood pressure - Take assessment test every 1 - 3 years
6 – 8 points	11 – 20 %	High	1/7	- Exercise regularly - Control body weight to be on a suitable level - Check blood pressure - Check glucose level in the blood - Take examination test every 1 - 3 years
More than 8 points	Higher than 20 %	Very high	1/3 – 1/4	- Control diet and exercise regularly - Control body weight to be on a suitable level - Check blood pressure - Check blood glucose level - Take examination test every year

Source: Wichai Ekplakorn et al., 2005 (The Diabetes Mellitus Association of Thailand, Diabetes Mellitus Management Guideline 2008, p. 3)

Diagnosis of Diabetes Mellitus

The testing of blood glucose level is the best way to diagnose Diabetes Mellitus as the testing of sugar level in urine can diagnose Diabetes Mellitus in the later phase. Blood test can be carried out in two methods which are taking blood sample from the vein at the arm joint or from a fingertip. Blood test should be carried out in the morning. For a person with no obvious sign of Diabetes Mellitus, they should fast (no food and drink) for at least 8 hours before taking the test. For a person with clear sign of Diabetes Mellitus, they may take the blood test without fasting. The glucose level in the blood of normal person should be between 70 and 100 milligram per deciliter (mg/dl). Nonetheless, if the blood glucose level of a person who fasts before taking the test is higher than 126 mg/dl, that person has Diabetes Mellitus. In case of uncertain result, a person should retake the blood test. If the result of blood glucose level is below 126 but higher than 100 mg/dl,, this shows that a person would have higher chance of getting Diabetes Mellitus in the future. The person should consult physician and monitor the condition (The Diabetes Mellitus Association of Thailand, 2007)

Chronic Opportunistic Diseases in diabetic patient

Every diabetic patient can experience DM- related complications if he/she can not control glucose level in the blood. Complications in diabetic patient can be classified into 2 types:

1. Acute complication is an emergency condition that can be fatal for diabetic patients. These states include

1.1 Diabetic ketoacidosis: This is an acute, major, life-threatening complication of Diabetes Mellitus. A patient would experience polyuria as the body discharges urine together with glucose, and also experience nausea, vomiting, dry lip and dehydration. When the body starts to dehydrate, it would derive water from intracellular fluid. This will, in turn, lower fluid level in the cells which triggers the

body to feel thirsty. Later on, the symptom would develop into low blood pressure due to malfunction of blood circulation system. A patient who experiences this symptom would faint and lose consciousness simultaneously

1.2 Hyperosmolar hyperglycemic state is a serious metabolic disarrangement that occurs in most of the diabetic patients who do not use insulin for treatment. A majority of patients with this symptom are elderly, more female than male. A patient would experience polyuria, dehydration and less efficient kidney. This would lead to even higher glucose level in the blood as the body can not get rid of glucose. A patient who experiences this symptom would have low blood pressure and finally would lose consciousness simultaneously

2. **Chronic complications** - would occur at both main and small arteries. The

problem would accumulate gradually and slowly spread through all the body organs. This symptom has a positive correlation with time and disease control. This means if a patient is unable to look after oneself properly, DM complication is likely to occur.

DM complication in diabetic patient has a positive correlation with time and disease control. The longer a person with DM, the higher chance for that person to experience DM-related complications, especially in a patient who does not take good care of one's health. The most common DM- related complications are:

Complications in Cardiovascular System

Heart disease is one of the main causes of death of diabetic patients as they are prone to coronary artery disease in comparison to a normal person. Often diabetic patients are found with over standard cholesterol and triglyceride level in the blood. This is a result of high glucose in the blood which would make the blood 'sticky' and 'clot' together and sometime block the blood to flow into the blood vessel. From medical information, it is found that a diabetic male patient has twice of the chance to

experience heart disease than a male without DM. Meanwhile, a diabetic female patient has triple of the chance to experience heart disease than a female without DM.

Complications in the eyes

Recently, we found that Diabetes Mellitus is a major cause of blindness. The medical term for this symptom is called 'Retinopathy' which occur as a result of an inability to control glucose level in the blood and cause transformation in the blood that flows into vessel in retina area. The retina would experience some form of non-inflammatory damage and finally leads to blindness.

Complications in kidney

There are supportive evidences that DM leads to kidney failure. The blood vessel that brings blood flow to kidney might be clotted due to prolonged high blood glucose that causes the blood to become 'sticky'. Proper blood glucose control can help reducing and slowing down the deterioration of kidney.

Foot injury

When a diabetic patient experiences foot injury, the patient would have higher chance as the injury may develop into serious ulcer and the feet need to be cut off than a person without DM. Causes of the foot injury can be from many minor accidents which can be prevented. Improper foot care and inappropriate blood glucose level control can lead to serious foot ulcer condition.

Approaches to prevent complications in Diabetes Mellitus

1. Maintain blood glucose level under 140 mg/dL.
2. Maintain blood pressure under 130/80 mmHg
3. Control body weight

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

4. Control fat level in the blood

- Cholesterol below 200 mg/dl.
- Triglyceride below 150 mg/dl.
- High-density lipoprotein (HDL) above 40 mg/dl.

5. Quit smoking

6. Exercise regularly

7. Take good care of one's feet, prevent injury and check one's feet regularly

8. Check eye condition, and conduct microalbuminuria urine test annually

(Suwanwalaigorn S, 2008 and Pickup & Wikams. 1994)

Treatment for Diabetes Mellitus: There are 4 methods to treat Diabetes Mellitus. They are:

1. Diet Control

As DM occurs when blood glucose level gets too high due to the body's inability to utilize glucose, therefore; diet control is an effective way to reduce amount of glucose taken into the body. This can be done by reducing the amount of food consumption or change types of food.

It can be noticed that, presently, a diabetic patient has more food choices, with less strict on food limitation. Nonetheless, a patient must choose food with good nutrition, learn to switch one type of food to another, read and understand the label of the food package so as to make future diet plan. This would help a diabetic patient to maintain glucose level, promote good health and reduce DM-related complications. (The American Diabetes Mellitus Association, 2003 and Pacharanee Pawattakul ,2007)

2. Exercise

Exercise will help our body to use more energy. Exercise should be done regularly especially in an overweight diabetic patient. By reducing 15% of

bodyweight, it would make insulin receptor in fat cells and other cells to have a better reaction to insulin.

3. Taking medication

A diabetic patient can take medication in pill form to control blood glucose level. However, the patient must strictly follow a physician's advice and must not change the prescription nor stop taking the medication without consulting the physician. A patient should take blood test and urine test to check glucose level regularly. This is to allow the patient to observe the overall result of the medication. In addition, the patient must learn about the side effects of the medication and seek physician's assistance immediately if the blood glucose level falls too low. At the same time, the patient should also change diet and exercise -related behaviors. These will help them to better control blood glucose level (Chotimongkol, 2000)

4. Insulin injection

Insulin is a hormone that is produced by beta cells in the pancreas. It is used to control the metabolism of nutrition such as carbohydrate, protein and fat. The insulin injection method would be used only when a type I diabetic patient experiences loss of all the insulin-producing beta cells; or when a type II diabetic patient does not respond to medication treatment. The body needs insulin in order to utilize glucose and control its level in the blood (Jadsadayanametha, 2002)

2.2 Concept and theory used in the research

2.2.1 Concept and theory on health behavior

Health behavior is an idea within a person (invert behavior) which is expressed as action and practice (covert behavior). According to Green and Kreuter's concept, people would adopt behaviors regarding care, prevention, promotion and management of one's health because of several factors (The Health Education Division, Department of Health Service Support, 1999)

2.2.2 Concept on lifestyle modification

1. Human behavior can be affected or aroused and would manifest several symptoms such as heart beat, body gestures or nerve.

2. Arousing behavior is a behavior of human that is expressed to reduce tension.

3. Objectives that are set by a person will have great influence on the individual. The person will change his/her behavior in order to achieve the objectives.

4. Environment will have an influence on the modification of behavior such as providing them with opportunity, educational opportunity, accessibility of the service and opportunity to change.

5. The behavior would be pushed by internal behavior or internal process which has an influence on human behavior.

6. People ability is an indicator of their behaviors. People with different ability will tend to have different behaviors (The Health Education Division, Department of Health Service Support, 1999)

2.2.3 Important theory on behavior that can be applied to the modification of behavior.

Health Belief Model : HBM consists of 4 factors which are:

1) Perceived Susceptibility: is an idea or belief that there is a chance of getting a particular disease.

2) Perceived Severity: is an idea or belief that an individual evaluate the severity of the disease on oneself in respect to sickness, inability, death, difficulties, and complications. The severity of the perceived threat will make an individual avoid the behaviors.

3) Acknowledging the benefit : is an idea or belief that by a person can reduce risk or seriousness of a problem by following an advice.

4) Acknowledging obstacles/expense: is an idea or belief that following an advice would cause difficulties, expense etc. (Chareonpan and Tansakul, 2006)

2.2.4 Concept on empowerment

Empowerment Education Model was developed by Paulo Freire in 1975. The important concepts of the model are:

1. Empowerment education: is an educational approach that focuses on the involvement of a learner. The learner would be asked to identify one's problems, analyze causes and stability of the problems by using the common sense. The learner would also be taught to look at the society in an appropriate perspective and develop approaches to solves obstacles and achieve objectives.

2. Empowerment: is a process whereby individuals in the community can contribute to cooperate and control the change in ways of life, society and environment to be in accordance with the current situation (Duangsong, 2002, p.16)

2.2.5 Concept on group process

This is a process of interaction of the group members who jointly conduct activities which they considered to be suitable for the group. This would help the group members to learn, make correction and apply the thing that they learn in their daily life. In addition, by working together, it will help them to understand themselves and learn to work with others (Concept of behavior, 2009)

2.2.6 Model of behavior change

Specific Objectives: At the conclusion of this model the learner will be able to:

- Examine behavior change theory and its role in changing health habits in individuals and populations.

It is hoped that this presentation will stimulate discussion among audience participants. Health is a topic that provides common ground among people and most of everyone have areas of challenge related to fitness. It can be helpful to share our approaches towards fitness with another.

Variables in Behavior Change

Thoughts and ideas are inside a person's mind having significant influence on an individual's health behavior. These variables interact with social and environmental factors and it is the synergy among all these influences that operate on behavior.

Knowledge: An intellectual acquaintance with facts, truth, or principles gained by sight, experience, or report.

Skills : The ability to do something well, arising from talent, training , or practice.

Belief : Acceptance or confidence in an alleged fact or body of facts as true or right without positive knowledge or proof; a perceived truth.

Attitude: Manner, disposition, feeling, or position toward a person or thing.

