EFFECTIVENESS OF SELF-MANAGEMENT EDUCATION THROUGH CROCHETING IN
IMPROVING QUALITY OF LIFE AND BLOOD GLUCOSE LEVEL AMONG ADULT
FEMALE PATIENTS WITH TYPE 2 DIABETES MELLITUS IN PUBLIC HEALTH CENTERS
BANGKOK THAILAND: QUASI-EXPERIMENTAL STUDY

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ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิตและ
ระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการสาธารณสุข
กรุงเทพมหานคร ประเทศไทย: การศึกษากึ่งทดลอง

น.ส.มณฑลี หนูสีใส

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มณฑลี หนูสีใส : ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิตและระดับกลูโคส ในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการสาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษากึ่ง ทดลอง. (EFFECTIVENESS OF SELF-MANAGEMENT EDUCATION THROUGH CROCHETING IN IMPROVING QUALITY OF LIFE AND BLOOD GLUCOSE LEVEL AMONG ADULT FEMALE PATIENTS WITH TYPE 2 DIABETES MELLITUS IN PUBLIC HEALTH CENTERS BANGKOK THAILAND: QUASI-EXPERIMENTAL STUDY) อ.ที่ปรึกษาหลัก : รศ. ดร.รัตนา สำโรงทอง, อ.ที่ปรึกษาร่วม : รศ. นพ.ปัญญา ไข่มุก

หนึ่งในเป้าหมายของการรักษาเบาหวานคือการมีคุณภาพชีวิตที่ดี ผู้ป่วยเบาหวานจะได้รับคำแนะนำให้ควบคุมระดับ น้ำตาลในเลือดให้อยู่ในเกณฑ์ปกติ ความเครียดอาจทำให้ระดับน้ำตาลในเลือดเพิ่มขึ้น การเรียนรู้เพื่อการจัดการตนเองเกี่ยวกับเบาหวานมี ความสำคัญกับผู้ป่วย ผลของการเรียนรู้จะเกี่ยวข้องกับเนื้อหาของหลักสูตรการเรียนนั้นๆ การศึกษานี้มีวัตถุประสงค์เพื่อวัดประสิทธิผลของ โปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิตและระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัย ผู้ใหญ่ที่ศูนย์บริการสาธารณสุข กรุงเทพมหานคร ประเทศไทย

การศึกษากึ่งทดลองแบบมีกลุ่มควบคุมจัดขึ้นในศูนย์บริการสาธารณสุขสองแห่ง โดยใช้เทคนิคการเลือกกลุ่มตัวอย่าง หลายขั้นแบบเจาะจง ผู้เข้าร่วมการศึกษาเป็นผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ของแต่ละศูนย์บริการสาธารณสุข แห่งละ 39 คน โดยจัดโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ ให้ผู้เข้าร่วมการศึกษาในกลุ่มศึกษาเสริมจากบริการสุขภาพที่ได้รับอยู่โดยปกติในช่วง เดือนกันยายน - ธันวาคม 2560 ส่วนกลุ่มควบคุมได้รับเฉพาะบริการสุขภาพที่ได้รับอยู่ตามมาตรฐานบริการของศูนย์บริการสาธารณสุข การวิเคราะห์ข้อมูล ใช้สถิติเชิงพรรณาแสดงคุณลักษณะของผู้เข้าร่วมการวิจัย และใช้การวิเคราะห์เชิงถดถอยประเมินค่าสัมประสิทธิ์ สหสัมพันธ์ของโปรแกรมการจัดการตนเองกับระดับกลูโคสในเลือดและคุณภาพชีวิต

ผลการศึกษาแสดงให้เห็นว่าผู้เข้าร่วมการศึกษาส่วนใหญ่เป็นแม่บ้าน (54.5 %), มีการศึกษาระดับประถมศึกษา (79.2 %), มีลักษณะพฤติกรรมการดำเนินชีวิตแบบเนือยนิ่งหรือมีการเดินบ้าง (81.8%), ส่วนใหญ่มีน้ำหนักเกินเกณฑ์หรือมีภาวะอ้วน (62.4)%, มีความเครียดระดับปาน (64.94 %), มีสติด้านความตระหนักและการยอมรับในระดับสูง (55.8% และ 50.6% ตามลำดับ), มีความรู้และ พฤติกรรมการดูแลตนเองในระดับมาก (67.5% และ 51.9% ตามลำดับ), และมีคุณภาพชีวิตระดับปานกลาง (64.9%). ระดับน้ำตาลสะสม เฉลี่ยเท่ากับ 8.26 ส่วนเบี่ยงเบนมาตรฐาน เท่ากับ .74 ภายหลังการจัดโปรแกรมการจัดการตนเองฯ มีการเปลี่ยนแปลงแตกต่างอย่างมี นัยสำคัญในด้านความตระหนัก ($p<.001$), การยอมรับ ($p<.001$), คุณภาพชีวิต ($p = .041$), และระดับน้ำตาลสะสม ($p = .009$) การ วิเคราะห์สมการถดถอยเชิงชั้นเพื่อประเมินค่าสัมประสิทธิ์สหสัมพันธ์ของโปรแกรมการจัดการตนเองต่อการเปลี่ยนแปลงของระดับน้ำตาล สะสม พบว่าค่าสัมประสิทธิ์การพยากรณ์เท่ากับ .183 และค่าสัมประสิทธิ์ถดถอยมาตรฐานเท่ากับ -.498 ($p = .002$) ค่าสัมประสิทธิ์ สหสัมพันธ์ของโปรแกรมฯต่อการเปลี่ยนแปลงคุณภาพชีวิตมีค่าสัมประสิทธิ์การพยากรณ์เท่ากับ .054 และค่าสัมประสิทธิ์ถดถอยมาตรฐาน เท่ากับ .233 ($p = .042$) ผลการศึกษาแสดงให้เห็นว่าเมื่อควบคุมอิทธิพลจากปัจจัยอื่น โปรแกรมการจัดการตนเองฯ ส่งผลร้อยละ 50 ต่อ หน่วยการเปลี่ยนแปลงน้ำตาลสะสม และร้อยละ 23 ต่อหน่วยการเปลี่ยนแปลงคุณภาพชีวิต สมการถดถอยสามารถอธิบายความแปรผัน ของการเปลี่ยนแปลงน้ำตาลสะสมได้ร้อยละ 18 อธิบายความแปรผันของการเปลี่ยนแปลงคุณภาพชีวิตได้ร้อยละ 6 โดยสรุป โปรแกรมการ จัดการตนเองด้วยการถักโครเชต์มีประโยชน์ต่อการควบคุมระดับน้ำตาลในเลือดและการพัฒนาคุณภาพชีวิตและระดับกลูโคสในเลือดของ ผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการสาธารณสุข กรุงเทพมหานคร

สาขาวิชา	สาธารณสุขศาสตร์	ลายมือชื่อนิสิต ....
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KEYWORD: Diabetes self-management education (DSME), stress, mindfulness, crochet, blood sugar, quality of life

Monthalee Nooseisai : EFFECTIVENESS OF SELF-MANAGEMENT EDUCATION THROUGH CROCHETING IN IMPROVING QUALITY OF LIFE AND BLOOD GLUCOSE LEVEL AMONG ADULT FEMALE PATIENTS WITH TYPE 2 DIABETES MELLITUS IN PUBLIC HEALTH CENTERS BANGKOK THAILAND: QUASI-EXPERIMENTAL STUDY. Advisor: Assoc. Prof. Ratana Somrongthong, Ph.D. Co-advisor: Assoc. Prof. Panya Kaimuk, M.D.

One of Diabetic treatment goal is optimum quality of life. DM patients are suggested to control blood glucose to be in the normal range. Stress may increase blood sugar levels. Diabetes self-management education (DSME) is important for patient's diabetes management. Outcomes of DSME trend to related with the elements of the DSME interventions. This study aims to assess the effectiveness of self-management education through crocheting program in improving quality of life (QOL) and blood glucose level among adult female patients with type 2 diabetes mellitus in public health centers Bangkok Thailand.

A quasi-experimental study with control group was conducted in 2 public health centors. By multistage purposeful sampling technique, 39 adult female patients with type 2 diabetes mellitus were selected from each public health center to be study participants. The education program was implemented for intervention group during September – December 2017 by add up to standard service of public health center, while the control group receive standard care as usual. Descriptive statistics were used to describe participants' characteristics. The effectiveness of intervention was estimated by regression coefficient of intervention on the change of HbA1c and quality of life.

The results indicated that most of participants were housewife (54.5 %), had primary education (79.2 %), had sedentary lifestyle or had some walk (81.8%), were overweight or obese (62.4)%, had moderate stress (64.94 %), had higher awareness and acceptance (55.8% and 50.6%, respectively), had higher knowledge and self-care (67.5% and 51.9%, respectively), and had moderate QOL (64.9%). Average $HbA1_c$ (*SD*) at baseline was 8.26 (.74). After intervention, there were significant change in awareness ($p<.001$), acceptance ($p<.001$), QOL ($p = .041$), and $HbA1_c$ ($p = .009$). To calculate coefficients of intervention on blood glucose level and QOL, hierarchical regression approach was used. For the change of $HbA1_c$, R^2 was .092, and standardized coefficient of intervention on the change of $HbA1_c$ was -.304 ($p = .007$). For the change of QOL, R^2 was .054, and standardized coefficient of intervention on the change of $HbA1_c$ was .233 ($p = .042$). The results indicated that, intervention respond around 30% of each unit decrease of $HbA1_c$ when influence of other factors was control. The regression equation can explain around 18 % of $HbA1_c$ variation. For QOL, intervention respond around 23% of each unit increase of QOL when influence of other factors was control, however, this equation can explain around 6% of QOL variation. In conclusion, this self-management education through crocheting program has benefit for female adult patient with type 2 diabetes mellitus in glycemic control and quality of life improvement.

Field of Study:	Public Health	Student's Signature ....
Academic Year:	2018	Advisor's Signature ....
		Co-advisor's Signature ....

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INTRODUCTION

1.1   Background & Rational

The advance in scientific approach about diabetes make it possible, nowadays, for many effective treatments which led to prolong patient life expectancy. Unfortunately, for over the past two centuries, the improvement in outcomes of medical care for individual patients has no similar improvements in public health perspective in the population level. Although it was recognized since ancient Egypt era, diabetes was revealed in 1776, by Matthew Dobson, that the urine sweetness was the result of sugar which was preceded in the blood. It was not until early 1920s that Frederick G. Banting, John Macleod and their team discovered insulin, and numerous later studies led us more understanding in disease mechanisms. Improved glucose control shows the reduction of microvascular complications in diabetes control and complications trial. However, the worldwide prevalence of diabetes has continued to increase[1].

World Health Organization (WHO) estimated the global age-standardized prevalence of diabetes had been rising from 4.7% (108 million) in 1980 to 8.5% (422 million) in 2014 [2]. International Diabetes Federation (IDF) estimated that 8.8% of adults aged 20-79 years (424.9 million) have diabetes in 2017, 158.8 million lives in Western Pacific Region. IDF also estimated the number of people with diabetes that, if the nowadays trend continue, will reach 628.6 million by 2045 [3]. However, from WHO Diabetes country profiles 2016, among 11 countries belong to WHO Regional Office of South-East Asia, Thailand had the highest prevalence of diabetes and trend in age-standardized prevalence of diabetes has been increase continuously in both male and female, since 1980 [4].

The survey report on the prevalence of diabetes among Thai population (aged 15 years and older) found that the prevelance in 2009 was 6.9%, approximated to that in 2004. Bangkok was the highest prevalence area with 9.2%. The diabetes

prevalence is 9.9% in female, and 8.5% in male. It was the highest diabetes prevalence by sex in Thailand [5]. Public Health Ministry of Thailand reported that trend of diabetes has been increased from 500,000s in-patients in 2007 to 800,000s in 2015. In Bangkok, the number of in-patients with diabetes go up from 51,000s in 2007 to 72,000s in 2015 [6]. Diabetes is a costly condition [7].

The more co-morbidities diabetes patients got, the more expenditure they pay [8] [9] [10]. Due to raised sugar level over time, diabetes can lead to many damages in body's systems and bring about complications such as heart attack, stroke, kidney failure, leg amputation, vision loss and nerve damage. To preventing and slowing the progression of these complications, DM patients are suggested to control blood glucose to be in the normal range. In general, the target level of blood sugar level, reflected by HbA1c, is less than 7% [11], however, most of patients cannot achieve this target.

An assessment on quality of care among patients diagnosed with type 2 diabetes in Bangkok reported that 47.7% of these patients had HbA1c less than 7%, and 35.5% of patients in the big picture of all country areas [12]. Many factors correlated with glycemic control or blood glucose level among diabetes patients such as duration of diabetes, treatment modalities, medication adherence, lifestyle habits, diabetes knowledge, perceived health status, and psychological factors [13] [14] [15] [16] [17] [18] [19] [20] [21] [22]. Stress seem to be common psychosocial problems among diabetic patients [23] [24] [25].

Stress may increase blood sugar levels by direct effect via stress hormone, or hinder person's ability to self-manage the disease and achieve metabolic control [26] [27] [28] [29] [30] [31]. To assist DM patients in managing their health conditions, diabetes self-management education, including with support, is a critical element of care. It facilitates knowledge, skills, and ability necessary for person with diabetes to do self-care as well as activities that assist patient in managing his or her condition. [32] Diabetes self-management education (DSME) encompass with different combinations of educational, psychological, and behavioral element [33].

For successful and effective diabetes self-management, self-care behaviors are important, especially those called AADE7[TM]. Identified by The American Association of Diabetes Educators (AADE), AADE7[TM] included 7 behaviors: (1) healthy eating, (2) being active, (3) monitoring, (4) taking medication, (5) problem solving, (6) reducing risks and (7) healthy coping.[34] However, healthy coping techniques differ among various populations.