Values: Ideas, ideals, customs that arouse an emotional response for or against them. (Wilson D. ,Mary S. 1991)

2.3 Related research

The research of Anong Nilkamhaeng and Chalia Pimpan (2007) whose work was on the results of health program to change behavior to reduce cholesterol level of 30 staffs in Chainat Hospital was quasi – experimental research. The results showed that the sample group had improved their behavior regarding diet and exercise to reduce cholesterol level in their blood in post-experiment (statistical significance $p < 0.001$). In addition, it was found that their cholesterol level had gone down in post-experiment (statistical significance $p < 0.001$). This indicated that the health promotion program which applied incentive theory to prevent sickness with group process and social support could stimulate an individual to reduce cholesterol level which helped to prevent coronary artery disease. The research can be applied to other sample groups that have similar characteristics as the sample group in this research.

Supim Unprom and Nongnuch Oba (2007) conducted a study on the program to provide knowledge on health promotion behavior to a group of adults who had high risk towards Diabetes Mellitus. The research was quasi – experimental research. The sampled members were divided into 2 groups with 30 members per group. One group received knowledge on health promotion behavior, while the other group did not. In post-experiment, it was found that a group that received health promotion knowledge could score higher on overall performance (earned 3.98 points for behavior score). Meanwhile the other group had earned 3.26 points for behavior score (statistical significance $p < 0.001$). This indicated that health education program is suitable for people who have high risk of DM.

Yenrudee Keawpituk and Piyanut Khunsawat (2009) conducted risk assessment of Diabetes Mellitus on staffs in the Walailak University. The research was quasi – experimental research. The sample groups were divided into 2 groups which were people with high risk of developing DM and the low risk group. There were 31 members in each group. The assessment form, which was developed by Mr. Wichai Ekplakorn, was used. The results showed that the risk of getting DM in the high risk group that participated in the health promotion program had reduced shown by physical check (statistical significance $p < 0.001$). Meanwhile the risk of getting DM in the low risk group also reduced significantly (statistical significance $p < 0.05$). This indicated that health promotion program contributed to better health condition of staffs in the Walailak University and helped reducing and delaying DM manifestation. The program is also suitable for community and reduces the risk of getting DM which is important problem of Thailand.

Ancharee Meesena (2005) studied on results of DM preventive program on body mass index, blood glucose level, knowledge of self care, cholesterol and triglyceride level in DM risky group. Becker's theory on Health Belief Model and Health Behavior Modification concept were being applied to the sample group which

consisted of 27 members. The result showed that after participating in the DM preventive program, the sample group had lower body mass index, lower cholesterol and triglyceride level, and had better knowledge on how to take care of themselves. Their body mass index was reduced with statistical significance of (t=8. p=.000). The average score of self care behavior improved with statistical significance (t=2.53, p=.009). Their triglyceride level was also reduced with statistical significance (t=2.5, p=.008). Nonetheless, it was found that the fasting blood glucose level (FBS) remained unchanged both in pre- and post- experiment (p=.101). This indicated the effectiveness of the preventive program. The research can be applied to other sample groups that have similar characteristics as the sample group in this research.

Chanya Santayakorn and Chomnad Wannasiri (2009) studied a formation of health-related empowerment on patients with knee osteoarthritis, who were living in Bangrakam district, Phitsanulok province and the formation model development on patients with chronic disease. The results showed the formation of health-related empowerment on patients with knee osteoarthritis.

Srisuda Aklukkanarat andThanatcha Paipayob (2006) conducted a study on empowerment by providing group counseling service which would have an impact on the diet and exercise -related behaviors of teenagers with food over-consumption habit. The research was quasi – experimental research. Gibson's concept of empowerment was employed. The results showed that the sample group had a better performance regarding diet and exercise -related behaviors in post-experiment (statistical significance of .001). Their bodyweights were reduced in post-experiment (statistical significance of .001). The average behavior assessment score during the counseling was in a medium to excellent range. The average attitude assessment score of the sample group toward the leader in term of empowerment during the counseling was positive in every aspect. This indicated that empowerment by group counseling service can be applied to modify diet and exercise -related behaviors of teenagers.

Sriked Thanyavinichkul (1995) set up a health promotion program for Diabetes Mellitus and hypertension patients and high risk group who were 40 years old and above. The results of the study showed that the targeted group had better knowledge and health belief on DM and hypertension after attending the program. This indicated that health promotion program and group exercise were suitable for the community.

Chittiporn Nabsuwan, Jirapan Jinawong, Taweesak Mosayangkul, 2003 studied the results of knowledge and determination to lose weight of overweight customers of "Suwan Pharmacy" in Ayutthaya province, and customers of "For You Pharmacy" in Chonburi province. The program had 47 participants. The Transtheoretical Model assessment form was used. The result showed that the determination to lose weight of the participants differed significantly after receiving the service for 1 month (p-value <0.05). In addition, the participants had better knowledge after receiving the pharmacy service (p-value <0.05). This indicated that community pharmacy can contribute to the health promotion of people regarding obesity.

Sukanya Saisaengjin and Yochita Boonchaleaw(2007) conducted a study on an efficiency of health modification program for government officers who had abnormal physical condition. The research was quasi – experimental research. The sample group consisted of 30 government officers in Prasat Hospital. The assessment was conducted three weeks after the program. The result showed that there was no change of health behavior. This can help to change project formation by focusing on providing more accurate knowledge and health promotion on a continuous basis.

Seksan Chantana (2008) studied the results of health management to change health belief and behavior to prevent type II DM of high risk group who were living in Tadpanom District, Nakorn Panom province. The research was quasi – experimental research. There were two sample groups with 35 members each. The research applied Deming Quality Control Circle, group process, provision of interactive guidance and

visitation. The results showed that the sample group had better knowledge of causes of DM, its seriousness The results showed that the experimental group had better knowledge of causes of DM, its seriousness, perception on risk to have DM, on severity of DM, and on obstacles of DM. In post- experiment, the group that received educational information were more in alignment with the program than the group that did not (statistical significance of $p<0.05$). The sample group had better performance regarding diet, exercise and stress management behavior in post- experiment (statistical significance of $p<0.05$). The sample group also had lower blood glucose level in post- experiment (statistical significance of $p<0.05$). The research can be applied to other group of people so that they can learn how to take care of themselves and to prevent Diabetes Mellitus in their community.

Tithima Wiriya (2004) who studied the effectiveness of the health promotion program toward the change in health behaviors of DM patients at the DM Clinics, Viengsa Hospital, Nan province. The sample group was non-insulin dependent diabetic patients who received services from medicine department, diabetes mellitus clinic at OPD building, Wieang Sa hospital, Nan province. The patients were sampled into the experimental and comparison group which included 30 samples each. The results revealed that in post-experiment with the experimental group had more changes about their correct knowledge on DM than that in the comparison group with the statistical significance.

Taksina Tanyaharn (1997) who conducted a study on the effectiveness of nutrition study to reduce the level of cholesterol among male obese teenagers with an application of the behavioral sciences. Through integration of principle of health belief model, social learning theory and group process, 3 times of nutrition education were provided during the 3 months-period of the study. The result specified that the scores of knowledge had higher average value in the experimental and the comparison groups with the statistical significance.

Patcharee Chuethong (2005) who studied the result of the health promotion program toward self-care behavior and the control on blood sugar of DM type II patients. The sample group was diabetic patients who received diabetic pill treatment aged over 40 years old. Their result revealed that DM type II patients who went through the health promotion program had the average score in their self-care behavior regarding diet control and exercise higher than the group with normal nursing care.

Chutarat Lom-on (2005) who studied on the result of the promotion of self-care behaviors of DM type II patients at the Pen Hospital, Amphur Pen, Udornthani. by integrating theories of self-efficacy and group process to conduct activities for the experimental group. It was found that in post-experiment, the experimental group had the average BMI less than in pre-experiment but with no statistical significance.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

The study was a Quasi - Experimental Research where 2 groups were divided into the experimental and the comparison groups. The model for behavioral change through the camping program was organized for the experimental group, while the comparison group only received brochures.

Through using the questionnaire, assessment of knowledge, health behavior and health check-up results were conducted among these two groups. The knowledge assessment was conducted two-days pre- and post- experiment of the camping program and the assessment of behavior and health check-up results were conducted 15-days pre- and post- experiment of the camping program.

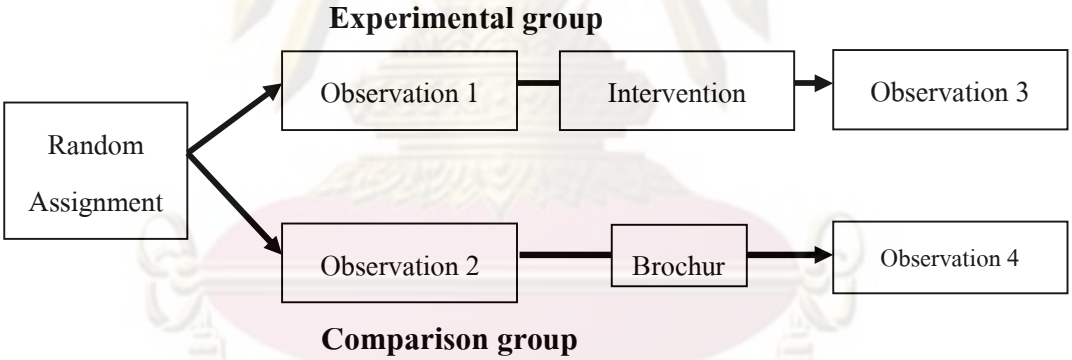

Figure 3 Research Model: Quasi - Experimental Research

3.2 Research Area Mueang District, Roi Et province

3.3 Research Period December 2009

3.4 Research Population and the Sample Group

The research population was a group of people who were registered as high-risk toward Diabetes Mellitus patients during DM screening process in 2009 and has resided in the research area for more than 6 months as of September 2009. The risk

assessment criteria by Mr. Wichai Ekplakorn et al.(Ekplakorn, W., 2005) were used to recruit both male and female whose age were between 40-59 years (Ouprom, S., and Oba, N., 2007). In addition, their BMI had to be in the range of 25-29.9 kilogram/square meters which is considered an 'obesity' (Department of Health, Ministry of Public Health, 2009) and waist circumference of male and female had to be equal or over 90 centimeters and 80 centimeters, respectively.

Table 3.1:Numbers of population and the sample group, Mueang District, Roi Et

No	Sub-district	Numbers of population	High risk group
1	Rob Muang sub-district	16,892	218
2	Nua Muang	19,745	138
3	Khon Kaen	7,648	112
4	Na Poe (Comparison group)	4,857	98
5	Saardsomboon	8,643	152
6	Srikeaw	13,101	231
7	Poeparn	7,676	79
8	Non Rang	5,299	73
9	Nong Keaw	6,806	89
10	Nong Wang	8,536	81
11	Dong Lan (Experimental group)	8,261	118
12	Kanyai	4,559	46
13	Nontan	5,445	72
14	Muang Thong	5,429	106
15	Nai Muang	29,523	240
	Total	152,420	1,853

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Sampling – to prevent switching between the members of the experimental group attending the camping program and the comparison groups receiving brochures, the researcher used sampling assignment method to select 2 sub - districts from 15 Sub - districts situated in Mueang District, Roi Et province. Therefore, 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. The research population was voluntarily selected from a registry list of those with high risk toward type II Diabetes Mellitus according to risk assessment toward type II Diabetes Mellitus. Voluntary method was used to select the sample group both male and female aged between 40-59 years old into the experimental and the comparison groups. These two groups were independently to each other.

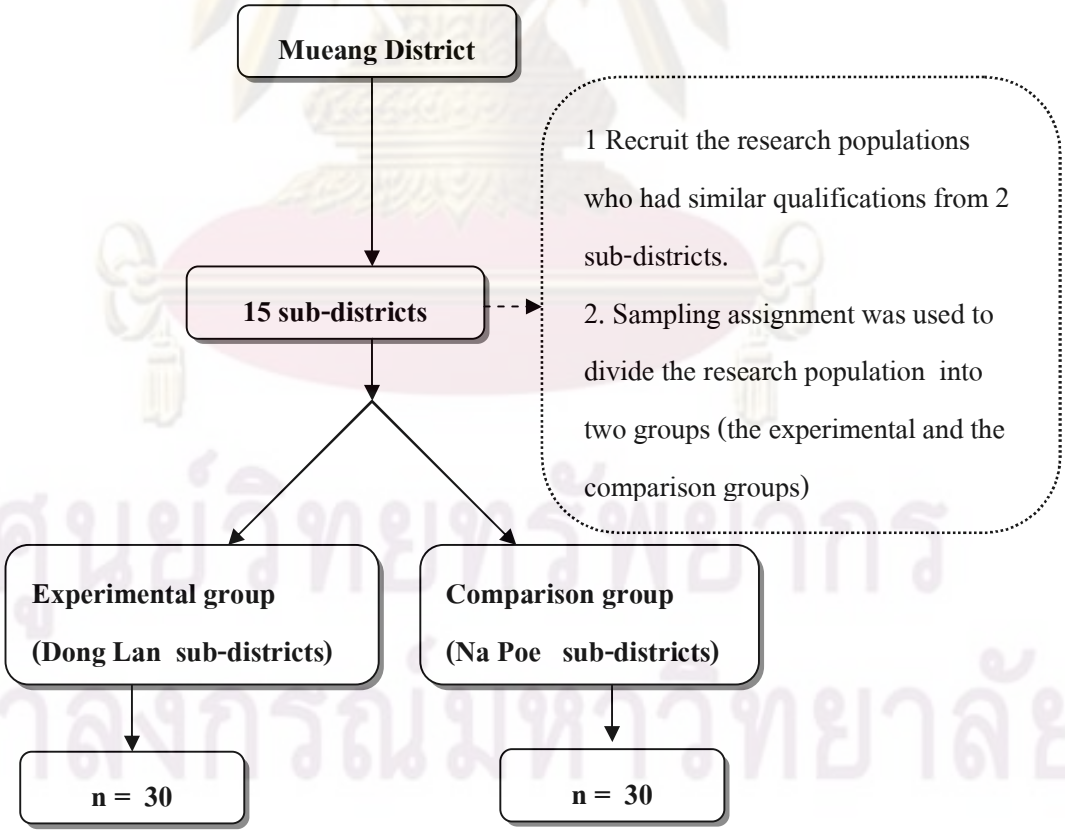

Figure 4 Sampling Method

Inclusion Criteria

Populations who were registered as a high risk toward Diabetes Mellitus patients during DM screening process in 2009 who had resided in the research area for more than 6 months as of September 2009. The research recruited both male and female aged between 40-59 years with BMI from 25.0-29.9 kilogram/square meter which is considered an 'obesity' and waist circumference of those male and female had to be equal or over 90 centimeters and 80 centimeters, respectively. Details of the research as well as the benefits gained by the research participants were explained thoroughly so that voluntary participants could be achieved.

Exclusion Criteria Probably

Out along with those who had issues of illiteracy, were registered as handicapped person, had Diabetes Mellitus and/ or heart disease, paralyzed, were unable to take care of themselves, had problems in communication and were unwillingness to participate.

Allocation: Voluntary method was used to divide registered groups who had high risks of type II Diabetes Mellitus into two groups. As a result, 30 research participants from Dong Lan sub-district were recruited to attend the camping program while another 30 research participants from Na Poe sub-district received only brochures. Each group was explained that they could not switch to another group as it would cause undependable interpretation of the result.

3.5 Size of the Sample Group

The sample group of the research was the population with high risk toward type II Diabetes Mellitus. The following formula is used to calculate the size of sample group and the average points of the two groups were independently to each other.

Formula (Jirawatkul, A., 1993)

$$\mathbf{n / group} = \frac{2\ \sigma^2\ (Z_\alpha + Z_\beta)^2}{(\mu_1 - \mu_2)^2}$$

According to the research by Onprom, S. and et al., 2007.

σ^2 = 0.81 (Variance of health behavior's post experiment in both group)

Z_α = 1.96 (α = 0.05)

Z_β = 0.84 (β = 0.20) for 80% power

μ_1 = 3.98 (Mean of health behavior after the experiment in the experimental group)

μ_2 = 3.26 (Mean of health behavior after the experiment in the comparison group)

$$\mathbf{n / group} = \frac{2\ (0.81)(1.96 + 0.84)^2}{(3.98 - 3.36)^2}$$

$$= 24.5 \rightarrow 25 \text{ people}$$

The size of the sample group was 25 people, but to prevent the problem of withdrawal in the middle of the research, each sample group, therefore, consists of 30 persons adding up to a total of 60 persons.

3.6 Research Tools

1. Tool used in the research is a camping program organized based on the model for behavioral change among high risk toward Diabetes Mellitus group using group activity and empowerment. The 4 following items were sessions/activities within the camping program (2 day):

1) Lecture on several types of information: Diabetes Mellitus -related knowledge(2.5 hours), nutrition (1.5 hours) and exercise (1.0 hour), totaling of 6 hours.

2) Demonstration on nutrition and exercise: by learning to choose appropriate types and portion of food (1.0 hour) and to perform exercise such as yoga, band exercise, chair exercise and aerobic (1.0 hour each), totaling of 5 hours.

3) Practice on obesity assessment (1.0 hour), arrangement of food menu (2.0 hours) and exercise training (3.0 hours), totaling of 6 hours.

4) Group Dynamics: group learning and empowerment (3.0 hours)

Brochures about self-care behaviors to prevent an occurrence of DM were developed by the researcher. It included the content of factors, symptoms, treatment, risky groups, DM- related complications and self-care behavior related to diet and exercise behaviors.

The above mentioned contents were utilized for the two groups.

Each research tool was partly developed by the researcher based on theory stated in the chapter 2 and by Supim Onprom and Nongnut Oba in 2007. In addition, the research tool was also reviewed and examined by three experts.

2. Data Collection Tools – the researcher developed a questionnaire to be in line with the objective and the conceptual framework of the research. The questions in the questionnaire required the research participants to answer in the Likert Scale type. A questionnaire consists of three parts as following:

Independent variables: sex, age, education, marital status, occupation, monthly income and monthly expense.

Dependent variables: knowledge, behavior, changes in body (a total of 30 questions).

3.7 Pre-testing

The face-to-face interviews were pre-testing among 30 persons who were registered as high-risk toward Diabetes Mellitus patients during DM screening process in 2009 and the same characteristics as the research population. Which were

lived in the area of Changhan District, Roi Et province. The reliability of the questionnaires was calculation by using Cronbach's alpha coefficient. Each scale's reliability was as Follows:

1. Total content validity of questionnaire (30 items)
   : Alpha coefficient value = .856
2. Knowledge (20 items) : Alpha coefficient value = .785
3. Behavior (10 items) : Alpha coefficient value = .824

3.8 Data Collection and Compilation

Primary Data: data received through the use of questionnaire.

Secondary Data: data taken from books, documents, reports, analysis article and statistical documents.

Quantitative Data: data received through the use of questionnaire and assessment forms as following:

1. Questionnaire required data on knowledge and behavior related to DM.

2. Health check-up assessment form required data on weight, height, waist circumference and BMI.

3. Obesity assessment form and individual's calories calculation.

Details of Questionnaire

Part 1 General Data

Personal data included sex, age, education level, occupation, marital status, household's monthly income and household's monthly expense.

Body related data included waist circumference, weight, height and BMI (pre- and post- experiment).

Part 2 Knowledge assessment (pre- and post- experiment), the questionnaire was consisted of 20 questions *(Total points of 20)*

The score for the content of positive and correct explanation

- Answer ‘Correct’ = 1 point
- Answer ‘Incorrect’ = 0 point
- Answer ‘Do not know’ = 0 point

Part 3: Behaviors related to exercise and diet. Questionnaire was consisted of 10 questions.

3.1) The score for the content of positive message.

- Answer ‘Regularly’ = 3 points.
- Answer ‘Sometimes’ = 2 points.
- Answer ‘Rarely’ = 1 point.

3.2) The score for the content of negative message.

- Answer ‘Regularly’ = 1 point.
- Answer ‘Sometimes’ = 2 points.
- Answer ‘Rarely’ = 3 points.

3.9 Quality Inspection of Research Measurement Tool

The researcher developed a questionnaire as a measurement tool through the following process:

1. Search and study of documents and research papers relating to factors reducing risks toward type II Diabetes Mellitus.

2. Learning on how to develop an effective questionnaire from the related documents.

3. Determination of concepts and contents according to the research objective and later use of such data for questionnaire development.

4. Development of drafted questionnaire to be submitted to the advisor and the proposal exam committee for correction and revision of content and language implication used in the questionnaire.

5. Submission of the revised version of questionnaire to three experts for further modification.

6. Try-out of the latest revised version of questionnaire with 30 samples (not the actual sample group) in the district of Chiang Kwan, Roi Et province, to finalize the questionnaire to be more validated on the content.

7. Data receiving from the try-out was used to calculate reliability on the aspect of behavior and discrimination on the aspect of knowledge.

8. Finalization of the questionnaire after the try-out.

3.10 Data Analysis

The researcher keyed in the data into the SPSS/FW version 17 and the following types of data were analyzed by different types of statistical methods.

1. The personal data of the sample group by distributing frequency, percentage, average, and standard deviation.

2. The difference of point average on health behaviors related to body, knowledge between the experimental and the comparison groups by independent t-test.