No one technique of healthy coping fits all groups. Approach to address the patient's coping is critical. The efforts to address the issue of healthy coping need to include an updated review of the literature [29]. Beside this, some studies indicated the benefits of mindfulness on psychological symptoms [35] [36] [37] The mindfulness-based stress reduction (MBSR) may be the most well-known mindfulness interventions in the scientific literature, but there are other evidence-based forms of mindfulness intervention available to researchers and practitioners [38] [39] . Mindful practice can be grouped into two categories: formal practice - do specific and purposeful training to cultivate mindfulness skills in focused and systematic ways such as meditation, and informal practice – incorporate mindfulness in day-to-day life activity from vocational responsibilities to leisure pursuits [39] [40] [41].

Roots in Buddhism, mindfulness is traditionally cultivated through meditation. However, in some situations, some people feel not fit with doing formal meditation. Aligning mindful practice with any daily experience may facilitate greater state of accessibility to a wider range of people. Some people with chronic illness got benefits of increasing mindfulness, getting more satisfaction, enhancing quality of life, and facilitating positive emotions by turning to art leisure [42] [43] [44].

Various textile arts have factors in common with typical meditation practices. With the pattern of repetitive movements, textile arts such as knitting and crocheting offer a chance to meditate as those Tara Jon Manning mentioned in the book 'Mindful Knitting' that "when we knit, we place our attention over and over again on the natural rhythm of creating fabric from yarn—insert needle, wrap yarn, pull through a new stitch, repeat. Following this simple repetitive action is the basis of contemplative

practice. It continually reminds us to stay focused, to stay in the moment. When we knit with this attention, we have an almost indescribable feeling of satisfaction and contentment. This is knitting as meditation." Similar to the experience of Kathryn Vercillo in the book 'crochet save my life' that "I spent hours in my dorm room crocheting scarves or just crocheting a single stitch over and over. I would go into a completely meditative state and even if there was music or a TV on in the background, I never really absorbed what I was hearing. Now, many years later, crochet is my go-to therapy. In moments of stress and anxiety, my fingers begin to itch for the feel of the hook in one hand and the yarn in the other." [45] [46] Moreover, some studies suggested to use mindfulness-based practice to promote self-management [47] [48] [49].

Outcomes of diabetes self-management education (DSME) trend to related with the elements of the DSME interventions [50] [33]. Studies indicate that improved metabolic control results from a variety of interventions, including cognitive-behavioral interventions, coping/problem-solving interventions, and stress management intervention [51]. A review on healthy coping in diabetes also supports for a variety of healthy coping interventions in diverse populations for improving a range of outcomes. [52] A study of mindfulness-based stress reduction program on the changes of glycemic control and stress-related psychological symptoms in patients with type 2 diabetes found a decrease in HbA1c,depression, anxiety, and general psychological distress. [36] Some studies on the combination of education with acceptance and mindfulness skills indicated better diabetes self-care, and having glycated hemoglobin values in the target range among participants in intervention group.[53] [54]

Poor glycemic control may be reflected the failure of patient self-management as well as intervention strategy. World Health Organization proposed that well-structured health services can help people with diabetes achieve optimum quality of life by basic cost-effective intervention, and facilities for diabetes management should be available in primary health-care settings.[2]

In Bangkok, 68 public health centers - under the administration of Health Department, Bangkok Metropolitan Administration (BMA) - is one of major primary health-care network, covered area of all 50 districts, provided medical treatments to around 1 million patients per year [55]. Holistic concept is basic principles of health services provided by BMA public health centers. Health promotion according to the need of each population group is one of organization services.

Self-management education program is important for patient's diabetes management. Besides these, mindfulness has been shown benefit on psychological health, health behaviors, and self-management. It can be cultivated by informal mindfulness activities in from of art leisure such as knitting and crocheting. There is no study on benefits of self-management education through crocheting program on quality of life and blood sugar level among patients with type 2 diabetes mellitus in public health centers. According to the high prevalence and burden of type 2 diabetes, along with the prevalence of stress among diabetic patients, as mentioned, new interventions to promote healthy lifestyles, support self-management, and help DM patients to cope with stress are needed as choices for different DM patient group.

1.2   Research question

Does self-management education through crocheting program effect blood sugar level and quality of life among adult female patients with type 2 diabetes mellitus in public health centers, Bangkok, Thailand?

1.3   Research Objective

General Objective

To evaluate the effect of self-management education through crocheting program on the glycemic control and quality of life among adult female patients with type 2 diabetes mellitus in public health centers in Bangkok.

Specific Objectives

1. To assess the effect of self-management education through crocheting program on the change of $HbA1_c$ among participants who were adult female patients with type 2 diabetes mellitus of public health center in control and intervention group.

2. To assess the the effect of self-management education through crocheting program on the change of quality of life among participants who were adult female patients with type 2 diabetes mellitus of public health center in control and intervention group.

1.4   Research Hypothesis

Self-management education through crocheting program decrease $HbA1_c$ level and increase quality of life among participants who were adult female patients with type 2 diabetes mellitus of public health center in intervention group.

1.5   Scope of Study

This study used quasi-experimental methodology with control group to assess the effect of education program for adult female patient with type 2 diabetes mellitus who received DM treatment from public health centers under Bangkok Metropolitan Administration (BMA). BMA manages 68 public health centers which has altogether responsible area cover all Bangkok area, with the same service standard.

By purposive sampling technique, researcher selected 2 public health centers from 1 out of 6 zone to be contact points of diabetic patients, then randomly selected one public health center to be contact point of control group and another to be intervention group. Researcher recruited 39 adult female patients with type 2 diabetes mellitus from each public health center to be study participants, but 1 participant in control group was drop out. Total participants were 77.

The education program was implemented for intervention group during September – December 2017 by add up to standard service of public health center, while the control group receive standard care as usual. The effectiveness of intervention was estimated by regression coefficient of intervention on the change of $HbA1_c$ and quality of life (total score of WHOQOL–BREF–THAI). Other independent factors which may affect HbA1c and quality of life were measured included stress, mindfulness, knowledge, self-care, health-related lifestyle, and health status.

1.6   Expected Benefits

To take control of diabetes, patients encounter with a number of challenges. Among these huge challenges, they expand from issue to others, from mild to severe, and they are various from person to another. To support person with diabetes achieving the optimum health outcome and life satisfaction, it's important to have valid and various measures as a suitable and reliable choice for patients under difference conditions. This study is expected to find another choice that benefited - in increasing quality of life and achieving favorable glycated hemoglobin level - for adult female with type 2 diabetes who received diabetes treatment from public health centers. In addition, the benefit for other groups of patients with diabetes who adopt this program as the choice of their diabetes self-care was expected.

Moreover, crocheting produces various products such as doll, wool hat, and blouse. They can be given as gifts. They also have values in market, especial in hand-made business as those of some community enterprise groups. Due to this property, the program may be starting-point for benefits on additional income which can sustain self-management activities of participants and the group.

1.7   Conceptual Framework

World Health Organization (WHO) suggested that self-management education is an important components of diabetes control and complication prevention.[56]   American Association of Diabetes Educators (AADE) introduced the AADE7™ self-care behaviors as a framework for diabetes education to learn and

modify behavior in order to improve health status and achieve the greater quality of life.[57] These recommendations are relevant to knowledge, recommended by Diabetes Association of Thailand, which should be promoting for patients with diabetes in Thailand. [11] So, the research expected to support person with diabetes achieving the optimum health outcome and quality of life will be conduct to evaluate intervention of self-management education through crocheting according to the following conceptual framework.

Independent variable

Dependent variable

Characteristics

   Demographic

     - sex

     - age

     - education

     - occupation

   Health related lifestyle

     - Physical activity

     - Exercise

     - Physical fitness

     - Smoking

     - Alcohol drinking

     - Blood sugar monitoring

     - Medical appointment

      adherence

   Health status

     - BMI

     - Year with DM

     - DM complication

     - Hypoglycemia symptom

     - Hyperglycemia symptom

Knowledge

Self-care

Stress

Mindfulness

Intervention
Self-management education
enhancing mindfulness
through crocheting program

Standard care

Standard care
for control group

primary outcome

Blood sugar ($HbA1_c$)

secondary outcome

Quality of life

Figure 1   Conceptual Framework

1.8   Operation Definitions

Self-management education through crocheting refer to education program proposed to participants in intervention group to apply in daily life. The program was designed to facilitate knowledge necessary for diabetes self-care, and introduces crocheting practice as a strategy for enhancing mindfulness and coping with stress.

Quality of life refers to individuals' perception of their life situation in total of 4 domains – physical health, psychological health, social relationships, and environment – and overall facets.

Blood glucose level was measured in form of glycated hemoglobin (HbA1$_c$) reported as a percentage of total hemoglobin (%).

Stress refer to level of feeling or reaction in excessive amount occurred when individual confront with or be in unpleasant situation which bring about physical or emotional negative responds.

Mindfulness refer to level of personal attention to current experience in 2 components: awareness and acceptance. Awareness is an ability of continuous monitoring on current experience. Acceptance is an ability to experiencing events fully and without judgment.

Knowledge refer to level of accuracy of information individual achieved. This information is about diabetes and 7 self-cares included eating, being active, coping with stress, monitoring, taking medication, reducing risks, and problem solving.

Self-care refers to frequency of recommend behaviors which individual undertaken to enhance or maintain health and to cope with diabetes mellitus. These behaviors included eating, being active, coping with stress, monitoring, taking medication, reducing risks, and problem solving.

Health-related lifestyle refer to behavior pattern which individual usually conduct in daily life about physical activity, exercise, physical fitness, smoking, alcohol drinking, blood sugar monitoring, medical appointment adherence.

Health status refer to signs reflected individual's health in forms of BMI, year with diabetes, diabetes complications, hypoglycemia symptom, and hyperglycemia symptom.

CHAPTER 2
LITERATURE REVIEW

To understand the concept related to type 2 DM patient regarding intervention on quality of life improvement and hemoglobin A1c reduction, this chapter reviews the contents as follows:

1. Diabetes Mellitus

 - Types and Symptoms

 - Definition and Diagnosis

 - Prevalence and burden

 - Complications

 - Treatment Targets

2. Self-management Education and Self-care

3. Stress

4. Mindfulness

5. Quality of life

2.1   Diabetes Mellitus

Diabetes or Diabetes mellitus (DM) or เบาหวาน (bao-hwan) in Thai shows notable symptoms of this noncommunicable disease. It means sweet urine, while the Greek word "diabetes" means "to run through", and the Latin "malitus" suggests "honey sweet".[58] The disease had been recognized since ancient Egypt era - around 1500 B.C., but it was revealed in 1776, by Matthew Dobson, that the urine sweetness was the result of glucose which was preceded in the blood.[1] [59] [60] Glucose is a type of sugar which is main source of energy controlled by hormone such as insulin. Glucose

detection in urine may caution some health problems, included diabetes. However, other signs and symptoms are needed for diagnose.

Diabetes types and symptoms

There are 2 main forms. Type 1 diabetes, once known as juvenile diabetes because this form usually develops in children and adolescents, is a condition in which the pancreas produces little or no insulin by itself. Type 2 diabetes is the form that persons produce inadequate insulin, or they are unable to use it properly. [56] However, according to Clinical Practice Guidelines for Diabetes 2014, by Diabetes Association of Thailand, divided diabetes into 4 groups as follows: [11]

1. Type 1 diabetes mellitus (T1DM) caused by cells which produce insulin in the pancreas are attack by the body's defense system. T1DM usually occur in children or young adults and often develops suddenly.

2. Type 2 diabetes mellitus (T2DM) caused by insufficient insulin produced or the body cannot respond to its effects called "insulin resistance". The important risk factors include advancing age, family history of diabetes, obesity, poor diet, and physical inactivity.

3. Other specific types such as Maturity-onset diabetes in the young caused by mutation on gene, Cushing's syndrome caused by endocrine gland disorders

4. Gestational diabetes mellitus (GDM) normally develops around the 24th week of pregnancy due to blockage of insulin action, probably by hormones produced by the placenta.

The second comprises some 90% of all cases which has risen dramatically in countries of all income in the past three decades. [59]

In some case, people with diabetes don't have any signs or symptoms. The only way to know their conditions is to do a blood test. However, in general, the symptoms of diabetes are [61]

- Very thirsty

- Frequently urinating

- Feel very hungry

- Feel very tired

- Lose weight without trying

- Sores that heal slowly

- Has blurry eyesight

Definition and diagnosis

Diabetes is primarily defined by the level of hyperglycemia. This condition rises to risk of microvascular damage. Report of a WHO/IDF consultation (2006) recommended that diagnostic criteria for diabetes should be maintained – fasting plasma glucose ≥ 7.0mmol/l (126mg/dl) or 2–h plasma glucose ≥ 11.1mmol/l (200mg/dl). Venous plasma glucose should be the standard method for measuring. However, in acceptance of the popular use of capillary sampling, the capillary plasma glucose values in conversion are provided for post-load glucose values. Fasting values for venous and capillary plasma glucose are the same.[62]

Glycated Hemoglobin ($HbA1_c$), modified form of hemoglobin produced when glucose molecules attach to protein within red blood cells, can be used as a diagnostic test for diabetes in case of stringent quality assurance tests are in place and assays are standardized to criteria aligned to the international reference values, and there are no conditions present which preclude its accurate measurement. The level of 6.5% is recommended as the cut point for diagnosing diabetes. Beside this, $HbA1_c$ - in single measure - reflects average level of plasma glucose over the previous 2-3 months.

It can be performed at any time of the day, and does not require any special preparation such as fasting. So, it is the gold standard for assessing glycemic control in people with diabetes.[63]

According to Clinical Practice Guidelines for Diabetes 2014, by Diabetes Association of Thailand, the diagnostic criteria for diabetes should be 1 out of 4 methods as follows: [11]

1. Person with very clear diabetes symptoms - very thirst, frequently and more urination, and unexplained weight loss. The plasma glucose level test can be performed at any time, without regarding for time person's last ate. Person with plasma glucose level equal to or greater than milligrams per deciliter (mg/dL) diagnosed of diabetes.