3. The difference of point average on health behaviors related to body, knowledge between the experimental and the comparison groups pre- and post- the camping program by paired t – test

3.11 Review of ethical research involving human by Ethical Review Committee (ERC)

This research was granted by ERC of Chulalongkorn University on the aspect of ethical research involving human before the beginning of the research. Additionally, all processes conducted in the research were completed with an awareness of compliance with human rights including informing and allowing the research participants to withdraw from the research at any time without any negative consequences in their life conduct.

The protection of rights relating willingness to participate in the research, confidentiality and complaints of those research participants are explained below:

Those who are 'population group' or research participants' have voluntarily become a part of the research. They can either deny to or withdraw from the research at any point of time without clarification of the reasons. In addition, they can still be eligible to receive any agreeable benefits (Transportation cost) from the research.

Information relating to research participants will be kept confidentially by the researcher. If a presentation of the results is conducted, the data will be presented as an overall picture. Any data identifying to the research participants will not appear in the presentation or the reports.

Any research participants who are not treated according to a Participant Information Sheet, they can give complaints to the Ethical Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, 4th floor, Institute Building 2, Soi Chulalongkorn 62, Phayathai Rd., Phatumwan district, Bangkok. *10330 Telephone: 0-2218-8147 Fax: 0-2218-8147* ***E-mail: eccu@chula.ac.th***

3.12 Limitation

There is a limitation of time and budget for the research. Additionally, the research was conducted in Mueang District, Roi Et province (not at the provincial level), therefore; the results may not be viewed as a representative of all population in Thailand.

3.13 Expected Benefits from the Research.

1. Awareness related to DM of the sample group is increased.
2. Peer supporting group to promote good health behaviors is established.

CHAPTER IV
RESEARCH RESULTS

The current study was a 'Quasi-Experimental Research' where the researcher collected the data through using questionnaire among the population having high risks toward Diabetes Mellitus in pre- and post- experiment. A total of 60 samples were recruited. The 30 samples were in the experimental group attending the camping program on the "Change in Health Behavior". On the other hand, another 30 samples as the comparison group only received brochures. The data collected were reviewed for its correctness and later analyzed by using Statistical Package for the Social Sciences (SPSS) version 17. The results can be described through the following sections:

1. Symbols used for results presentation.
2. Structure of results presentation.
3. Results found through data analysis

4.1 Symbols Used for Results Presentation

To communicate the same understanding of the research results, the researcher defined a meaning of each symbol used in the process of data analysis as following:

$\bar{X}$	represents	Average
n	represents	Number of samples
S.D.	represents	Standard Deviation
t	represents	Test statistic for T-distribution
p	represents	Statistical probability
*	represents	Statistical significance level of .05

4.2 Structure of Results Presentation

Results found through the data analysis among the experimental group and the comparison group can be explained in the below parts:

Part one: an analysis of numbers and percentages by general data of the sample groups.

Part two: a comparison on health behaviors among population having high risks toward Diabetes Mellitus residing in Mueang District, Roi Et province.
Unpaired t – test was used to compare data related to physiology, knowledge, and behaviors of the experimental group and the comparison group.

Part three: a comparison on health behaviors among population having high risks toward Diabetes Mellitus residing in Mueang District, Roi Et province. Paired t – test was used to compare data related to physiology, knowledge, and behaviors in pre- and post- experiment.

4.3 Results found through the process of data analysis

Part one: Analysis of numbers and percentages on general data of the sample groups.

Table 4.1: Numbers and Percentages on general data of the sample group

General Data	Experimental group (n=30)		Comparison group (n=30)	
	Number	Percentage	Number	Percentage
1. Gender				
Male	11	36.7	9	30
Female	19	63.3	21	70
2. Education level				
Primary school	24	80.0	21	70.0
Junior high school	2	6.7	2	6.7
High school/vocational certificate	1	3.3	4	13.3
Diploma/high vocational certificate	0	0.0	1	3.3
Bachelor's degree	3	10.0	2	6.7

Table 4.1 (Cont.)

General Data	Experimental group (n=30)		Comparison group (n=30)	
	Number	**Percentage**	**Number**	**Percentage**
3. Marital status				
Single	1	3.3	2	6.7
Couple	22	73.3	24	80.0
Widow/divorced/separate	7	23.3	4	13.3
4. Principal occupation				
Farming/gardening	14	46.7	26	86.6
Traders	9	30.0	2	6.7
Work for wages	4	13.3	0	0.0
Others	3	10.0	2	6.7
	Experimental group (n=30)		**Comparison group (n=30)**	
5. Age				
Mean	50.43	S.D. = 5.57	50.73	S.D. = 5.90
Minimum	40		40	
Maximum	59		59	
6. Household's monthly income				
Median	5,000	IQR	5,000	IQR
Minimum	2,000	(-1,031.25	1,000	(-250
Maximum	60,000	-14,218.75)	27,620	-13,750)
7. Household's monthly expense				
Median	5,000	IQR	4,000	IQR
Minimum	3,000	(-625	500	(-1,287.5
Maximum	40,000	-10,375)	25,000	-12,812.5)

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Table 4.1 (Cont.)

General Data	Experimental group (n=30)		Comparison group (n=30)	
8. Physiology				
Body Mass Index (BMI)				
Mean	27.12	S.D. = 1.75	27.66	S.D. = 1.55
Minimum	25.20		25.21	
Maximum	29.77		29.74	
Waist circumference				
Mean	90.26	S.D. = 7.80	90.50	S.D. =20.86
Minimum	80		80	
Maximum	111		130	

Table 4.1 indicates that majority (63.3%) of the experimental group was women and the average age of the group was 50.43 years old (SD= 5.57). The youngest was 40 years old, while 59 years of age was the oldest person in the group. About 80 percent of all completed primary school and over seventy-three percent (73.3%) lived with their spouses. Almost half of them (46.7%) conducted farming/gardening as principal occupation. The lowest and highest rates of household's monthly income were Baht 2,000 and 60,000, respectively. In addition, an average rate of household's monthly income was Baht 5,000. In contrast, the lowest rate of household's monthly expense was Baht 3,000, while the highest rate was Baht 40,000. Additionally, an average rate of household's monthly expense was Baht 5,000. For the measurement of BMI, the lowest value was 25.20 and the highest was 29.77. Moreover, value of 27.12 (SD = 1.75) was found as an average BMI. The smallest and biggest waist circumference were 80 centimeters and 111 centimeters, respectively, while an average waist circumference was 90.26 centimeters.

For the comparison group, most of them (70%) was female with an average age of 50.73 years old (SD = 5.90). The youngest one was 40 years old while the oldest one was 59 years of age. Majority (70%) of the group completed primary school and 80.0% lived with their spouses. Almost ninety percent (86.6%) were principally worked in the field of farming/gardening. The lowest rate of household's monthly income was Baht 1,000, while the highest was 27,620. Moreover, an average rate of household's monthly income was Baht 5,000. On the contrary, the lowest rate of household's monthly expense was Baht 500 while the highest rate was Baht 25,000. In addition, an average rate of household's monthly expense was Baht 4,000. For the measurement of BMI, the lowest value was 25.21 while the highest was 29.74. Additionally, value of 27.66 (S.D.=1.55) was found as an average BMI. The smallest and largest waist circumference was 80 centimeters and 130 centimeters, respectively, while an average waist circumference was 90.50 centimeters (SD = 20.86).

It was found that the distributions of general data between these two groups (the experimental and comparison groups) are similar. The majority of each group was female and the highest education level was primary school. In addition, most of them lived with their spouses and conducted farming/gardening as principal occupation. An average age of two groups was 50 years old. An average household's monthly income was at Baht 5,000 while 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 and waist circumference was 90 centimeters.

Part two: A comparison on health behaviors among the samples having high risks of getting Diabetes Mellitus type II who resided in Mueang District, Roi Et province.

Unpaired t – test was used to compare the data related to physiology, knowledge, and behaviors of the experimental group and the comparison group.

Table 4.2 : Comparison on health behaviors in relation to physiology pre-experiment between the experimental group and the comparison group

Physiology	Experimental group (n=30)		Comparison group (n=30)		*t*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	S.D.		
BMI	27.12	1.75	27.66	1.55	-1.272	0.208
Waist circumference	90.26	7.80	91.06	20.86	-0.197	0.845

Table 4.2 indicates that in pre-experiment, BMI and waist circumference of the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, among the two groups (experimental and comparison groups) had no statistical difference in mean value.

Table 4.3: Comparison on health behaviors in relation to physiology in post-experiment between the experimental group and the comparison group

Physiology	Experiment group (n=30)		Comparison group (n=30)		*T*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	S.D.		
BMI	26.59	1.96	27.51	1.56	-1.998	0.050
Waist circumference	87.46	7.72	92.76	10.76	-2.191	0.033*

* Significance level of 0.05

Table 4.3 indicates that BMI and waist circumference of the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, in pre and post experiment had no statistical difference in mean value. When comparing these two groups, it was shown that the waist circumference had some difference in mean values with the statistical significance at the level of 0.05.

Table 4.4: Comparison on health behaviors in relation to knowledge in pre-experiment between the experimental group and the comparison group

Knowledge	Experimental group (n=30)		Comparison group (n=30)		*t*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	S.D.		
1.Diabetes Mellitus related knowledge	7.36	1.49	6.03	1.99	2.932	0.05*
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 4.4 indicates that in pre- experiment, the knowledge of the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, among the two groups (experimental and comparison groups) had difference in mean value with the statistical significance of the level of 0.05. The result showed that 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.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Table 4.5: Comparison on health behaviors in relation to knowledge in post-experiment between the experimental group and the comparison group

Knowledge	Experimental group (n=30)		Comparison group (n=30)		*t*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.5 indicates that in post- experiment, DM knowledge and diet related behaviors among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, among the two groups (the experimental and the comparison 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 4.6: Comparison on health behaviors in relation to behavior in pre-experiment between the experimental group and the comparison group

Behavior	Experiment group (n=30)		Comparison group (n=30)		*T*	*p*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.6 indicates that in pre- experiment, the behaviors of the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et

province, among the two groups (the experiment and the comparison groups) had no difference in mean value. Considering on particular areas, it was found that in pre-experiment, there was no difference in mean value on the aspect of diet and exercise behaviors among these two groups.

Table 4.7: Comparison on health behaviors in relation to behavior in post-experiment between the experimental group and the comparison group

Behavior	Experimental group (n=30)		Comparison group (n=30)		*t*	*p*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.7 indicates that in post-experiment, the behaviors of the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, among these two groups (experimental and comparison groups) had differences in mean value with statistical significance at the level of 0.05. Considering on particular aspect, it was found that in post- experiment, diet and exercise behaviors among both groups had differences in mean value with statistical significance at the level of 0.05. Additionally, the experimental group had better health behaviors by performing more exercise rather than the comparison group.

Part three: A comparison on health behaviors among samples having high - risks of getting Diabetes Mellitus type II who resided in Mueang District, Roi Et province. Paired t – test was used to compare data related to physiology, knowledge, and behaviors in pre- and post- experiment.

Table 4.8: Comparison on health behaviors related to physiology in the experimental group in pre- and post- experiment.

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

* Significance level of 0.05

Table 4.8 indicates that among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, 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.

Table 4.9: Comparison on health behaviors related to physiology in the comparison group in pre- and post- experiment.

Physiology	Pre		Post		*t*	*p*
	$\overline{X}$	S.D.	$\overline{X}$	S.D.		
BMI	27.66	1.55	27.51	1.56	0.514	0.611
Waist circumference	91.06	20.86	92.76	10.76	-0.383	0.705

Table 4.9 indicates that among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, the BMI and waist circumference of the comparison group had no statistical differences in mean value.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Table 4.10: Comparison on health behaviors related to knowledge in the experimental group in pre- and post- experiment

Knowledge	Pre		Post		*T*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.10 indicates that among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, 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.

Table 4.11: Comparison on health behaviors related to knowledge in the comparison group in pre- and post- experiment

Knowledge	Pre		Post		*t*	*p*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.11 indicates that the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, in pre- and post-

experiment, 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 4.12: Comparison on health behaviors related to behavior in the experimental group in pre- and post- experiment

Behavior	Pre		Post		*T*	*p*
	$\overline{X}$	S.D.	$\overline{X}$	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 4.12 indicates that among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, 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.

Table 4.13: Comparison on health behaviors related to behavior in the comparison group in pre- and post- experiment

Behavior	Pre		Post		*T*	*P*
	$\overline{X}$	S.D.	$\overline{X}$	S.D.		
1.Diet	11.86	1.92	11.40	0.38	1.000	0.326
2.Excercise	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 4.13 indicates that among the samples having high risks toward type II Diabetes Mellitus who resided in Mueang District, Roi Et province, the overall

behaviors of the comparison group in pre- and post- experiment had no difference in mean value.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This study was a Quasi - Experimental Research with an objective to study the behavior differences between high risk toward type II diabetic patients who attended and who did not attend the camping program on the 'Change in Health Behavior'. The sample groups in this research were those with high risk toward type II Diabetes Mellitus who received more than 6 points according to the risk evaluation criteria by Mr. Wichai Ekplakorn and his team. The sample groups had to reside in Mueang District, Roi Et province, for at least 6 months and had to be between 40-59 years old. Voluntary method was used to recruit the sample groups from 2 sub-districts. The experimental group of 30 samples was recruited to attend the camping program while another 30 samples of the comparison group were received only brochures, totaling 60 samples according to its regulation. The inclusion criteria were set. The volunteers conducted the pre- and post- questionnaire interview to measure their weight, height, waist circumference, body mass index (BMI) during September to December 2009. (or December 2009 only for data collection period). The data was analyzed through the use of descriptive statistics to explain the results by the distribution of frequency, percentage, mean, and standard deviation. Comparison of knowledge regarding Diabetes Mellitus, diet, exercise, and health behavior, in pre- and post- experiment, within and between the experimental and the comparison groups, with statistical confidence 95% (p <0.05) (α = 0.05) were made. This chapter was structured in the following order (1) the objective of the study (2) summary of the results (3) discussion of the results and (4) recommendations given.

5.1 Study objective

1.The study aimed to learn the behavior diet and exercise have differences between high risks toward

type II diabetic patients who attended and who did not attend the camping program on the 'Change in Health Behavior'

2. To study the effect of the interventions on physiological parameters (BMI / waist circumferences who did not attend the camping program on the 'Change in Health Behavior'

5.2 Summary of the results

1. Results on an analysis of numbers and percentage regarding general information of the sample groups, revealed that: It was found that the distribution of general data between these two groups (the experimental and the comparison groups) was similar as the majority of each group was females with highest education level of primary school. Most of them lived with their spouses and conducted farming/gardening as their principal occupation. An average age of the two groups was 50 years old with average household's monthly income of Baht 5,000 while average household's monthly expense of the experimental and the 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 waist circumference was 90 centimeters.

2. An analysis on the comparison of health behavior of high risk toward type II diabetic patients, Mueang district, Roi Et Province, in terms of physiology, knowledge, and behaviors, between the experimental and the comparison groups revealed that BMI and waist circumference, knowledge and health behaviors in pre-experiment between the experimental and the comparison groups was not different in mean value. However, In post-experiment between the experimental and the comparison groups, revealed that waist circumference, knowledge on DM, knowledge on diet, behavior on diet and behavior on exercise had differences in mean value with the statistical significance at the level of 0.05

3. An analysis on the comparison of health behavior of high risk toward type II diabetic patients, Mueang District, Roi Et Province, in terms of physiology,

knowledge, and behaviors in the pre- and post experiment, it was found that in pre-experiment, BMI and waist circumference within the experimental group was higher than the post- experiment with differences in mean value at statistical significance of the level of 0.05. It was found that in post- experiment, there was more knowledge comparing to what they had in pre- experiment. In addition, in post-experiment for each aspect, knowledge on DM and diet was improved comparing to what they had in the pre- experiment. Regarding the knowledge on exercise, it had a difference in mean value with the statistical significance at the level of 0.05, and it was found that in post-experiment, the behavior was better improved than what it was in pre- experiment. In this aspect, the behavior on diet had a difference in mean value with the statistical significance at the level of 0.05. For the comparison groups, between pre- and post-experiment, BMI and waist circumference had no difference in mean value. It was found that in post- experiment, there was more knowledge compared to what it was in pre- experiment. In this aspect, knowledge on DM had a difference in mean value with the statistical significance at the level of 0.05 and there was no difference in mean value in pre- and post- experiment. In each aspect, it was found that health behavior on diet and exercise had no difference in mean value.

5.3 Discussion of the results

The study on the " model for behavioral change in high risk toward diabetes type II patients by camping, Mueang District, Roi Et province, Thailand. The results could be discussed as follows:

The result of the current study in post- experiment between the experimental group and the comparison group showed that the comparison group had a larger waist circumference than the experimental group. In addition, it was found that the experimental group had more overall knowledge than the comparison group. In each aspect, it was found that the experimental group had more knowledge and

understanding than the comparison group. Furthermore, it was found that the experimental group had better health behavior about diet and exercise than the comparison group. This can be concluded that through utilization of theories regarding a group process and an empowerment, the experimental group who attended the camping 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 camping program comparing to the comparison group who had only a self-study from the brochures. The result showed that the experimental group had a smaller waist circumference comparing to the comparison group. This is in line with several studies as folloinwg 1) by Tithima Wiriya (2004) who studied the effectiveness of the health promotion program toward the change in health behaviors of DM patients at the DM Clinics, Viengsa Hospital, Nan province; 2) by Taksina Tanyaharn (1997) who conducted a study on the effectiveness of nutrition study to reduce the level of cholesterol among male obese teenagers with an application of the behavioral sciences; 3) by Supim Oon-prom and Nongnuch O-ba (2007) who stated about the program on health knowledge toward health promotion behavior among people of high risk toward adult diabetes mellitus; 4) by Patcharee Chuethong (2005) who studied the result of the health promotion program toward self-care behavior and the control on blood sugar of DM type II patients; by Anchalee Meesena (2005) who studied the program to prevent DM toward BMI, blood glucose level, self-care knowledge, cholesterol level and triglyceride level in high risk group for DM; and 5) by Yenrudee Keawpituk and Piyanut Khunsawat (2009) who studied the risk assessment of Diabetes Mellitus among staff in the Walailak University. However, the result of this study differs from the study by Chutarat Lom-on (2005) who studied on the result of the promotion of

self-care behaviors of DM type II patients at the Pen Hospital, Amphur Pen, Udornthani. Furthermore, the health behaviors related to knowledge was changed dramatically post-experiment in the experimental, knowledge related DM, diet and exercise provided by the experts through the camp program was more effective than the self-study. Since, during the camping 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. The result corresponded to the study by Sriked Thanyavinichkul (1995) who set up the health promotion program for Diabetes Mellitus and hypertension patients as the high risk group; by Seksan Chantana (2008) whose study was on the results of the health management for the change of health belief and health behavior for the prevention of type II DM of high risk group; and by Chittiporn Nabsuwan, Jirapan Jinawong, Taweesak Mosayangkul (2003) who studied the results of the knowledge and determination to lose weight of overweight customers at "Suwan Pharmacy" in Ayutthaya province. 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 useful for them. The result of the current study was in line with the study by Seksan Chantana (2008) who studied the health management to adjust health belief and health behaviors to prevent DM type II of high risk group in Panom District, Nakornpanom Province; by Anong Nilkamhaeng and Chalae Pimpan (2007) who study was on the program on health behavior change to reduce cholesterol in blood among staff at the Chainat Hospital; and by Srisuda Aklukkanarat and Thanatcha Paipayob (2006) who conducted a study on an empowerment by providing group counseling service for an impact on the diet and exercise -related behaviors of teenagers with food over-consumption habit.

However, the result differs from the study by Sukanya Saisaengjun and Yochita Boonchaleaw (2007) who conducted a study on the efficiency of health modification program for government officers with abnormal physical condition.

5.4 Recommendations

5.4.1 Recommendations based on the study results

The result on the behaviors of high risk group toward Type II DM who attended the camping program on the "Change in Health Behavior" and those who did not attend, revealed that the experimental group had more knowledge on DM and on diet and had better health behaviors in diet and exercise than the comparison group in post-experiment This indicated that the camping program on the "Change in Health Behavior" for high risk group toward type II DM could motivate the samples to perceive the importance for self-care behaviors and to consequently to make changes in improving their own health behavior related to 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 domain and public health staff should consider promoting the camping program for the change in health behavior of high risk group toward type II DM 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.

5.4.2 Recommendations for future research

1) The result of this study indicated that the target group was more aware of and possessed more self-care behavior compared with the comparison group. Nevertheless, There would have certain limitations, for instance; limits on the period of the study. In order to build-up the continuum and long-term sustainability, the concerned community leaders and community stakeholders should participate in problem-solving strategy and should also support the budget for health promotion of the community.

2) There should be more study on social support from spouse, offspring, or relatives of the type II DM patients with an aim to change the patient's health behavior, especially the patients in high risk group. More research and development should also be implemented in this regard.