2. The plasma glucose level test - in the morning after period of time without eating or drinking anything but water for 8 hours – or FPG (fasting plasma glucose) is equal to or greater than 126 mg/dL diagnosed of diabetes.

3. The oral glucose tolerance test (75 g. Oral Glucose Tolerance Test, OGTT) after 2 hours loading results that is equal to or greater than 200 mg/dL diagnosed of diabetes.

4. Have a hemoglobin A1c that is 6.5% or higher.

However, $HbA1_c$ for diagnosis is not recommend in Thailand, due to standardization and quality control, and cost of testing.

For person with unclear symptom, the diagnosis of diabetes needs to be confirmed by repeating the same blood sugar test or doing a different test on another day.

Diabetes

Fasting plasma glucose	≥7.0mmol/l (126mg/dl)
2—h plasma glucose*	**or**
	≥11.1mmol/l (200mg/dl)

Impaired Glucose Tolerance (IGT)

Fasting plasma glucose	<7.0mmol/l (126mg/dl)
2—h plasma glucose*	**and**
	≥7.8 and <11.1mmol/l
	(140mg/dl and 200mg/dl)

Impaired Fasting Glucose (IFG)

Fasting plasma glucose	6.1 to 6.9mmol/l
2—h plasma glucose*	(110mg/dl to 125mg/dl)
	and (if measured)
	<7.8mmol/l (140mg/dl)

* Venous plasma glucose 2—h after ingestion of 75g oral glucose load
* If 2—h plasma glucose is not measured, status is uncertain as diabetes
 or IGT cannot be excluded

Figure 2   *Summaries the 2006 World Health Organization Recommendations for the diagnostic criteria for diabetes and intermediate hyperglycemia*

Source: World Health Organization. (2011). Use of glycated hemoglobin (HbA1$_c$) in diagnosis of diabetes mellitus: abbreviated report of a WHO consultation.

By elevated levels of blood glucose (or blood sugar) over time, diabetes leads to serious damage to blood vessels and other consequences such as the damage of small blood vessels in the eyes causes the harm of back layer of the eye (retinopathy) and blindness, the damage in the kidneys leads to nephropathy and renal failure, the damage of nerves causes the sensory loss which leads to diabetic foot disorders and amputation and the damage of lager blood vessels causes cardiovascular diseases including with heart attacks, strokes and insufficiency in blood flow to legs. [56, 64] Diabetes is an important noncommunicable diseases which is one out of 4 world's biggest cause of death. [65]. Moreover, the worldwide prevalence of diabetes has continued to increase.

Prevalence and burden

World Health Organization (WHO) reported that, in 2008, approximately 347 million people affected by diabetes mellitus worldwide, and, in 2012 the disease was the direct cause of some 1.5 million deaths. [66] Diabetes mellitus - resulted from increased glucose concentrations in the blood, caused by insulin deficient produce or ineffective use – damage many body's systems, and will be the 7th leading cause of death by 2030. [67, 68]

International Diabetes Federation (IDF) estimated that, in 2015, 153 million adults, aged 20-79 year old, from 39 countries and territories of Western Pacific Region including with Thailand, lived with diabetes. This number is equivalent to 36.9% of the total number of people with diabetes in the world.[69]

In Thailand, Public Health Ministry reported that trend of diabetes has been increased and the number of patients with diabetes reached more than 670,000 in 2015.[6] According to 2011 Thailand disease mortality rate in every age-group, diabetes causes the second rank of death in female and the eighth in male. It also causes of the fourth rank of YLD (Year of Life Lost due to Disability) in both male and female.[70] From The fourth Thai health survey 2008-2009, the prevalence of diabetes in Thai population aged 15 and older was 6.9%. The prevalence was higher in female and older age. [5]

Bangkok is the highest number and density of population.[71] It's also be the city with highest prevalence of male and female with diabetes. [5] According to the Public Health Ministry report, there are more than 64,000 people with diabetes in Bangkok, in 2015. The ratio of person with diabetes is 1,129.25 per hundred thousand populations. [6]
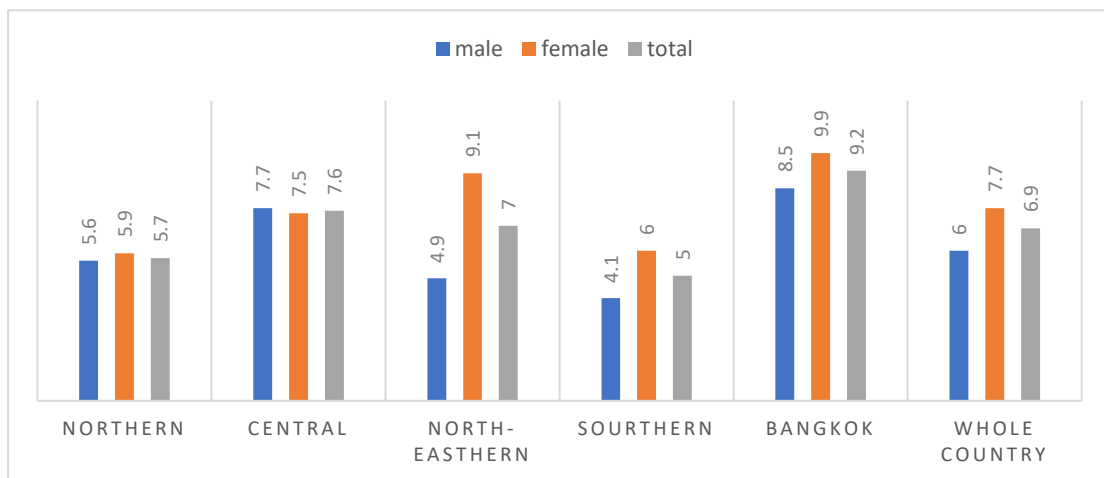
Figure 3   **The prevalence of Diabetes among Thai population aged 15 and over, divided by sex and region.**

Source: The report of the fourth Thai Population Health Survey by health screening, 2008-2009

Diabetes is a significant challenge for healthcare system. International Diabetes Federation (IDF) indicated that diabetes place a large financial burden on individuals and countries due to the loss of productivity and the use of health services, essential medicines, and the long term support needs for diabetes related complication. For the Western Pacific Region, it costs approximately USD 106 billion spent on diabetes-related care in the region, or approximately 10% of the region's total health budget. The average diabetes-related spending on healthcare per person was estimated to range from USD 693 to USD 1,246. [69] In Thailand, the report of the study formulated a cost model from a provider perspective concerning the direct medical costs for diabetic patients showed that the average cost of caring for a diabetic patient during the fiscal year 2001 (October 1, 2000–September 30,2001) was 6,331 Thai baht (THB) per year. Regarding the model for forecasting the cost, the cost could be higher than ten thousand for type 2 diabetes with cerebrovascular accident. The cost spent for pharmacy services was around 45% of the whole cost, followed by 24% of the outpatient services, 16% of inpatient services, and 11% of laboratory investigation. [72]

Another study used prevalence-based approach to estimate the cost of illness of diabetes from societal perspective. The total cost of illness of diabetes for 475 study participants was estimated as USD 418,696 for the financial year 2008 (1 USD = 32 THB). The average cost of illness per diabetic patient was USD 881.47. This amount was 21% of per capita gross domestic product of Thailand. The cost spent for direct medical cost was 23%, for direct non-medical cost was 40%, and for indirect cost was 37%.[8]

Complications

Diabetes is a group of chronic diseases characterized by hyperglycemia. The direct and indirect effects on blood vessel are the major source of morbidity and mortality in diabetes. There are 2 theories explained mechanism in the development of diabetic complications. [61, 73]

1. Sorbitol pathway theory: The process relates the conversion of glucose into glucose alcohol (sorbitol). High glucose levels bring about sorbitol accumulation in cells. Osmotic stress from sorbitol accumulation has been propose as an underlying mechanism in the development of diabetic microvascular complications such as diabetic retinopathy.

2. Glycated protein theory: High glucose concentrations can stimulate the nonenzymatic formation of advanced glycosylated end products (AGEs). This process may play an important role in cellular injury and other complications.

These effects of hyperglycemia are divided into 2 main groups - macrovascular complications and microvascular complications such as [74]

Diabetic retinopathy (eye disease)

Diabetic retinopathy is a leading cause of blindness and visual disability. It is caused by small blood vessel damages. Good metabolic control, in advance detection and care of vision-threatening retinopathy can slow up the onset and progression of diabetic retinopathy.

Nephropathy (kidney disease)

Diabetic kidney disease can lend to kidney failure and death. In early state, patients usually have no symptoms, but, as the disease progresses, they may feel tired, become anemic, and even develop dangerous electrolyte imbalances.

Neuropathy (nerve disease)

Diabetes causes nerve damage. The symptoms are various, depending on which nerves are affected: for example, numbness or pain in extremities, and sensory loss. Decreased sensation to feet can lead to patients not recognizing cuts and developing foot infections. These can lead to amputation.

Cardiovascular disease

The process called "atherosclerosis" due to hyperglycemia damages blood vessels. The clogging of arteries narrows down the arteries, and lead to decreased blood flow to organs which can developed heart attack, or stroke.

World Health Organization indicated that diabetes will be the 7th leading cause of death by 2030, and self-management is a vital components of diabetes complication prevention. [66]

Treatment Targets

Objective of treatment for diabetic patients is the optimum quality of life which is close to normal people. So, the diabetes treatment targets, for each Thai patient groups, are made in conjunction with the patient according to the guideline, in brief, as follows: [11]

1. Adult patient with diabetes for not long time, and no complication:

2. Diabetes patient who often affected with hypoglycemia, or has severe hypoglycemia; and patient with severe or several complications – target HbA1c is not lower than 7%

3. Older Adult patient (age > 65) – target HbA1c varies by conditions.

4. Patient with life expectancy less than 1 year. Palliative care is recommended.

5. Children and Adolescent

By the way, to achieve the treatment targets, Diabetes self-management education (DSME) and Diabetes self-management support (DSMS) are important process. Diabetes patient, diabetes patient care-giver and person with diabetes risk should have practical diabetes self-care and have opportunities to learn and review their knowledge at least in 4 occasions: 1) when person was diagnosis as diabetic patient. 2) yearly evaluation and review on knowledge about diabetes, food, and emotional needs. 3.) when patient has complication or other factors effected self-care. 4.) there is some change or different condition for diabetes care and treatment.

2.2   Self-management Education and Self-care

Diabetes self-management education (DSME) is a critical element of care for all diabetes patients. It's the ongoing process of facilitating the knowledge, practice for prediabetes and diabetes self-care. The main objectives of DSME are to support decision making, self-care behaviors, problem solving, and active collaboration with the health care team in order to improve clinical outcomes, health status, and quality of life. [75]

DM patients are suggested to control blood glucose to be in the normal range. [76] Systematic reviews indicated benefits of DSME on glycemic control.[77] [78] [79] However, the vary outcomes were due to heterogeneity characteristics of DSME such as subject race/ethnicity, duration of diabetes, different countries, and

comprehensiveness in terms of coverage of the seven AADE7™ Self-Care Behaviors. [79]

There are various definitions of self-care. Godfrey (2011) studies the diversity of self-care definition from 75 papers published from 1976 to 2009, included 1 from Thailand. 139 definitions were analysis. They composed from 7 related facets, and have a span of terms that were applicable to each component. The definitions are more expansive over time. [80] The British governments draw self-care in continuum from individual daily choices to medical care for major trauma, and place self-management in-between. [81]

Definitions of self-care in health are proposed to influence health care policy by focusing direction on what behaviors can be encouraged to benefit public health. [82] According to the report "self-care in the context of primary health care" by the Regional Consultation, WHO Regional office for South-East Asia (2009), recommended that self-care is an componence of the continuum of health-care. Multi-sectoral efforts are needed to assist people to practice self-care. Beside this, health policy and strategy need to realize the importance of self-care in primary health-care. Community-based health workers and volunteers can effectively promote self-care. The effective promotion of self-care is important to reduce health- care costs, and also can lead to improvement of equity in health.[83]

Table 1   World Health Organization definitions of Self-care

Themes	WHO 1983	WHO 1998	WHO 2009	UK DOH 2005
Prevention	Self Care in health refers to the activities individuals, families and communities undertake with the intention of enhancing health, **preventing** disease, limiting illness, and restoring health	Self-Care is what people do for themselves to establish and maintain health, and to **prevent** and deal with illness	Self-Care is the ability of individuals, families and communities to promote health, **prevent** disease (...)	Self-Care includes the actions individuals and carers take for themselves, their children, their families and others to (...) **prevent** illness or accidents (...)
Self-medication		It is a broad concept encompassing hygiene, nutrition, lifestyle, environmental factors, socio-economic factors and **self-medication**		
Teamwork with healthcare provider	They are undertaken by lay people on their own behalf, either separately or in participative collaboration with professionals		" (...) with or without the support of a healthcare provider"	
Who engages in the activity (individual, family, community)	The activities **individuals, families and communities** undertake	Self-care is what **people** do for themselves	The ability of **individuals, families and communities**	It is the care taken by **individuals** towards their own health and well being, and includes the care extended to their children, family, friends and others in neighbourhoods and local communities
Health -promotion	Self Care in health refers to the activities individuals, families and communities undertake with the intention of **enhancing** health	Self-Care is what people do for themselves to **establish and maintain health**, and to prevent and deal with illness	Self-Care is the ability of individuals, families and communities to **promote health**, prevent disease, and maintain health and to cope with illness and disability	