3) The future study should be a long term follow up in order to evaluate the sustainable of good behavior.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Reference

Alberti KG., and Zimmet PZ. 1998. Definition, diagnosis and classification of diabetes mellitus and its complications: diagnosis and classification of diabetes mellitus: provisional report of a WHO consultation. Diabetes Med 15:539–553,

American Diabetes Association. 2003. Evidence-Based Nutrition Principles and Recommend for the Treatment and Related Complication. Diabetes Care.Vol 6 Suppl ;Jan 2003.

American Diabetes Association. 2004. Diagnosis and classification of diabetes mellitus.? Diabetes Care 2004;27(suppl1):S5-S14

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

Chantana S. 2008 . Health management to change health belief and behavior to prevent type II DM of high risk group who were living in Tadpanom District, Nakorn Panom province. Master's Thesis, Faculty of Public Health, Mahasarakharm University.

Charoenpan J., and Tonskul, C. 2006. Health related Behavior**.** Maha Sarakham: Faculty of Public Health, Mahasarakharm University

Chotimongkol R. 2000. Self - care practices of non insulin dependent diabetes mellitus patients in Out – Patient , Research , Khon Kean University.

Chuethong P. 2005. The health promotion program toward self-care behavior and the control on blood sugar of DM type II patients. Master's Thesis, Master of Nursing Science , Program in Adult Nursing, Khon Kaen University.

Chutarat Lom-on .2005. The promotion of self-care behaviors of DM type II patients at the Pen Hospital, Amphur Pen, Udornthani. Master's Thesis, Public Health Program, Subject of Health Education and Health Promotion, Khon Kean University.

Duangsong R. 2002. Mental Health Promtion and Psychiatric Nursing. Nonthaburi : Sukothaithammathirat University printing house.

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

Eklukkanarat S., and Phaipayob T. 2006. Advantages of Power Development by providing group counseling to change behavior related to exercise and food consumption among obese teenagers. Nakhon sawan: Sawanphachaluk nursing college.

Ekplakorn V., and others. 2005. Diabetes risk score. [Online]. Available from: http://library.hsri.or.th/ [2009, July 13]

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.

Himathongkum T. 2007. Knowledge on Diabetes Mellitus. 8th ed. Bangkok : Witayanipon printing house. Page 27 to 76

Horton ES. 1986. Exercise and physical training effects on insulin sensitivity and glucose metabolism. Diabetes Metabolism Review.

Jantha S. 2007. Health Management for Change in Health related Attitude and Behavior towards Diabetes Mellitus Type II among High Risk Group towards Diabetes Mellitus , Thad Pranom sub-district, Nakhon Phanom province. Master's Thesis, Health System Management, Mahasarakharm University.

Jareonbut P. 2007. Implementation of Health Promotion related to food, nutrition for development of Public Health Institute to become 'Health Promotion Organization'. Page 26-28

Jareonbut P. 2007. Implementation of Health Promotion related to food, nutrition for development of Public Health Institute to become 'Health Promotion Organization'. Page 26-28

Jessadametha A. 2002. Pharmacotherapy for the Prevention of Macro vascular Complications in Diabetes Mellitus. Meeting materials for the Association of Hospital Pharmacy (Thailand), 1st time 'Be updated with use of drug for complications of diabetes mellitus'

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

John C., Pickup W. ,and Gareth W. 1994. The heart and macro vascular disease in mellitus. Chronic Complication of Diabetes. London : Blackwell Scientific Publications: p 195-209

Harris K. 2000. Effects of changes in sandeel availability on the reproductive output of seabirds. Marine Ecology Progress Series 202: 241-252.

Keawpituk Y. , and Khunsawat P. 2009. Risk factor assessment and intervention for diabetes prevention in Walailak university personnel. School of Allied Health Sciences and Public Health J Health Res 23(1) : 47-54

Keawwanrat A. 2003. Writing of Implementation Plan for Health Education: 3rd ed. Chonburi, Chonburi house printing.

Knowler WC, and others. 2002. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. Feb 7;346(6):393-403.

Meesena A. 2004. Results from the Program 'Prevention of Diabetes Mellitus towards BMI, Blood Glucose Level, Self-care, Cholesterol Level and Triglyceride level among group with high-risks towards diabetes mellitus. Master's Thesis, Adult Nursing, Rang-Sit University.

Ninkamheang A.,and Pimphan, C. 2007. Results from Program 'Health Promotion to change behaviors to reduce cholesterol among officials in Chai-Nat Hospital. Master's Thesis, Health Promotion, Ratchapat Nakhon Sawan

Nubsuwan J., Jinnawong J., and Hemachayangkul T. 2003. Results from the Project 'Weight loss for Health towards Knowledge and Efforts in loosing weight of Obese People. Master's Thesis, Pharmacy Faculty of Pharmaceutical Sciences, Naresuan University.

Ounprom S., and 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.

Pawattakul P. 2007. Food to prevent and cure or treatment for the disease, food related to nutrition, education, food. Deficient or non-nutrient, To protect and maintain chronic nutrition-related. Bangkok : Department of food science ,College of Health Sciences , Mahidol University.

Robbins JM., vaccarino JM. , and Kasl SV. 2001. Socioeconomic status and type 2 diabetes in African American and on Hispanic white women and men : evidence from the Third National health and Nutrition Examination Survey : Am J Public Health 91: 78-83

Santayakorn J. , and Wansiri., C. 2009. Model Development for Spirit Encouragment related to health of Patients with Knee Arthrosis in Bangrakum sub-district, Phitsanulok: Development for Patients with Chronic Disease. [Online]. Available from : http://www.nurse.nu.ac.th/ [2009, August 13]

Saisangjun S., and Boonchaleoy Y. 2007. Efficacy received from attending the program 'Behavior Change' among government officials having abnormal health check-up results: Research

Sriansadaporn S.,and Nithiyanant W. 2005. Diabetes . Bankok : Reankeaw house printing.

Srimadee W. 2000. Textbook of Medicine4. 1st ed. Bangkok : Chulalongkorn University house printing.

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

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

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

Supornsilchai C. 2005. Trends for Violence Situation and Risk Factors towards Incommunicable Diseases as well as Protocol in Preventing and Managing Risks of Hypertension, Diabetes mellitus, Heart Disease, and Blood Vessel. 27 June 2005 (A version in hard copy). Phitsanulok: Phitsanulok Public Health Office.

Suwanwalaikorn S. 2008. Article 'Diabetes Mellitus'. [Online]. Available from : http://www.sp.worldmedic.com [2009, July 13]

Tanyaharn T. 1997. The effectiveness of nutrition study to reduce the level of cholesterol among male obese teenagers with an application of the behavioral sciences. Master's Thesis, Major Subject: Dietetics , Mahasarakham University.

Thanyavinitkul S. 1995. Health Promotion Program for Diabetic Patients and risky group towards diabetes mellitus. [Online]. Available from: http://www.aihd.mahidol.ac.th. [2009, August 12]

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

Wilson D. ,and Mary S. 1991. Model of behavior change. The College of Dental Medicine, Medical University of South Carolina.

Wiriya T. 2004. The effectiveness of the health promotion program toward the change in health behaviors of DM patients at the DM Clinics, Viengsa Hospital, Nan province. Master's Thesis, Science Subject , Health Education, Kasetsart University.

World Health Organization .2000. Diabetes. Geneva: World Health Organization.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDICES

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Questionnaire on health behavioral (pre-experiment) NO .....

The study on the "**MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING , MUEANG DISTRICT, ROI ET PROVINCE ,THAILAND"**

Researcher's name : Mrs. Sura suphomin Degree of Master in Health Systems Development, the College of Pupblic Health Sciences, Chulalongkorn University

To: All participants

Explanation: This questionnaire consists of three parts as follows:

Part One: General data of the participants

Part Two: Knowledge in several aspects of the participants

Part Three: Behavior in several aspects of the participants

Instruction: Please mark '✓' in the box ❑ or fill-in the data in the space provided based on the fact.

Part I Personal Data

1. Gender (Sex) 1 ( ) Male 2 ( ) Female

2. Age..... years old (Age)

3. Education Level (Edc)

1 ( ) Primary school 2 ( ) Lower secondary school 3 ( ) Upper secondary school

4 ( ) Diploma 5 ( ) Bachelor's degree 6 ( ) Higher than Bachelor's

7 ( ) Other……

4. Marital Status (Status)

1 ( ) Single 2 ( ) Married 3 ( ) Widow/ Divorced/Separate

5. Current occupation (Occ)

1 ( ) Agriculture 2 ( ) Trader 3 ( ) Employee 4 ( ) Others, please specify…

6. Household's monthly income ..... Baht [ ]

7. Household's monthly expense ..... Baht [ ]

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

8. Weight……kilogram, Height……centimeters, Waist circumference……
centimeters (specific the date you measured your body)

Part II: Knowledge of the research participant

Instruction: Please mark ✓ in the column 'YES' or 'NO' or 'DO NOT KNOW' to opine on each statement (only one answer can be chosen).

NO	Item	Yes	No	Do Not Know	Code
	2.1 Knowledge on Diabetes Mellitus				**K**[ ]
1	If blood glucose level is over 10mg/dl before having breakfast, it is considered that one is at high-risk of getting Diabetes Mellitus.				**K1**[ ]
2	Screening for Diabetes Mellitus can help identifying people who are at risk for Diabetes Mellitus and preventing/controlling it at the beginning stage.				**K2**[ ]
3	Overweight or fat people are at risk for Diabetes Mellitus.				**K3**[ ]
4	Losing weight helps reducing the risks for Diabetes Mellitus, hypertension and hyperlipidemias.				**K4**[ ]
5	A chance for Diabetes Mellitus between people having visceral fat (a hazardous factor causing Diabetes Mellitus), and people without visceral fat, is equal.				**K5**[ ]
6	Symptoms of 'Hypoglecemia' include sweating, heart shake, and cold body.				**K6**[ ]
7	Diabetes Mellitus causes the complications of all types of body systems, for instance, renal failure, leg amputation, and paralysis.				**K7**[ ]

NO	Item	Yes	No	Do Not Know	Code
8	Health behaviors of family members are considered partially stimulating factors in getting Diabetes Mellitus, for example, family having obese people usually behaves inappropriately in diet and lack of exercise activities.				**K8**[ ]
9	Tobacco smoking and alcohol drinking are considered the stimulating factors for getting Diabetes Mellitus and hypertension.				**K9**[ ]
10	Taking medicine and injection of insulin can control glucose level so that it is not necessary to give other types of health care.				**K10**[ ]
	2.2 Knowledge on food consumption				
1	Taking vegetable and fruit at a minimum of half-kilogram daily can prevent Diabetes Mellitus, cancer, hypertension and heart & blood vessels related to diseases.				**K11**[ ]
2	Diabetic patients are allowed to take everything but they must limit to take them only within an appropriate quantity.				**K12**[ ]
3	Millet, corn, green bean and glass noodle, are types of carbohydrate food equivalent to rice.				**K13**[ ]
4	One should take three meals a day and should not skip any meals solely for the purpose of weight loss.				**K14**[ ]
5	People, who wish to overcome visceral fat, should reduce the food quantity at breakfast and lunch and increase the food quantity at dinner instead.				**K15**[ ]

NO	Item	Yes	No	Do Not Know	Code
	2.3 Knowledge on exercise				
1	One should choose the types of exercise that are appropriate to one's sex and age.				**K16**[ ]
2	Exercise makes the body's blood system circulate while enables the muscle and other body's systems get stronger.				**K17**[ ]
3	Exercising 5 days a week at the minimum of 45 minutes each time can reduce the risks for chronic disease, Diabetes Mellitus, and hypertension.				**K18**[ ]
4	Before doing any exercise, body's muscles should be stretched out to prevent any injury of muscles.				**K19**[ ]
5	Exercise can help reducing cholesterol.				**K20**[ ]

Part Three : Behavior of the research participants

Instruction: Please mark '✓' in the column to indicate how you behave the stated activities in the past 15 days.

NO	Item	Behavior Level			Code
		Regular (5-7 days a week))	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
	3.1 Behavior related to food consumption				
1	You fill-up half of your plate with vegetables and fruit at each meal.				B1 [ ]
2	You always take too much food until your stomach comes to grips.				B2 [ ]

NO	Item	Behavior Level			Code
	3.1 Behavior related to food consumption (cont'd)	Regular (5-7 days a week)	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
3	You take vegetables and fresh fruits at a minimum of half kilogramdaily.				B3 [ ]
4	You take food or dessert cooked with coconut milk such as 'Keang Pet' (spicy curry), "Keang Kiew Wan' (green curry), 'Keang Massamum, 'Keang Kua' (prawn and pineapple curry), 'Kluy Buat Chi' (banana in coconut milk), 'Lod Chong' (rice noodles made of rice with coconut cream).				B4 [ ]
5	You like to take and always have extremely sweet food.				B5 [ ]
	3.2 Behavior related to exercise				
1	You exercise at least 5 days a week at a minimum of 45 minutes each day. Each time of exercise you will keep on exercising until you get enough or feel really tired.				B6 [ ]
2	You have sedentary lifestyle daily				B7 [ ]
3	You move your body such as washing a car, doing housework, walking to the work				B8 [ ]

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

NO	Item	Behavior Level			Code
		Regular (5-7 days a week)	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
	3.2 Behavior related to exercise (cont'd)				
	place at least 3-5 days a week at a minimum of 30 minutes daily. Each time of moving, you will get enough tired.				
4	You warm-up your body about 5-10 minutes before exercising/playing sport.				B9 [ ]
5	You stretch out your muscle about 5-10 minutes after exercising/playing sport.				B10[ ]

Thank you everybody for your kind cooperation.

Researcher

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Questionnaire on health behavioral (pre-experiment) NO .....

The study on the "**MODEL FOR BEHAVIORAL CHANGE IN HIGH RISK TOWARD DIABETES TYPE II PATIENTS BY CAMPING, MUEANG DISTRICT, ROI ET PROVINCE ,THAILAND"**

Researcher's name : Mrs. Sura suphomin Degree of Master in Health Systems Development, the College of Pupblic Health Sciences, Chulalongkorn University

To: All participants

Explanation: This questionnaire consists of three parts as follows:

Part One: General data of the participants

Part Two: Knowledge in several aspects of the participants

Part Three: Behavior in several aspects of the participants

Instruction: Please mark '✓' in the box ❑ or fill-in the data in the space provided based on the fact.

Part I Personal Data

1. Gender (Sex) 1 ( ) Male 2 ( ) Female

2. Age..... years old (Age)

3. Education Level (Edc)

1 ( ) Primary school 2 ( ) Lower secondary school 3 ( ) Upper secondary school

4 ( ) Diploma 5 ( ) Bachelor's degree 6 ( ) Higher than Bachelor's

7 ( ) Other……

4. Marital Status (Status)

1 ( ) Single 2 ( ) Married 3 ( ) Widow/ Divorced/Separate

5. Current occupation (Occ)

1 ( ) Agriculture 2 ( ) Trader 3 ( ) Employee 4 ( ) Others, please specify…

6. Household's monthly income ..... Baht [ ]

7. Household's monthly expense ..... Baht [ ]

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

8. Weight……kilogram, Height……centimeters, Waist circumference……
centimeters (specific the date you measured your body)

Part II: Knowledge of the research participant

Instruction: Please mark ✓ in the column 'YES' or 'NO' or 'DO NOT KNOW' to opine on each statement (only one answer can be chosen).

NO	Item	Yes	No	Do Not Know	Code
	2.1 Knowledge on Diabetes Mellitus				**K** [ ]
1	If blood glucose level is over 10mg/dl before having breakfast, it is considered that one is at high-risk of getting Diabetes Mellitus.				**K1**[ ]
2	Screening for Diabetes Mellitus can help identifying people who are at risk for Diabetes Mellitus and preventing/controlling it at the beginning stage.				**K2**[ ]
3	Overweight or fat people are at risk for Diabetes Mellitus.				**K3**[ ]
4	Losing weight helps reducing the risks for Diabetes Mellitus, hypertension and hyperlipidemias.				**K4**[ ]
5	A chance for Diabetes Mellitus between people having visceral fat (a hazardous factor causing Diabetes Mellitus), and people without visceral fat, is equal.				**K5**[ ]
6	Symptoms of 'Hypoglecemia' include sweating, heart shake, and cold body.				**K6**[ ]
7	Diabetes Mellitus causes the complications of all types of body systems, for instance, renal failure, leg amputation, and paralysis.				**K7**[ ]

NO	Item	Yes	No	Do Not Know	Code
8	Health behaviors of family members are considered partially stimulating factors in getting Diabetes Mellitus, for example, family having obese people usually behaves inappropriately in diet and lack of exercise activities.				**K8**[ ]
9	Tobacco smoking and alcohol drinking are considered the stimulating factors for getting Diabetes Mellitus and hypertension.				**K9**[ ]
10	Taking medicine and injection of insulin can control glucose level so that it is not necessary to give other types of health care.				**K10**[ ]
	2.2 Knowledge on food consumption				
1	Taking vegetable and fruit at a minimum of half-kilogram daily can prevent Diabetes Mellitus, cancer, hypertension and heart & blood vessels related to diseases.				**K11**[ ]
2	Diabetic patients are allowed to take everything but they must limit to take them only within an appropriate quantity.				**K12**[ ]
3	Millet, corn, green bean and glass noodle, are types of carbohydrate food equivalent to rice.				**K13**[ ]
4	One should take three meals a day and should not skip any meals solely for the purpose of weight loss.				**K14**[ ]
5	People, who wish to overcome visceral fat, should reduce the food quantity at breakfast and lunch and increase the food quantity at dinner instead.				**K15**[ ]

NO	Item	Yes	No	Do Not Know	Code
	2.3 Knowledge on exercise				
1	One should choose the types of exercise that are appropriate to one's sex and age.				**K16**[ ]
2	Exercise makes the body's blood system circulate while enables the muscle and other body's systems get stronger.				**K17**[ ]
3	Exercising 5 days a week at the minimum of 45 minutes each time can reduce the risks for chronic disease, Diabetes Mellitus, and hypertension.				**K18**[ ]
4	Before doing any exercise, body's muscles should be stretched out to prevent any injury of muscles.				**K19**[ ]
5	Exercise can help reducing cholesterol.				**K20**[ ]

Part Three : Behavior of the research participants

Instruction: Please mark '✓' in the column to indicate how you behave the stated activities in the past 15 days.

NO	Item	Behavior Level			Code
		Regular (5-7 days a week))	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
	3.1 Behavior related to food consumption				
1	You fill-up half of your plate with vegetables and fruit at each meal.				B1 [ ]
2	You always take too much food until your stomach comes to grips.				B2 [ ]

NO	Item	Behavior Level			Code
	3.1 Behavior related to food consumption (cont'd)	Regular (5-7 days a week)	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
3	You take vegetables and fresh fruits at a minimum of half kilogramdaily.				B3 [ ]
4	You take food or dessert cooked with coconut milk such as 'Keang Pet' (spicy curry), "Keang Kiew Wan' (green curry), 'Keang Massamum, 'Keang Kua' (prawn and pineapple curry), 'Kluy Buat Chi' (banana in coconut milk), 'Lod Chong' (rice noodles made of rice with coconut cream).				B4 [ ]
5	You like to take and always have extremely sweet food.				B5 [ ]
	3.2 Behavior related to exercise				
1	You exercise at least 5 days a week at a minimum of 45 minutes each day. Each time of exercise you will keep on exercising until you get enough or feel really tired.				B6 [ ]
2	You have sedentary lifestyle daily				B7 [ ]
3	You move your body such as washing a car, doing housework, walking to the work				B8 [ ]

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

NO	Item	Behavior Level			Code
		Regular (5-7 days a week)	Often (1-4 days a week)	Rarely (Less than 1 day a week)	
	3.2 Behavior related to exercise (cont'd)				
	place at least 3-5 days a week at a minimum of 30 minutes daily. Each time of moving, you will get enough tired.				
4	You warm-up your body about 5-10 minutes before exercising/playing sport.				B9 [ ]
5	You stretch out your muscle about 5-10 minutes after exercising/playing sport.				B10[ ]

Thank you everybody for your kind cooperation.

Researcher

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Answers

Part II: Knowledge of research participant

Explanation Please mark ✓ in the box 'YES' or 'NO' or 'DO NOT KNOW' to present what you think about the content stated in the question (only one answer can be chosen).