Source: Webber, D., Guo, Z., & Mann, S. (2013). Self-care in health: we can define it but should we also measure it. *Self Care*, *4*(5), 101-5.
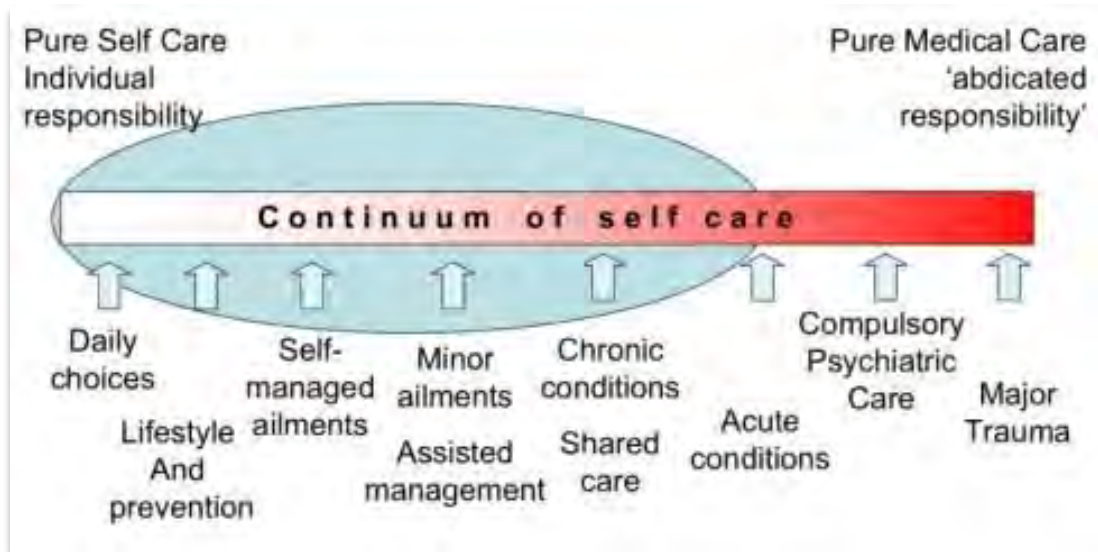
Figure 4   ***The Self-care Continuum.***

Source: Self care – A real choice, Self care support – a practical option, published by

Department of Health, 2005. Available at http://www.pagb.co.uk/selfcare/home.html

In promoting self-care for people with diabetes, American Association of Diabetes Educators (AADE) introduced the AADE7™ self-care behaviors as a framework for diabetes education (also known as diabetes self-management training) to learn and modify behavior in order to improve health status and achieve the greater quality of life. [57] The AADE7self-care behaviors™ is broadly accepted as standardized nomenclature that is incorporated into the definition of diabetes education. [84] It is comprised of seven issues as follows: [85]

1. Healthy eating: Think about the food amount and choices to help control diabetes and prevent other health problems.

2. Being active: Think of all means in moving body as much as possible throughout the day or starting an exercise routine to burn calories, lower blood sugar and cholesterol, improve blood pressure, lower

stress and anxiety, improve mood, and strengthen muscles and bones.

3. Monitoring: Measure and record blood sugar level, included with heart health monitoring such as blood pressure, weight and cholesterol level; kidney health monitoring such as urine and blood testing; eye health monitoring by eye exams; and foot health monitoring by foot exams and sensory testing.

4. Taking medication: Don't forget to take the medication at the right time every day, learn about each medication, and tell the doctor about all of the medications which are taking, including over-the-counter medications, dietary supplements, vitamins and herbs.

5. Problem solving: Managing diabetes doesn't mean being "perfect." Think of ways to ease stress, such as by meditating, or sitting quietly for a few minutes with a cup of tea or a book. Discuss possible solutions with doctors, health team, or diabetes support group. Learn about the unexpected things that happen and driven blood sugar in the wrong direction. Figure out how to correct the problem in a way that works best, and think through how to prevent it from happening again.

6. Healthy coping: As the challenges of managing diabetes, stress is sometime overwhelmingly. Having a lot of stress can increase blood sugar levels. Stress lead the feeling more negative and may cause bad decisions. It's important to find healthy ways to cope with, or person may turn to harmful habits. There are many healthy ways to cope with stress, such as pursuing hobbies, being active, and participating in faith-based activities or meditating.

7. Reducing risks: Due to the ways of eating, living, blood sugar monitoring, taking medication, solving problems, and cope with the

challenges of diabetes self-care in a healthy way, it can reduce the risks of diabetes complications.

All these seven self-care behaviors have been found positive correlation with good glycemic control, reduction of complications and improvement in quality of life.[86] They are also relevant with the knowledge, recommended by Diabetes Association of Thailand, which should be promoting for patients with diabetes. According to Clinical Practice Guidelines for Diabetes 2014, the knowledge and self-care practices that should be provided for patient with type 2 diabetes are as follows: [11]

1. Basic knowledge about diabetes

2. Therapeutic Nutrition

3. Exercise

4. Medication

5. Measuring and understanding the meaning of blood sugar level

6. Hypoglycemia and hyperglycemia, and treatment and preventive methods.

7. Diabetes complications

8. General health care

9. Foot care

10. Diabetes health care for special events

To measure the outcome of that diabetes self-management education, some model of the continuum of healthcare outcomes were purposed.[84]
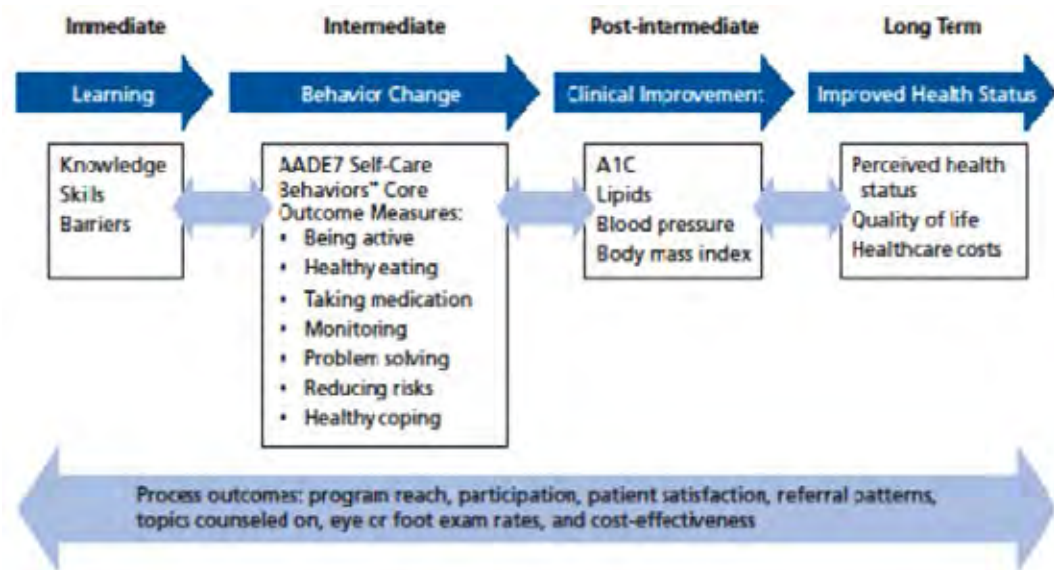
Figure 5 **Diabetes Self-management Education Outcome Continuum.**

Adapted from Lacey, K., & Pritchett, E. (2003). Nutrition care process and model: ADA adopts road map to quality care and outcomes management. *Journal of the American Dietetic Association*, *103*(8), 1061-1072.; American Diabetes Association. (2003). National Standards for Diabetes Self-Management Education and Support.. *Diabetes care*, *29, 804-16*

Source: American Association of Diabetes Educators. (2014, Dec. 3, 2014). AADE7th Self-Care Behaviors. *American Association of Diabetes Education (AADE) Position Statement*. Retrieved from https://www.diabeteseducator.org/docs/default-source/legacy-docs/_resources/pdf/publications/aade7_position_statement_ final.pdf?sfvrsn=4

Despite of trifling irrelevant fragment, the studies indicated the positive results of diabetes self-management programs on various related factors of diabetes control and improvement in quality of life. [86-95] Dunkey (2014) studies diabetes prevention in the real-life situations to investigate the effectiveness of lifestyle interventions translated evidence from previous efficacy studies of diabetes prevention into more practical intervention programs in real life situations. The evidence from twenty-five studies met the inclusion criteria suggested that pragmatic diabetes

prevention programs are effective. However, this effectiveness varies substantially between programs, and can be improved by maximizing guideline adherence. [96]

Lifestyle factors related to dietary and physical activity play important role in treatment of type 2 diabetes.[97, 98] However, self-management demands both physical and cognitive tasks, and socio-emotional ones. [50] Older adults with diabetes have unique issues that impede the progress in diabetes management. There are barriers lead to interfere the patients' abilities to perform self-care tasks such as duration of diabetes, health status and coexisting chronic condition, ageing-related physical changes and physical abilities, cognitive and mental abilities, socioeconomic status, support systems, knowledge and understanding in self-care activities, and knowledge, poor understanding and low literacy in self-care activities. [13] [99] [100] [101] [102] [103] [104]

2.3   Stress

There are evidences suggested that stressful experiences have correlation with an increased risk for the development and exacerbation of type 2 diabetes. [105] Though people have their subjective definition of stress, most of them tend to focus on the negative feelings and emotions raised form the stress. Most people consider the definition of stress to be something that causes distress. Probably the most common term of term is, "physical, mental, or emotional strain or tension". Another popular definition is, "a condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize." [106]

In actually, stress is not always harmful. All animals have a stress response, in some situations for life-saving in. Many scholars are interested in psychological phenomena for a long time. In *Aristotle's writing "De Anima"* and a short work collection *"Parva Naturalia"*, He takes psychology to be the branch of science which investigates the soul and its properties. [107] Claude Bernard developed the idea of the internal environment bathing cells—the *milieu intérieur*—maintained by

continual compensatory changes of bodily functions. [108, 109] It was the way how cells and tissues in multicell organisms might be protected from stress. Walter B. Cannon coined the term "fight" or "flight" to describe an animal's response to threat.[110]

Cannon proposed the concepts of "homeostasis" to explain acceptable ranges of values for internal variable in maintaining the steady sates of the organism. Threat to homeostasis evokes the sympathetic nervous system, priming the animal for fighting of fleeing.[110] When people face a dangerous situation, their pulse quickens, they breathe faster, the muscles tense, the brain uses more oxygen and increases activity. This can boost the immune system. [111] Hans Selye described stress as a state of uniform response pattern, with regardless of the particular stressor. This state could lead to long-term pathologic changes. [108] He observed that patients suffering from different diseases often "looked sick". He described the response as General Adaptation Syndrome. The syndrome details how stress induces hormonal autonomic responses. [112] The body systems act to restore normal functioning once the threat has passed. However, problems occur if the stress response goes on too long. [111]
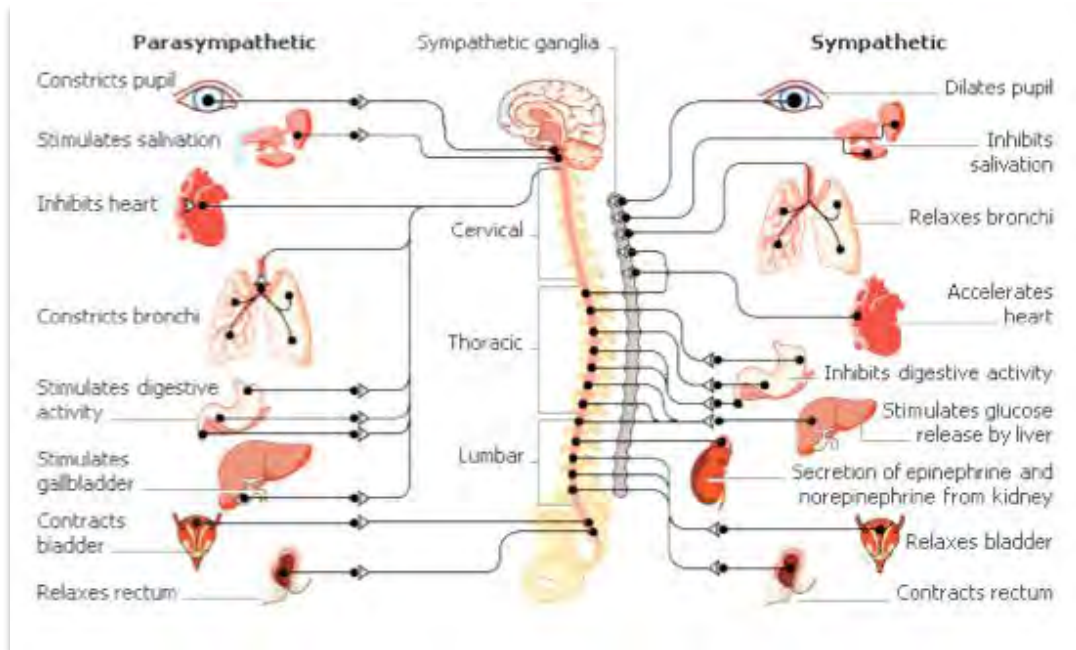
Figure 6 Physiology of the stress responds.

Source: The American Institute of Stress. *What is Stress?* Available at http://www.stress.org/daily-life/

The hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS) composed the main effector pathways of the stress system. When person confront experiences a stressful event, the information was sent to the amygdala in cerebrum. It functions about emotional processing. After the amygdala interprets and perceives danger, it instantly sends a signal to the hypothalamus. The hypothalamus is like a command center which communicates with the rest of the body through the autonomic nervous system which has two components, the sympathetic and the parasympathetic nervous system. In the sympathetic part, hypothalamus send signals to the adrenal glands. These glands send adrenaline (epinephrine) into the bloodstream. Epinephrine circulation brings on a series of physiological changes. The heart beats faster than normal. Pulse rate and blood pressure go up, pushing blood to the muscles, heart, and other vital organs. Breathing becomes more rapidly. Small airways in the lungs open wide. Lungs take in as much oxygen as possible with each breath. Extra

oxygen is sent to the brain, increasing alertness. Sensory abilities become sharper. At the same time, epinephrine cause the release of blood sugar (glucose) and fats flooded into the bloodstream, supplying energy to all parts of the body. [113] In addition to increase availability and redistribute energy, the immune system also be activated in the stress response. Cells of the innate immune system such as macrophages and natural killer cells depart from lymphatic tissue, enter the bloodstream, and temporarily raise the number of immune cells in circulation. [114]

The HPA axis relies on a series of hormonal signals in order to keep the sympathetic nervous system pressed down. If the brain perceives something as dangerous continually, the hypothalamus releases corticotropin-releasing hormone (CRH). CRH flows to the pituitary gland, and stimulate the release of adrenocorticotropic hormone (ACTH). ACTH goes to the adrenal glands and prompt them to release cortisol. Cortisol promotes the conversion of glycogen into glucose, increasing available sources of energy. The body stays on high alert. When the threat passes, cortisol levels fall. The parasympathetic nervous system reduces the stress response.[113]

The acute stress response can cause poor adaptation if it is repeatedly or continuously activated. Stress leads to sustained increases in blood pressure and vascular hypertrophy. When blood pressure elevated chronically, it forces the heart to work harder. Over time, blood pressure which elevated and shifted rapidly and chronically can lead to damaged arteries and plaque formation. The elevated basal levels of stress hormones also associated with chronic stress also suppress immunity, and chronic stress is particularly problematic for elderly people in light of immunosenescence, the gradual loss of immune function associated with aging. [114]

Stress is an important cause of pathological conditions in humans. Hormonal changes that occur during acute and chronic stress situations can affect glucose homeostasis. Faulenbach et al. (2012) studied a role for stress in altering glycemic control in 30 adult patients with type 2 diabetes. The result supported that stress may involve two mechanisms. First, there is a direct effect of stress hormones on blood glucose concentrations. Likewise, insulin sensitivity is generally reduced during

stress situations, glucose production is higher, and glucose utilization within all cells is impaired due to increased oxidative metabolism and reduced nonoxidative metabolism. Second, an indirect effect, patients with diabetes may pay less attention to their diabetes treatment and monitoring and may be less compliant with meal and exercise plans under stress conditions. Stress also can promotes the development of type 2 diabetes indirectly by promoting obesity and metabolic syndrome. [26]

Some studies suggested that psychological therapies for reducing stress might improve glycemic control in diabetes patients. Ismail et al. (2004) do a systematic review and meta-analysis of 25 previous published studies was performed to assess the effectiveness of psychological therapies in improving glycemic control in type 2 diabetes patients. In 12 studies, the mean HbA1c was lower in people assigned a psychological intervention than in the control group, defined as patients receiving usual care, education, waiting list, or attention control. Psychological interventions included counseling and cognitive, behavioral, and family systems therapy. As shown in this forest plot, the pooled mean difference was –0.32 (95% confidence interval –0.57 to –0.07), equivalent to an absolute difference of –0.76%. [115]

There are many effective self-management strategies that improve patients' outcomes. However, Erkan Erem's study found that participants of self-management program, who reported depression, were less likely to complete the program, and hence potentially benefiting from the program. [116] In managing diabetes, stress management related with 3 out of 7 issues in the AADE7self-care behaviors™: reducing stress when face the problem is a part of problem solving strategy, finding the right way to cope with stress is a healthy coping strategy, and coping with the problem in a healthy way is a way of reducing risks. Among various ways to cope with stress, mindfulness is one of the techniques uses.

2.4   Mindfulness: stress reduction and mindful practice

Mindfulness - a way of paying attention - stemmed from Eastern psychological practices, specifically in Buddhist psychology which 'sati' from the Pali language combined with 'sampajana'. [117]   The concept of mindfulness was continuously established in the realm of Western science and have become increasingly popular as complementary therapeutic strategies for a variety of medical and psychiatric conditions. [118]

To study mindfulness on a scientific level, scientific researchers have translated the term into measurable terms. The variety ways to measure mindfulness such as a dispositional characteristic (a trait that allows one to be aware of the present moment even during ordinary tasks [119]), an outcome (a state of awareness resulting from mindfulness training), and a practice (mindfulness meditation practice itself) [117]

Mindfulness has been adopted as an approach for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behavior. Much of the interest in the clinical applications of mindfulness has been sparked by the introduction of Mindfulness-Based Stress Reduction (MBSR).

MBSR originally developed by Jon Kabat-Zinn and colleagues at the Stress Reduction Clinic, the University of Massachusetts Medical Center. MBSR program consists of eight-weekly classes 2.5-3.5 hours in duration, with an all-day silent retreat during the sixth week of the program, for activities both formal and informal mindfulness meditation methods and daily home assignments of formal and informal practice. [120] A meta-analysis findings indicated the usefulness of MBSR as an intervention for a broad range of chronic disorders and problems. Improvements were seen across a spectrum of measurements including psychological dimensions of quality of life scales, depression, anxiety, some medical symptoms, sensory pain, functional quality-of-life estimates.[121] Recent innovations used mindfulness approaches have seen increase. [122] Some other mindfulness-based interventions are as follows:

- Mindfulness-based cognitive therapy (MBCT). It is designed to prevent depressive relapse by teaching to observe thoughts and feelings nonjudgmentally, and to view them simply as mental events that come and go.

- Dialectical behavior therapy (DBT) is a multifaceted approach included a wide range of cognitive and behavioral treatment procedures. Most of them are designed to change thoughts, emotions, or behaviors. Mindfulness skills are taught in DBT within the context of synthesizing acceptance and change.

- Acceptance and commitment therapy (ACT) is an approach which teaches clients to abandon attempts to control thoughts and feelings, but instead to observe them non- judgmentally and accept them as they are. Though it is theoretically based in contemporary behavior analysis, several of its strategies are consistent with the mindfulness approaches described.

- Relapse prevention (RP) is a cognitive-behavioral treatment package used mindfulness skills as a technique for coping with drive to engage in substance use.

There are current literatures suggested benefits of mindfulness such as

Yonas E. Geda investigated the association between mild cognitive impairment (MCI) and cognitive activities such as computer use, reading book, watching less TV, and craft activities. The result indicated the possible beneficial impact of cognitive activities. There were associated with 30% to 50% reduced odds of having MCI. [122]

Mechthild Hartmann's study investigate long-term outcomes of mindful-based stress-reduction (MBSR) intervention for patients with type 2 diabetes. In first year follow-up, the results showed lower levels of depression and improved health status compared with the control group. [123]

Jenny van Son study on the effectiveness of mindfulness-based cognitive therapy (MBCT) found that, compared with usual care, MBCT was more effective in

reducing stress, depressive symptoms, anxiety. MBCT was also more effective in improving quality of life. [124]

Some of them studied on or related with diabetes patient's issues as follows:

Jen Nash suggested that emotional eating may hinder diabetes patients to achieve dietary plan. Many people may found the difficulty to break away from the conditioning and pattern of food as an instant route to pleasure and satisfaction. The strategies based on principles of cognitive behavioral therapy for binge eating disorder may be choice of treatment. [125] For this problem, Mason studies the effects of a mindfulness-based intervention on mindful eating, sweets consumption. The results indicated that the mindfulness group, relative to the active control group, evidenced increases in mindful eating and maintenance of fasting glucose from baseline to 12-month assessment. Increases in mindful eating were associated with decreased eating of sweets and fasting glucose levels among mindfulness group participants. [126]

Caluyong surveyed the relationship between mindfulness and health-related Quality of Life in Patients with type 2 diabetes. The result indicated that mindfulness was negatively correlated with depression and positively correlated with mental health-related quality of life. [127]

Rosenzweig studied effect of mindfulness-based stress reduction program (MBSR) on the changes in glycemic control and stress related psychological symptoms among patients with type 2 diabetes. A study found a decrease in $HbA1_c$, depression, anxiety, and general psychological distress. [36]

Gregg conducted a randomized controlled trial to study about improving diabetes self-management through acceptance, mindfulness and values. Intervention was a combination of education and ACT (acceptance and commitment therapy) for acceptance and mindfulness skills. The study indicated better diabetes self-care, and having glycated hemoglobin values in the target range among participants in intervention group.[53]

Another study by Shayeghian implement ACT and education program for type 2 diabetes patients. The result showed that participants in intervention group reported better diabetes self-care, and optimum glycated hemoglobin (HbA1C) levels in the target range Shayeghian also indicated that this clinical randomized control trial study offered additional evidence regarding mechanisms for acceptance in self-management of diabetes. Among acceptance, value, and action, initial emphasis on acceptance, then, acceptance may facilitate later actions based on the values specified earlier, and in turn, acceptance and action based on these values improve performance. [54]

Another mechanisms that explain function of mindfulness may be as follows: [128]

- Exposure with a reduction in the emotional responses over time: The practice of mindfulness skills may improve patients' ability to tolerate negative emotional states and ability to cope with them effectively.

- Cognitive Change: The practice of mindfulness may lead to changes in thought patterns. Mindfulness training may redirect attention to other aspects of the present moment, thus avoiding rumination.

- Self-management: Mindfulness training may improve self-observation which promoted use of a range of coping skills. Linehan suggests that nonjudgmental observation and description permits recognition of the consequences of behaviors. This recognition may lead to more effective behavior change. Beside this, learning to focus "one-mindfully" on the present moment develops control of attention, a useful skill for individuals who are distracted by worries, memories, or negative moods.

- Relaxation: The induction of relaxation through various meditation strategies has been well documented. However, this outcome may not be a primary reason for engaging in mindfulness skills.

- Acceptance: Acceptance is one of several foundations of mindfulness practice. In DBT, several mindfulness techniques designed to promote acceptance of reality. Thus, it appears that mindfulness training may provide a method for teaching acceptance skills.

The ability to be mindful in everyday life is associated with better psychological and physical well-being. It can be purposely cultivated and enhanced through mindfulness practice. [129] Mindfulness was practiced in variety techniques to evoke mindfulness in many situations, and is often taught through a variety of meditation exercises. [128] While there are no widely agreed definitions about "pattern" or "form" of mindfulness cultivation practice, there are 3 options to practice mindfulness as follows: [39] [130]

- *Formal meditation practice*: This practice can be considered to perform when practitioners specifically set aside time to engage in mindfulness meditation practices. Most involve choosing an object of attention, such as the breath or the body, then returning the attention to that object each time the mind wanders. This develops a degree of calmness. Once some concentration is established, mindfulness meditation entails directing the mind and centering on how the event is experienced in the body. Regardless of the chosen object of attention, we practice being aware of our present experience with acceptance.

- *Everyday mindfulness*: This involves weaving mindfulness into existing routines through engaging in mindful moments, bringing mindful awareness to everyday activities, paying attention to what is happening in the moment without radically altering routines, and noticing any sensations such as walking when we walk,

the taste of food when we eat, and the appearance of surroundings as we pass through them.

- *Retreat practice*: Most involve extended periods of formal practice such as alternating sitting meditation with walking meditation. They are usually conducted in silence. All of the activities of the day which done in silence —getting up, showering, brushing teeth—can be used as opportunities to practice mindfulness

The effects of mindfulness practice seem to be dose related. If one does a little bit of everyday practice, a little bit of mindfulness is cultivated. Some studies have reported significant associations between amount of formal home practice and symptom reduction or other outcomes. However, it is not clear how much formal home practice is required to produce benefits. [39] [130] [131] Another study on dishwashing, as a mindfulness practice found the positive association with state mindfulness, promoted elements of positive affect, and decreased elements of negative affect. [41] Other literatures also mention the qualification of crocheting in improving mindfulness and psychological benefits.

Rosemary Kingston indicated that crafts - like knitting and crochet – are important means of accessing something that is fundamental to sense of well-being. Considering the characteristics of yarn crafts, the state of mind that one gets into when knitting is not dissimilar to mindfulness meditation in that are 'paying attention in a particular way, on purpose, in the present moment, and non-judgement. [132]

Kathryn Vercillo mentioned in the book 'crochet save my life' that when she do crocheting scarves or just crocheting a single stitch over and over. She would go into a completely meditative state and even if there was music or a TV on in the background, she never really absorbed what she was hearing. [46]

2.5   Quality of life

WHO defines Quality of Life as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. [133]

In western culture, the conception of quality of life may rooted in Greek philosophy. Aristotle wrote two ethical treatises: the *Nicomachean Ethics* and the *Eudemian Ethics*., and referred to one of them—probably the *Eudemian Ethics*—as "*ta êthika*"—his writings about character. Anyhow, these two works on the same ground: they begin with a discussion of *eudaimonia* ("happiness," "flourishing"), and turn to an examination of the nature of *aretê* ("virtue," "excellence") and the character traits that human beings need in order to live life at its best. [134] Buddhism has a similar goal of living the present life in preparation for Nirvana. The elements of quality of life are seen as prescriptive for the good life. [135]

Over time, worldly control by religious authorities has declined. Persons have more freedom to consider what's important to attain their satisfaction. [135] During the 1940s and 1950s, western government policies were directed towards socio-economic perspective to improve quality of life. In the 1950s and 1960s, American economists Samuel Ordway, Fairfield Osborn, and John Galbraith used the concept of quality of life to express their concerns about the risk of unlimited economic growth. During the 1960s and 1970s, the focus of quality of live concept shifted to individual's psychological and social needs as important components of quality of life. [136]

Quality of life means different things to different people, and takes on different meanings according to the area of application. So, there are various questionnaires for assessing quality of life. Some researchers may interested in self-reported health (SRH), with considerable overlap with quality of life. Some prefer to emphasis in some certain aspects, such as in health-related quality of life (HRQoL), while others interested in patient-reported outcomes (PROs) for a whole host of outcomes.[136] The WHOQOL-100, produced a total of 100 items in the assessment,

covers 24 facets in 6 broad domains - physical health, psychological, level of independence, social relations, environment, and spirituality/religion/personal beliefs. The WHOQOL – BREF, 26 items in total, contains 2 items from the Overall Quality of Life and General Health, and 1 item from each of the 24 facets included in the WHOQOL-100. [137] The questionnaire assessment indicated that it will be most useful in studies that require a brief assessment of quality of life, and may be of use to health professionals in the assessment and evaluation of treatment efficacy. [138] Furthermore, facilities for diabetes management in primary care settings are recommended [139] [140] .

Chapter III
Methodology

The study on "self-management education through crocheting program for diabetic patients" aims to assess the effects of education program intervention on blood glucose level and quality of life among participants who were adult female patients with type 2 diabetes mellitus in public health centers in Bangkok. This chapter describes research methodology of the study.

3.1   Research Design

This study is a quasi-experimental study with control group to evaluate the effect of self-management education program for type 2 diabetes patients. Participants were recruited by purposive sampling technique. Intervention group received intervention program added on standard service from public health center, while control group got only standard service. Data collections were conducted 2 times, before and after intervention implementation (O_1 and O_2 as showed in figure 3.1). The program intervention included 4 meeting classes ($X_1 - X_4$ as showed in figure 3.1), provided once a month.

	O_1	Month1	Month2	Month3	Month4	O_2
Intervention group		X_1	X_2	X_3	X_4	
Control group	O_1					O_2
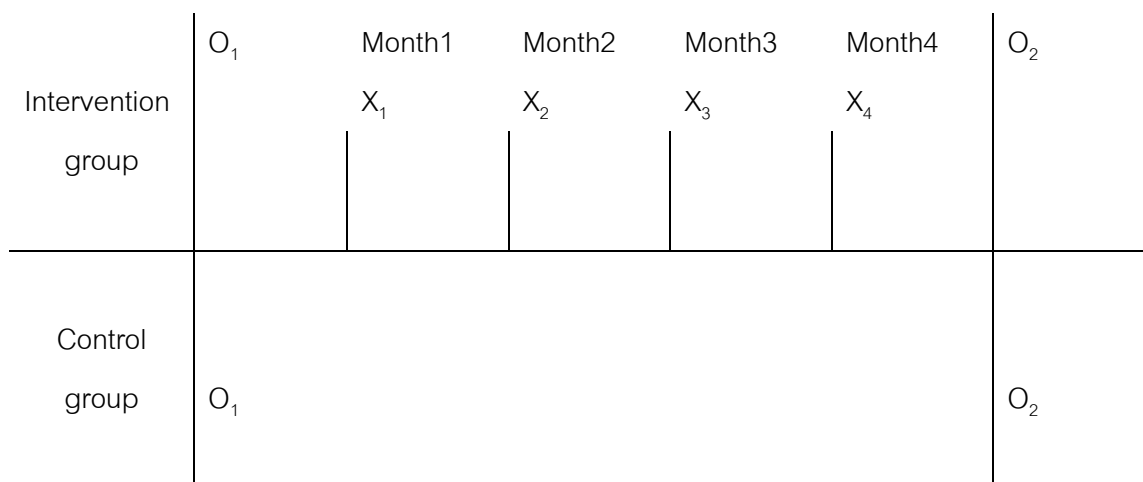
Note: O_1 = baseline data collection, O_2 = post-intervention data collection,

X_n = intervention (meeting class 1-4)

Figure 7   Research design

3.2   Study Area

Study area was Bangkok, Thailand. Primary health-care units were contact points where researcher found target population. Two Public health centers - under Health Department, Bangkok Metropolitan Administration (BMA) - were selected to be research sites.

Bangkok occupies 1,568.7 square kilometers in central Thailand, locally governed by Bangkok Metropolitan Administration (BMA). The BMA is divided into sixteen departments. Each department administers different aspects of the city's responsibilities. BMA provided medical and public health services through Medical Service Department and Health Department, included 9 hospitals, and 68 public health centers.

Bangkok area is divided into fifty districts, and grouped into 6 zones. Each district is managed by District Director. For medical and public health services, each of 9 hospitals, and 68 public health centers has its own responsible area. BMA public health centers are main primary care network, taken care in universal coverage and other health insurance and welfare. They also are grouped into 6 groups according to the Bangkok zone they located and take responsible.

Bangkok zone served population with similar socio-economic environment. Each zone is comprised of 8-12 public health centers. Each public health center is managed by Director of Public Health Center, and each public health center group is supervised by Assistant Director of Health Division. Each of these public health centers provides health care services included treatment, rehabilitation, disease control and prevention, and health promotion for its own responsible area, with the same standard and policy of BMA. Bangkok area and public health centers were selected according to willingness to participate and number of diabetic patients in public health centers. Finally, Bangkok zone 5 was selected. Thonburi and Nongkham Public Health Center were the last 2 public health centers taken part into the study. By randomly selection, Thonburi Public Health Center was selected to be study site of control group,

and Nongkham Public Health Center was selected to be study site of intervention group. Convenience selection was used to assign participants into control or intervention group, according to the health care unit where individual got her DM treatment for their routinely medical appointment.

Figure 8   Study sites

3.3   Study population and Sample

Study population in the study was adult female with type 2 diabetes mellitus diagnosed by medical doctor and received treatment from public health centers. Two public health centers located in zone 5 of Bangkok - Thonburi public health centers and Nongkham public health centers - were selected to be study sites.

Inclusion criteria

1. Adult female aged 50 – 65 years old who had diagnosed type 2 diabetes by medical doctor and received treatment from public health centers.

2. Has not used insulin.

3. $HbA1_c \geq 7$ % at last check up (not longer than 3 months).

4. Skilled in Thai reading and speaking.

Exclusion criteria

1. Has frequently affected by hypoglycemia, or suffered from severe hypoglycemia.

2. Suffered from severe complication, or has several complications, or has health condition diagnosed by medical doctor that was not appropriate to join the program.

3. Suffered from eyesight problem or hand dysfunction.

4. Loss of voluntary to participate.

3.4 Sample size

The appropriate sample size is expected to detect the difference of $HbA1_c$ based on the change of $HbA1_c$ level from previous study. HbA1c of intervention group decreased 1% [94]. Sample size was calculated by GPower 3.1 analysis program [141].

The two-sample t-test is used to determine if two population means. μ_1, μ_2 are equal. The data are two samples of size n1 and n2 from two independent and normally distributed populations. The true standard deviations in the two populations are unknown and must be estimated from the data. The null and alternate hypothesis of this t-test are: [141].

H0 : $\mu_1 - \mu_2 = 0$

H1 : $\mu_1 - \mu_2 \neq 0$

The effect size index d is defined as:

$$d = \frac{\mu_1 - \mu_2}{\sigma}$$

The t-test assumes the variances in both populations to be equal. A mean σ' may be used as the common within-population σ :

$$\sigma' = \sqrt{\frac{\sigma_1^2 + \sigma_2^2}{2}}$$

From a meta-analysis, the studies showed a vary effect of diabetes self-management education interventions (DSME) on outcome. For $HbA1_c$ reduction, H.A.Klein study indicated that HbA1c reduction of 1.09% that was significant at the 0.01 level [77] . Another systematic review evaluated the effectiveness of DSME in primary care showed pooled $HbA1_c$ reduction was -0.25 (95% CI, −0.42 to −0.07) [78]. However, the systematic review by Chrvala indicated the most favorable effect on $HbA1_c$ at 0.88% associated with combination DSME when compared with the control group.[79]

Other two studies aimed to do meta-analysis for the effect of DSME on quality of life, however, they were no conclusion due to high heterogeneity [88] [142]. For attrition rates, a systematic review indicated that dropping out rate from existing diabetes education services ranged from 4 to 57% across Britain, the United States, Ireland, Canada and Japan. [143]. An retrospective observational cohort study in the eastern districts of the City of Vantaa, Finland, indicated that 10% (n = 356) were dropouts from type 2 diabetes care of public primary health care [144].

In this study, researcher decided to use 80% power to detect the difference. So, sample size is 35 per group. Researcher also allowed 10% drop-out rate. Thus, 39 participants are needed in each group.
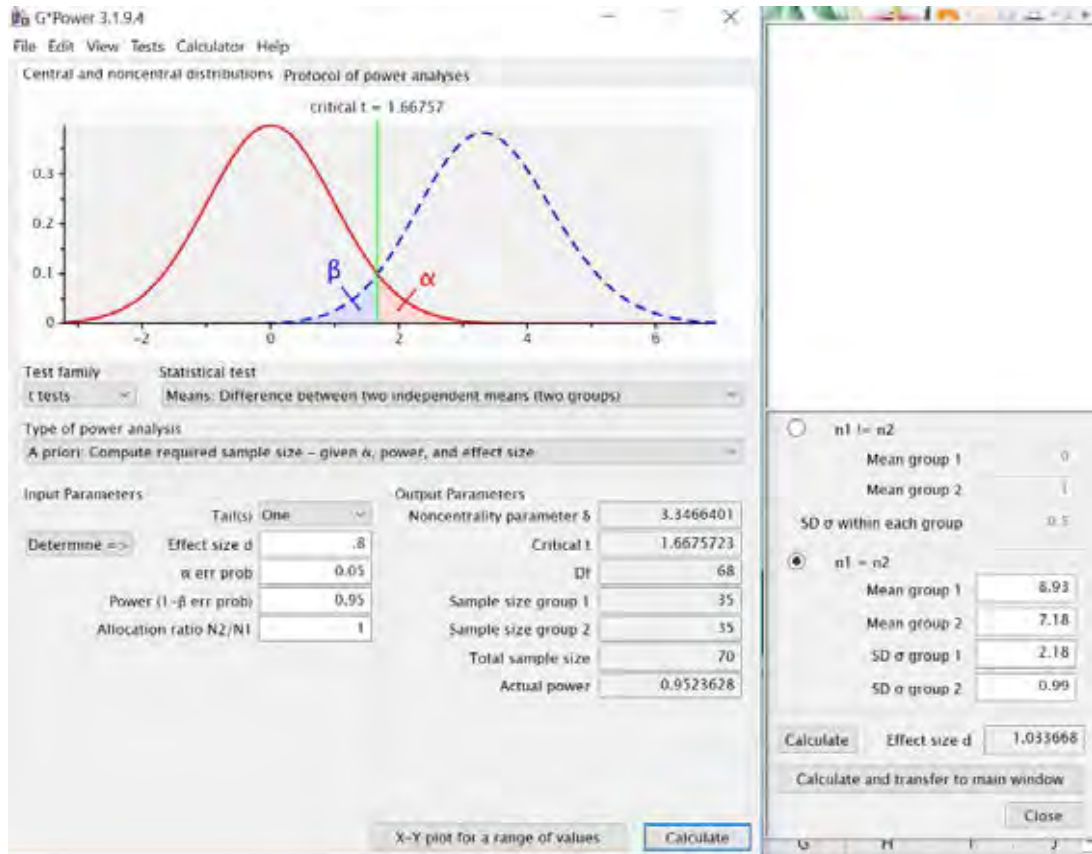
Figure 9   Sample size calculation by GPower 3.1 .9 analysis program

3.5   **Sampling technique**

Purposive sampling technique was used to get more chance to have enough participants for the study. The selection methods were used step by step for choosing study settings and participants. From all 68 BMA public health centers within 6 zones of all 50 districts in Bangkok, the selection procedure was conducted as follows:

1.   Public health center zone and health center.

To get public health center where were contact point researcher could meet study population, researcher contacted 6 Assistant Directors of Health Division and 68 Directors of Public Health Center for research approval in health center. To get more chance to meet study population, researcher purposive selected study area according to following steps:

1.1 Selected the biggest eligible zones.

The eligible zone is the zone which give research approval in health center within zone, and had at least 2 public health centers had given the approval. The biggest eligible zone is determined by the number of patients in the first 2 biggest eligible public health centers within zone. 4 zone were excluded in this step as of not approval. One zone selected was zone 5.

1.2 Selected public health centers.

Researcher selected the first 2 biggest eligible public health centers in selected zone. Eligible public health center is the public health center which give research approval and be in the zone which also give approval. 9 public health centers in zone 5 were excluded as of not approval. One public health center was excluded as it has smallest number of DM patients. Thonburi Public Health center and Nongkham Public Health Center were selected and randomly assigned to be contract point for participants in control and intervention group.

2. Participants in control and intervention group.

By randomly selected, Thonburi public health center was assigned as contact point for participants in control group, and Nongkham public health center was contact point for participants in intervention group. To invite adult female with type 2 diabetes to participate in the research project, posters and promotional media were distributed at all PR broads and information corners in public health centers. Potential participants got information from research project staffs and wrote application form. All application was sent to public health center for qualification process according to selection criteria. Qualified potential participants signed consent form before involved the research program.
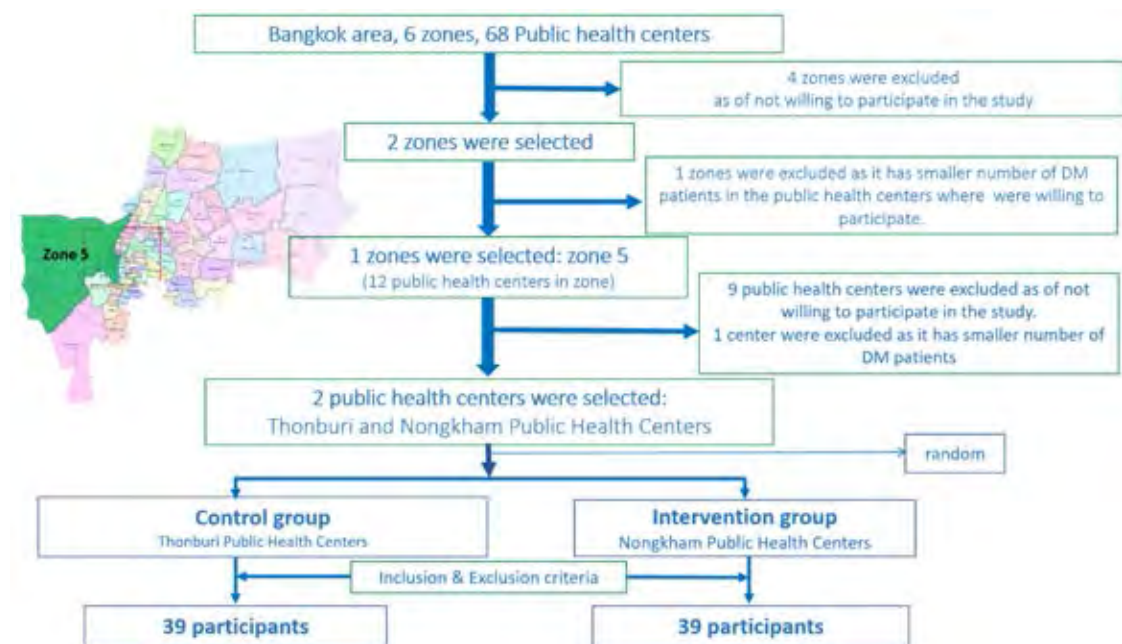
Figure 10 Flow diagram of sampling procedure

3.6   Intervention

The self-management education through crocheting program was designed to help people with type 2 diabetes achieve and maintain healthy blood glucose levels. According to recommendations from recognized organizations such as WHO, American Association of Diabetes Educators, Diabetes Association of Thailand, endosed by research evidence, fitted for local people under counselling from local health professional team, self-management education syllabus, activities, and time schedule were prepared.

The content in a course of study was compiled with

1. Basic knowledge about diabetes

2. Importance of self-care recommended for patient with type 2 diabetes

    2.1   Healthy eating and food choices

    2.2   Being Active with physical activities and exercise

    2.3   Coping with stress

    2.4   Taking medication in appropriate way

    2.5   Blood sugar monitoring: Measuring and understanding the meaning of blood sugar level

    2.6   Reducing risk of complication with suitable ways and understanding of one's own health status

    2.7   Problem solving with sample situations

3. Mindfulness and Crocheting practice

All content was prepared and printed in DM patient manual which gave to participants since the first meeting class.

The activities in program included 4 meeting class and DIY (do-it-yourself) practice. Meeting class was conducted once a month. The outline meeting class were as follows:

Section	Content	Trainer	Time duration
1	- Introduction to diabetes and self-care; Knowledge, focus on coping with stress and being active - Introduce some choice for exercise such as arm swing, 3x3 table for walk. - Introduce crocheting practice. - Problem solving or case studies or recitation. - Personal target & commitment.	- Medical Doctor - Specialist NCD nurse - Physical therapist - Embroidery trainer	2 hrs.
2	- Review knowledge from section 1. - Knowledge; focus on healthy eating. - Problem solving or case studies or recitation. - Personal target & commitment.	- Specialist NCD nurse - Nutritionist	2 hrs.

Section	Content	Trainer	Time duration
3	- Review knowledge from section 1 & 2. - Knowledge; focus on monitoring, taking medication - Problem solving or case studies or recitation - Personal target & commitment.	- Specialist NCD nurse - Pharmacist	2 hrs.
4	- Review knowledge from section 1, 2 & 3 - Knowledge; focus on reducing risks. - Problem solving or case studies or recitation - Personal target & commitment.	- Medical Doctor - Specialist NCD nurse	2 hrs.

Meeting classes were conducted after patient routine treatment procedure from public health center. For their standard treatment, patients got FBS measurement before met medical doctor. Clinical nurse recorded patient's FBS value in DM patient personal book. After patient meet her physician, she went to the meeting room and prepared for DSME learning intervention.

Before meeting class, research assistant asked participants to record their own FBS value in meeting class manual. This own recording gave more opportunity for patients to acknowledge their blood sugar level. At the end of the class, research staff asked participants to wrote their personal target and commitment, as goal-setting strategy to support self-management behavior, in their manual.

In each meeting class, activities were varied according to content as planned in curriculum and related with content of that class, such as presentation about insulin mechanisms by video clip, discourse about eating behaviors among participants, demonstration for stretching by physical therapist, instruction for crocheting by embroidery trainer and practice by participants themselves, including with problem solving or case studies or recitation or Q&A. All presenting and conducting activities were performed by experts in the field such as nutritionist for food choice, pharmacist for medication usage, physical therapist for exercise.

Discussion section, including case studies or recitation or Q&A, including with or section in each class, were good learning opportunities for problem solving with indirect experiences, recommendations, problem solving choices among participants, supervised by expert in the field. Trough two-way-communication, research staff also encouraged participants to do or continue appropriate self-care for achieving their goal.

Self-evaluation also used as strategy for self-development. Question sheet on participant's self-care satisfaction were distributed at the end of each class. Participants brought the sheet in the next meeting class, in the introduction section. Some pieces of souvenir were given by lucky drawn.

Beside main content of each class, benefit of mindfulness - such as mindfulness for eating, mindfulness for coping with stress, mindfulness as tool for helping person to overcome self-care obstructions were integrated, and encouraging for crocheting included.

For crocheting practice, the program introduced a 6 x 6 cm. square crochet pattern to participants and asked them to do 3 days/wk., 4-5 square/time. It took around 20 minutes per time. Yarn and needle were provided at the end of each class for participant practice in class and at home.

Figure 11   Square crochet pattern which introduced to participants for practice

Participants' crochet products were donate to person who were in need with the cooperation with the research project. Participants brought their crochet product to donate in the introduction section of $2^{nd} - 4^{th}$ meeting class. Few pieces of souvenir were given in return to few participants by lucky drawn.

3.7   Study procedure

This study consisted 2 phases: phase 1: Preparation and phase 2: data collection and program implementation

Phase 1: Preparation

This phase included intervention development, research assistant training and research staff team development, research project PR and application.

For intervention development, draft of the self-management education through crocheting syllabus, learning media and activities were brought to counselling with local health professional team, such as medical doctors, DM clinical nurses,

pharmacists, public health officers who work in study area to fitting intervention with local population.

For team development, meeting with public health center staff were set before and during the time research conducted. Information about research project - overall and activities in each step - was reported to public health center staff for understanding and cooperating. Tree community health volunteers accepted for invitation to be staff of research team. They got short training course for understanding about research project, and took role as coordinators with participants of intervention group in communities and in meeting classes. Four public health graduates were recruited as research assistants (RA) and got training on the content in self-management education through crocheting program curriculum, instructional and learning activity management skill, research methodology, research tool, and data collection emphasis on those used in the study. After passed training evaluation, 2 RA worked as main coordinators for control group, 2 others worked for intervention group, and all of them collected data at 2 public health centers and were assistants for preparation and proceeds of meeting class activities. Meeting with instructors/presenters for meeting class preparation were important.

PR activities were conducted before participant recruitment. Promotional posters were posted at all PR boards in public health center 27 and 48. Some brochures were distributed at information corners, and some were distributed through community health volunteers. Research assistants also did PR activities in public health centers. Potential participants got information from research project staffs. For those who interested to take part in the study filled in application form. All application was send to public health center for qualification process such as applicants' $HbA1_C$ value. Qualified potential participants signed consent form before involved the research program. After gave consent, their application information was sent to DM clinic for facilitation of joining research project.

Phase 2: Program implementation and Data collection

By coordination with public health centers, participants were set as sub-groups to rearrange and merge their time schedule of medical appointment and research activity schedule. In a month before program implementation, participants were invited to join baseline data collection section. Research team collected data about participants' profile and blood sugar level. Blood specimen for blood sugar measurement were collected, by nurse, before participant met their medical doctor. Data collection by questionnaire were handled, by researcher and 4 assistants, during their waiting time or after they finished their medical appointment. It took time around 40 mins. per person.

Self-management education program were regulated only for intervention group, while participants in control group will receive only routine treatment. For intervention implementation, meeting class were administered at public health center meeting room after participants' medical appointment. Place and all equipment were set in the day before. Instructors/presenters led the class activities with collaboration of research staff. For entertaining and being educative, interactive activities and gamification were periodically used in 3 main sections of each meeting class. These 3 sections were introduction section for greeting and creating a positive atmosphere such as fun self-evaluation with lucky draw for every participant, crochet donation with thank you game; instruction section for main content learning; and closure part for emphasizing key information, checking participants' understanding, and encouraging participants to keep their own commitment for achieving their target till next class.

Endlind data collection were conducted in a month after 4th meeting class. Participants were set into sub-groups for their time schedule of medical appointment and data collection schedule. With similar procedure as baseline data collection, data collection by questionnaire were accomplished by research staff. Blood specimen were collected by nurse, and send to Health Department Lab under the cooperating with public health centers.

3.8   Measurement Tools

There are 2 measurement tools in this study, laboratory procedure for HbA1$_c$ measurement and questionnaire

3.8.1   Questionnaire

Structured questionnaire was developed for collecting data of participant's characteristics, stress, mindfulness, DM knowledge and self-care, and quality of life; based on the patient-reported outcome instrument for patients with type 2 diabetes mellitus for Thai people (PRO-DM-Thai) developed by Kanisshanone Chuayruang [145], the Thai chronic illness resources survey (Thai CIRS) developed by Ananya Manit [146], Suanprung Stress Test-20 (SPST – 20) developed by Suwat Mahanirankul [147], Philadelphia Mindfulness Scale Thai version (PHLMS_TH) developed by Chatchawan Silpakit [148], and WHOQOL-BREF (Thai) developed by Suwat Mahanirankul [149].

The questionnaire complied with 5 parts as follows:

Part 1 Participant's characteristics

The questionnaire included demographic factors, i.e., age (year), education (primary or higher), occupation (housewife or others); health related lifestyle, i.e., physical activity (more passive – sedentary, had only some walk or more active), exercise (had or not), physical fitness (normal or need some assistance), smoking, alcohol drinking, blood sugar self-monitoring, medical appointment adherence; health status, i.e., BMI, year with DM (year), DM complication(had or not had), hypoglycemia and hyperglycemia symptom which participants felt or acknowledge the symptom(had or not had),

Part 2 DM knowledge and self-care

The questionnaire was specifically designed as a tool for this study according to content of the self-management education through crocheting program. Construct validity was assessed by 2 medical doctor experts on non-communicable

disease and 1 specialist NCD nurse lecturer. Index of Item-Objective Congruence (IOC) was .80.

DM knowledge questionnaire has 15 questions. Score for knowledge is 0 for wrong answer, and 1 for correct answer. Total score is 15. Reliability was tested, in other public health centers, with 30 type 2 diabetes patients who have similar characteristics according to inclusion – exclusion criteria for participants of the study program. Cronbach alpha coefficients for DM knowledge question was .745.

Knowledge score were categorized into two groups. For score which equal or higher than median score of all participants at baseline were higher knowledge group, and scores which lower than that median were lower knowledge group.

For knowledge change, different score between baseline and post-intervention ($\triangle$ Knowledge) were categorized into two groups; group 1 for those which post-intervention score is equal or less than baseline score, group 2 for those which post-intervention score is higher than baseline score.

For self-care practice, there are 17 questions for average frequency of behavior during the week of the pass month. Scoring used Likert's type rating 1-5. The scoring for each item is as follows:

Group 1 positive practices	
Answer	Score
Never	1
Less than once a week	2
1-2 days a week	3
3-4 days a week	4
5-6 days a week or more	5

Group 2 negative practices	
Answer	Score
Never	5
Less than once a week	4
1-2 days a week	3
3-4 days a week	2
5-6 days a week or more	1

Score from each item was summed up to be self-care score. Total score is 85. Cronbach alpha coefficients for self-care practice questions was .811. Self-care score were categorized into two groups. For score which equal or higher than median score of all participants at baseline were better self-care group, and scores which lower than that median were lower self-care group. For self-care change, $\triangle$ Self-care was different score between baseline and post-intervention.

Part 3: Stress

Stress measurement used Suanprung Stress Test-20 (SPST – 20) developed by Suwat Mahanirankul. [147] This tool is one of three stress tests included Suanprung Stress Test-104, Suanprung Stress Test-60, and Suanprung Stress Test-20. Cronbrach's alpha coefficients are more than 0.7 for every tool. Concurrent validity is more than 0.27 compared with standard Electromyography (EMG). Using factor analysis, SPST-20 was developed from SPST-104. SPST–20 has 20 questions, and can use in survey research, analytical research, and clinical test. [150] Before brought SPST-20 into this study, researcher tested reliability of the questionnaire with 30 type 2 diabetes patients who, were in other public health centers, had similar characteristics according to inclusion – exclusion criteria for participants of the study program. Cronbach alpha coefficients for SPST – 20 was .923.

For scoring, SPST-20 uses Likert's type rating 0 -5 as follows:

Answer	Score
Not feel stress	1
Feel a little	2
Feel moderate	3
Feel much	4
Feel very much	5
Not answer	0

The total score is 100, and be divided into 4 levels of stress as follows:

Score	Meaning
0 - 24	Low stress
25 - 42	Moderate stress
43 - 62	High stress
63 and more	Severe stress

For stress change, $\triangle$ stress was different score between baseline and post-intervention.

Part 4: **Mindfulness**

Mindfulness was measured by Philadelphia Mindfulness Scale. The questionnaire was designed to measure two components of mindfulness: awareness and acceptance. [151] Thai version of Philadelphia Mindfulness Scale (PHLMS_TH) was developed by Chatchawan Silpakit [152]. The test-retest reliability was tested in 30 subjects by Pearson's correlation. The internal consistency and construct validity were determined from another group of 103 subjects. Factor analysis with promax rotation was applied. Results from test-retest reliability and internal consistency were high. Pearson's correlation of awareness is 0.88, and that of acceptance is 0.89. Cronbrach's alpha coefficients of awareness is 0.87, and that of acceptance is 0.88. For construct validity, most items had high factor loadings to their corresponding domains. Before brought PHLMS_TH into this study, researcher tested reliability of the questionnaire with 30 type 2 diabetes patients who, were in other public health centers, had similar characteristics according to inclusion – exclusion criteria for participants of the study program. Cronbach alpha coefficients for component 1 (awareness) was .849, and component 2 (acceptance) was .851.

PHLMS_TH consists 20 questions, with Likert's type rating 1-5. There are two groups of questions; group 1 awareness and group 2 acceptance. The scoring and meaning are as follows:

Group 1: Odd number questions		Group 2: Even number questions	
Awareness		Acceptance	
Answer	Score	Answer	Score
Never	1	Never	5
A little	2	A little	4
Moderated	3	Moderated	3
Often	4	Often	2
Very often	5	Very often	1

Scores for each part range from 10 to 50. For the summed score from all odd number questions, the higher scores indicate higher levels of awareness. For the summed score from all even number questions, the higher scores indicate higher levels of acceptance. [151] Total score of awareness were categorized into two groups. For score which equal or higher than median score of all participants at baseline was in higher awareness group, and score which lower than that median score was in lower awareness group. Acceptance score also were categorized into two groups. For score which equal or higher than median score of all participants at baseline was in higher acceptance group, and score which lower than that median score was in lower acceptance group. For the change, $\triangle$ awareness or $\triangle$ acceptance were different score between each of the score at baseline and post-intervention.

Part 5: Quality of life.

WHO Quality of Life-BREF (WHOQOL-BREF) is a shorter version of the World Health Organization Quality of Life (WHOQOL) initiated to assess quality of life [153]. In this study, WHOQOL-BREF (Thai) was developed by Suwat Mahanirankul was used. Cronbrach's alpha coefficients of the tool is 0.8406. Validity is 0.6515 compared

with accepted WHOQOL-100 (Thai) [149]. Before brought WHOQOL-BREF (Thai) into this study, researcher tested reliability of the questionnaire with 30 type 2 diabetes patients who, were in other public health centers, had similar characteristics according to inclusion – exclusion criteria for participants of the study program. Cronbach alpha coefficients for total quality of life was .917.

The questionnaire comprises 2 types of questions: perceived objective and self-report subjective - for 4 facets: physical health, psychological, social relationships, and environment - and 2 items relating to the overall quality of life and general health. The score of each question ranges from 1 to 5. There are 2 groups of questions – negative approach of questions numbered 2, 9, and 11, and positive questions for the rest. The scoring is as follows: [149]

Scoring for each question.

Group 1 Negative approach*			Group 2: Positive approach	
Answer	Score		Answer	Score
Not at all	5		Not at all	1
A little	4		A little	2
Moderate	3		Moderate	3
Much	2		Much	4
Very much	1		Very much	5

* question 2, 9, and 11

For each facet score: physical health score is comprise those of question 2,3,4,10,11,12,24; psychological score is comprise those of question 5,6,7,8,9,23; social relationships score is comprise those of question 13,14,25; and environment score is comprise those of question 15,16,17,18,19,20,21,22

Meaning of score are in positive direction: the higher score, the higher quality of life [153]. However, WHOQOL-BREF (Thai) indicate score value as follows: [149]

1. Total score

Total score	Meaning
26 – 60	Poor Quality of Life
61 – 95	Moderate Quality of Life
96 - 130	Good Quality of Life

2. Each facet

Facet	Meaning		
	Poor QOL score	Moderate QOL score	Good QOL score
Physical health	7 – 16	17 – 26	27 - 35
Psychological	6 – 14	15 – 22	23 - 30
Social relationships	3 – 7	8 – 11	12 - 15
Environmental	8 – 18	19 – 29	30 – 40

Note: question 1 and 26 relate to the overall quality of life (QOL) and general health.

For quality of life change, $\triangle$ QOL was different score between total QOL score at baseline and those of post-intervention.

3.8.2   Laboratory procedure

To estimate blood glucose level, HbA1$_c$ was measured for average level of plasma glucose over the previous 2-3 months. Venous blood samples were collected by registered nurses at public health center. Blood Specimen Collection was processed as follow:

1.   Assemble equipment for collecting blood such as EDTA blood tube, tourniquet, gauze pad, rack for holding blood tube, 70% isopropyl alcohol.

2.   Identify the patient, and position the patient in a chair.

3.   Apply a tourniquet around the arm approximately 5 finger widths above the selected puncture site. Ask the patient to form a fist. Cleanse the area where a vein was selected. Anchored the vein, then performed 2 ml. blood draw. Remove blood collector tube. Mix anticoagulant additives gently by 8-time inversions.

4.   Blood samples were sent to Health Department Lab by van, and arrived lab within 2 hours.

5.   Blood glucose was analyzed by Turbidimetric Inthibition Immuno Assay

3.9   Data Analysis

Data was analyzed by SPSS for windows version 22, licensed to Chulalongkorn University.

1.   Descriptive statistics. For categorical data, we represented with percentage and frequency. For continuous data, we represented with mean and standard deviation (*SD*). These descriptive statistics were used to describe participants' characteristics, i.e. age, education, occupation, physical activity, exercise, physical fitness, smoking, alcohol drinking, blood sugar self-monitoring, medical appointment adherence, BMI, year with DM, DM complication(s), hypoglycemia symptom(s),

hyperglycemia symptom(s), stress, awareness, acceptance, knowledge, self-care, and quality of life.

2. Inferential statistics were used to reach judgment with probability. An alpha of 0.05 is used as the cutoff for significance. To deduce participants' properties, inferential statistics was used as follows:

The Shapiro-Wilk or Kolmogorov Smirnov test was used to test normality of data in continuous data. If the assumption of normal distribution is violated, the non-parametric statistics such as Mann-Whitney U test, Wilcoxon Signed Rank test will be conducted. If the assumption of normal distribution is not violated, the parametric statistics such as independent t test, correlation, multiple linear regression, etc. will be performed. Either Independent T-test (Parametric statistics) or Man-Whitney U test (Non-parametric statistics) was used to compare stress, awareness, quality of life; between control and intervention group. Chi-square test was used to test the association among categorical variables such as education, occupation, exercise, smoking between intervention and control group in order to test the baseline characteristics between intervention and control group.

Hierarchical regression was used to see the effect of intervention program (treatment) on the change of $HbA1_c$ and quality of life (QOL). To adjust for the confounding factors (covariates), the change score of total quality of life ($\triangle$QOL) and the change of HbA1c ($\triangle$ $HbA1_c$) was set as dependent variable and we selected covariates (i.e. occupation, exercise, the change of awareness) to put into the model based on the bivariate analysis (e.g. chi-square, correlation, independent t test).

3.10 Ethical Consideration,

Ethical approval was obtained from Chulalongkorn University Research Ethics Committee (Ref. COA No. 235/2559, COA No. 228/2560). Information sheet about research project; included objective, methodology, intervention, benefits, and rights to leave the study; was provided among target population. Potential participants got adequate information to make decision, and gave consent before take part in the study. All written informed consent was obtained from each participant with ensuring confidentiality, privacy, and respect.

Chapter IV
Results

This chapter were presented the results from the quasi-experimental study which aimed to evaluated the effect of diabetes self-management education enhancing mindfulness through crocheting program on the change of quality of life and blood sugar level among adult female patients with type 2 diabetes mellitus in public health centers, Bangkok, Thailand. Intervention group got the self-management education through crocheting program, while control group got standard service from public health center. The study showed the results as follows:

4.1   Characteristics of participants between control and intervention group

4.1.1   Demographic characteristics, health related lifestyle and health status among

participants

In this study, 78 eligible respondents were recruited. According to their treatment clinique, 39 participants were assigned to control group and other 39 for intervention group. However, in control group, only 38 participants were complete the study. For demographic characteristics, among all female participants in control and intervention groups, the average age of all participants was 58.86. Between two age groups - less than 60 year old and 60 year old up - a chi-square test indicated that no significant difference in age distribution between group (p = 0.570). Most of them (n = 61, 79.2 %). had primary education Around half of them (n = 42, 54.5 %) were housewife. Chi-square test indicated that no significant difference of distribution in education group (p = 0.104). But for occupation, housewife was higher proportion in intervention group (p = 0.002).

For health-related lifestyle, most of participants (81.8%) had limited physical activities. Out of all 77 participants, 63 had sedentary lifestyle or had some walk. Around 1 out of 3 (n = 30, 39%) had no exercise, and another portion (n = 25, 32.5%) had exercise less than 3 days per week. However, there was significant different

between control and intervention group in physical activities and exercise (p = 0.016). More participants in intervention group (n = 36, 92.3%) had passive physical activity lifestyle, compared with control group (n = 27, 71.1%). Nonetheless, for intervention group participants who had some exercise, higher proportion of them (n = 30, 76.9%) did, compared with control group (n = 17, 44.7%) (p = 0.004). Almost of participants (97.4%) had normal physical fitness. They were able to do daily living activities without assistance. Only 1 in each group sporadically needed assistance. They reported that sometimes they got leg pain which discourage them from going out. Physical fitness for daily living activities among 2 groups were not significantly different. All of them were not smoker nor alcohol consumer. Most of them (n = 71, 92.2%) always available for medical appointment. By the way, more than half of participants (n = 46, 59.7%) had no blood sugar monitoring. There were no significant differences between control and intervention group in blood sugar monitoring and medical appointment adherence (p = 0.209 and p = 0.095, respectively).

For health status, most of participants were overweight or obese (n = 26, 68.4% in control group and n = 22, 56.5% in intervention group). In addition, the average BMI of control group (M = 27.66, SD = 4.39) was significantly higher than that of intervention group (M = 25.61, SD = 3.37) (p = 0.025). The average time which they were come down with DM was 7.68 (SD = 4.16) with no significant difference between control and intervention group. Most of them (n = 48, 62.3%) had at least 1 complication. Hypertension was the highest prevalence among participants (n = 40, 51.95%) and dyslipidemia was the second (n = 32, 41.56%). Participants with complication(s) in control group (n = 30, 78.9%) is significantly higher than that in intervention group (n = 18, 46.2%) (p = 0.003). By the way, most of participants did not report symptom of hypoglycemia (63.2% in control group and 46.2% in intervention group, p = 0.202), nor hyperglycemia (60.5% in control group and 48.7% in intervention group, p = 0.206).

Table 2   Participants' characteristics between control and intervention groups.

Variables	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Age (Mean ± SD)	58.86 ± 4.73	58.82 ± 4.32	58.9 ± 5.15	0.411 $^{\epsilon}$
Age group				
60 yr. or older	39 (50.6)	18 (47.4)	21 (53.8)	0.570 $^{\#}$
Less than 60 yr.	38 (49.4)	20 (52.6)	18 (46.2)	
Education				
Primary school	61 (79.2)	33 (86.8)	28 (71.8)	0.104 $^{\#}$
Secondary school or higher	16 (20.8)	5 (13.2)	11 (28.2)	
Occupation				
House wife	42 (54.5)	14 (36.8)	28 (71.8)	0.002 $^{\#}$ *
Other (salesclerk, shop assistant, freelance, etc.)	35 (45.5)	24 (63.2)	11 (28.2)	
Health related lifestyle				
Physical activity				
More passive, Sedentary	63 (81.8)	27 (71.1)	36 (92.3)	0.016 $^{\epsilon}$ *
More active	14 (18.2)	11 (28.9)	3 (7.7)	
Exercise				
No exercise	30 (39.0)	21 (55.3)	9 (23.1)	0.004 $^{\#}$ *
Have some exercise	47 (61.0)	17 (44.7)	30 (76.9)	
- Frequently 3 days or more per week	22 (28.6)	5 (13.2)	17 (43.6)	
- Less than 3 days per week	25 (32.5)	12 (31.6)	13 (33.3)	

*statistically significant (p < 0.05)   # Chi-square test ϵ Independent t test

Table 2   Participants' characteristics between control and intervention groups. (continue)

Variables	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Physical fitness				
Normal	75 (97.4)	37 (97.4)	38 (97.4)	0.985 [#]
Some assistance needed.	2 (2.6)	1 (2.6)	1 (2.6)	
Smoking				
No smoking	77 (100)	38 (100)	39 (100)	
Alcohol drinking				
No alcohol drinking	77 (100)	38 (100)	39 (100)	
Blood sugar monitoring				
Monitored sometime	31 (40.3)	18 (47.4)	13 (33.3)	0.209 [#]
Never monitored	46 (59.7)	20 (52.6)	26 (66.7)	
Medical appointment adherence				
Always available for doctor's appointments	71 (92.2)	37 (97.4)	34 (87.2)	0.095 [#]
Not available for doctor's appointments sometimes	6 (7.8)	1 (2.6)	5 (12.8)	

*statistically significant (p < 0.05)   # Chi-square test   Є Independent t test

Table 2   Participants' characteristics between control and intervention groups. (continue)

Variables	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Health status				
BMI (Mean ± SD)	26.62 ± 4.01	27.66 ± 4.39	25.61 ± 3.37	0.024 [ε] *
BMI group				
normal range	29 (37.7)	12 (31.6)	17 (43.6)	0.111 [#]
(18.50 – 24.99 kg/m^2)				
overweight, pre-obese	33 (42.9)	15 (39.5)	18 (46.2)	
(25.00 – 29.99 kg/m^2)				
Obese (≥30.00 kg/m^2)	15 (19.5)	11 (28.9)	4 (10.3)	
Year with DM (Mean ± SD)	7.68 ± 4.16	8.53 ± 4.76	6.85 ± 3.35	0.078 [ε]
DM complication(s)				
No complication	29 (37.7)	8 (21.1)	21 (53.8)	0.003 [#] *
Have complication (s)	48 (62.3)	30 (78.9)	18 (46.2)	
Hypoglycemia symptom				
Have symptom sometime	34 (44.2)	14 (36.8)	20 (51.3)	0.202 [#]
Never feel	43 (55.8)	24 (63.2)	19 (48.7)	
Hyperglycemia symptom				
Have symptom sometime	36 (46.8)	15 (39.5)	21 (53.8)	0.206 [#]
Never feel	41 (53.2)	23 