NO	Item	Yes	No	Do Not Know
	2.1 Knowledge on diabetes mellitus			
1	If blood glucose level is over 10mg/dl before having breakfast, it is considered that one is at high-risk of getting Diabetes Mellitus.	✓		
2	Screening for Diabetes Mellitus can help identifying people who are at risk for Diabetes Mellitus and preventing/controlling it at the beginning stage.	✓		
3	Overweight or fat people are at risk for Diabetes Mellitus.	✓		
4	Losing weight helps reducing the risks for Diabetes Mellitus, hypertension and hyperlipidemias.	✓		
5	A chance for Diabetes Mellitus between people having visceral fat (a hazardous factor causing Diabetes Mellitus), and people without visceral fat, is equal.	X		
6	Symptoms of 'Hypoglecemia' include sweating, heart shake, and cold body.	✓		
7	Diabetes Mellitus causes the complications of all types of body systems, for instance, renal failure, leg amputation, and paralysis.	✓		

NO	Item	Yes	No	Do Not Know
8	Health behaviors of family members are considered partially stimulating factors in getting Diabetes Mellitus, for example, family having obese people usually behaves inappropriately in diet and lack of exercise activities.	✓		
9	Tobacco smoking and alcohol drinking are considered the stimulating factors for getting Diabetes Mellitus and hypertension.	✓		
10	Taking medicine and injection of insulin can control glucose level so that it is not necessary to give other types of health care.	X		
	2.2 Knowledge on food consumption			
1	Taking vegetable and fruit at a minimum of half-kilogram daily can prevent Diabetes Mellitus, cancer, hypertension and heart & blood vessels related to diseases.	✓		
2	Diabetic patients are allowed to take everything but they must limit to take them only within an appropriate quantity.	✓		
3	Millet, corn, green bean and glass noodle, are types of carbohydrate food equivalent to rice.	✓		
4	One should take three meals a day and should not skip any meals solely for the purpose of weight loss.	✓		
5	People, who wish to overcome visceral fat, should reduce the food quantity at breakfast and lunch and increase the food quantity at dinner instead.	X		

NO	Item	Yes	No	Do Not Know
	2.3 Knowledge on exercise			
1	One should choose the types of exercise that are appropriate to one's sex and age.	✓		
2	Exercise makes the body's blood system circulate while enables the muscle and other body's systems get stronger.	✓		
3	Exercising 5 days a week at the minimum of 45 minutes each time can reduce the risks for chronic disease, Diabetes Mellitus, and hypertension.	✓		
4	Before doing any exercise, body's muscles should be stretched out to prevent any injury of muscles.	✓		
5	Exercise can help reducing cholesterol.	✓		

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX B

A camping program agenda

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

The meeting room, Roi Et Hospital

Day I

Time	Subject	Types of Activity	Facilitator
07.00-08.00 AM.	Registration	● Distribution of obesity assessment form, manual, documents and name tag. ● Measurement of weight/height/waist circumference (fill-in the assessment form)	Facilitating team
08.00-09.00 AM.	Pre-test	● Pre-test procedure ● Distribution of questionnaire with an explanation of details and conclusion of agreeable regulations. ● Arrangement for an individual interview	Facilitating team
09.00-10.00 AM.	Group dynamics	● Building participants' relationships. ● Ice-breaking session on "Let's get to know each other" and "Seek for your buddy". ● Dividing into groups by using different color to identify each group and later naming the group.	Facilitating team for group activity

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Day I (cont'd)

Time	Subject	Types of Activity	Facilitator
		• Implementation of group activity including selection of group chairman and secretary, determination of group mission, write-up the motto and the song for the group. • Upon finishing the group activity, the group is required to perform particular body posture or joining in hand-clapping. • The participants collaboratively target the work plan and develop a social contract for the purpose of harmonious team work through the game called 'Fundee/Funrai" (Good/bad dream). • Self-review and make a promise to the group about 'how I make change in health behaviors'.	
10.00 AM.-12.30 PM.	Prevention to Diabetes Mellitus	• Belly fat – an unexpected danger/hazard • General DM knowledge • Risk assessment toward DM	Doctor Wachara Eamratsameekool, an expert
12.30-01.00 PM.	Lunch	Choose any types of food according to individual's requests.	

Day I (cont'd)

Time	Subject	Types of Activity	Facilitator
01.00-01.30 PM.	Group dynamics	Game 'Casting off snake's skin' aiming to encourage participants to leave bad things behind and accept new things for self-development	Facilitating team for group activity.
01.30-03.00 PM.	How to eat and be away from DM.	• Nutrition flag • Healthy food • Local food • Risky food toward an occurrence of disease • Favorite food (how much calories) • Food exchange • Conclusion of calories receipt through lunch menu consumed by each participant	• Khun Pitsamai Bussabun and Khun Bureeyong Sringam, Nutritionist from Roi-Et Hospital. Khun Wathikorn Natpranin, Dietitian
03.00-04.00 PM.	- How to know if you are at risk toward DM.	• Education on risk assessment, individual's calorie calculation, measurement of weight, height, waist circumference, BMI	Khun Sura Suphomin, a registered nurse
04.00-05.00 PM.	- Learning through group activity	• Assessment of risk toward DM according to criteria by participants themselves • Assessment of obesity using individual assessment form • Set the target of weight loss and develop a diet plan to be away from DM	Personal facilitator of each group

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Day I (cont'd)

Time	Subject	Types of Activity	Facilitator
05.00-06.00 PM.	• Lesson Learned • Role-Play	• Each group is required to perform role-play on the topic of appropriate food and dietary with correct nutrition to be away from DM • Set up the schedule for role-play	
06.00-09.00 PM.	Dinner and social time	• Demonstration of food consumption that is proper for an individual on a daily basis. • Demonstration on 'how to take party food and not becoming fat' • Role-play	
10.00 PM.	Leisure time	• Set up the next day-appointment.	

Day II

Time	Subject	Types of Activity	Facilitator
07.00-08.00 AM.	Breakfast	• Demonstration on food leading to weight loss with correct nutrition	Nutritionist team
08.00-09.00 AM.	Group dynamics to build-up bonding relationships among non-belly fat people	• Game on 'Magic Rock'. Participants can gain knowledge through an exchange of experiences among the group.	Facilitating team for group activity

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Day II (cont'd)

Time	Subject	Types of Activity	Facilitator
09.00-10.00 AM.	Skill building-up for menu arrangement for daily energy use	• Each group arranges a food menu that should be consumed daily and make a presentation on how and why for a choice of such menu • Facilitating team makes a conclusion about the issues found	Nutritionist team
10.00-11.00 AM.	Guidelines for exercise for general population and obese people	• Encouraging the participants to tell their story related to self-care behavior and exercise as well as problems they are facing. Solutions can be exchanged during this session • Allowing participants to raise questions and express their opinion • Collaboratively set-up the target for exercise	Khun Narong Lalert, Public health academician (Sport Science)
11.0012.15 AM.	Choice of exercise	• Yoga • Band exercise	Facilitator for exercise
01.00 -02.00 PM.	Group dynamics	Group dynamic activities	Facilitating team
02.00-03.30 PM.	Educational stations	Station 1: Pantomime Station 2: Calories counting Station 3: Warm-up (chair exercise)	Personal facilitator for each group

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Day II (cont'd)

Time	Subject	Types of Activity	Facilitator
03.30 -04.30 PM.	Exercise	• Body pump (Aerobic): moving to burn calories (integrated with correct knowledge)	Facilitator for exercise
04.30-05.00 PM.	• Lesson Learned • Close of the camping program	• Sharing of experiences • Selection of the chairman for the batch of the camping program • The chairman of the batch and group representative give speeches about their feeling to the camping program • Post – test for the camping program • Delivery of commitment to health promotion – peer group promoting healthy behaviors among colleagues • Singing a song on 'Sanyajai' • Set-up schedule to follow-up in next 15 days • Close of the camping program by the Chairman	Facilitating team

Remark: Refreshment time - 10.00- 10.15 AM. and 14.00-14.15 PM.
Lunch time - 12.00 AM. - 13.00 PM.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX C

Budget

The below items and budget are listed out to be used for organizing the camping program on the 'Change in Health Behavior':

No.	Item	Unit	Quantity	Rate/ one unit	Total Amount
1. Wages					
1	Honorarium and travel costs	person	3	8,000	24,000
2	Lunch and snacks for the research participants / organizer / educators	person	30	400	12,000
3	Transportation cost for the research participants	person	30	100	3,000
4	Accommodation for the research participants	person	30	200	6,000
2.Other expenses					
5	Office supplies and brochure production	item	60	100	6,000
6	Supplies and equipments used for the camping program	time	1	6,000	6,000
7	Cost of questionnaire production	piece	120	100	12,000
Total					**69,000**

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX D

Implementation Period and Plan

August 2009to Mruch 2010

Activity/Project	Time Frame (Month)							
	Aug09	Sep09	Oct09	Nov09	Dec09	Jan10	Fed10	Mar10
1. Literature review	↔							
2.Writing thesis Proposal	↔							
3. Submitting for proposal exam		↔						
4.Thesis Proposal exam		↔						
5.Ethical consideration from Chulalongkorn University(CPHS)			↔					
6. Application for Ethical review				↔				
7. Pretest questionnaire				↔				
8.Preparation and collection of data					↔			
9. Data analysis and interpretation					↔	↔		
10. Thesis and article writing						↔	↔	
11.Final thesis exam								↔
12.Submission of article for publication								↔
13.Submission of thesis								↔

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX E

Certification of Research Inspection Tools

After an inspection for suitability of the research questionnaire of Mrs. Sura Suphomin , Student ID No. 5179164953, Master of Public Health Sciences, College of Public Health Sciences, Chulalongkorn University.

I, hereby, certified that this questionnaire and program for behavioral change has Content Validity that is suitable for the topic on "Model for behavioral change in high risk toward Diabetes type II patients by camping , Mueang District, Roi Et Province, Thailand".

……..

(Mrs. Rujira Suriyavanagul)

Specialist in Preventive Medicine

Roi Et Hospital

Date 30/September/2009

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Certification of Research Inspection Tools

After an inspection for suitability of the research questionnaire of Mrs. Sura Suphomin , Student ID No. 5179164953, Master of Public Health Sciences, College of Public Health Sciences, Chulalongkorn University.

I, hereby, certified that this questionnaire and program for behavioral change has Content Validity that is suitable for the topic on "Model for behavioral change in high risk toward Diabetes type II patients by camping , Mueang District, Roi Et Province, Thailand".

……..

(Mr.Wachara Eamratsameekool)

Specialist in Preventive Medicine

Roi Et Public Health Office

Date 30/September/2009

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Certification of Research Inspection Tools

After an inspection for suitability of the research questionnaire of Mrs. Sura Suphomin , Student ID No. 5179164953, Master of Public Health Sciences, College of Public Health Sciences, Chulalongkorn University.

I, hereby, certified that this questionnaire and program for behavioral change has Content Validity that is suitable for the topic on "Model for behavioral change in high risk toward Diabetes type II patients by camping , Mueang District, Roi Et Province, Thailand".

……..

(Mr. Wanchai Atthakorn)

Obstetrician and Gynecologist

Roi Et Hospital

Date 30/September/2009

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Biography

Name : Mrs. Sura Suphomin

Date of Birth : 11 March 1964

Place of Birth : Roi Et Province

Educational Achievement : Bachelor of Nursing (1990)
Sukothaithammathirat University
: Bachelor of Pubic Health (1993)
Sukothaithammathirat University

Work Experiences : Technicial Nurse (1985-1991)
Nikomkomsoi Hospital , Mukdahan Province
: Professional Nurse (1991-1998)
Nikomkomsoi Hospital , Mukdahan Province
: Professional Nurse (1998-2010)
Roi Et Hospital , Roi Et Province

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย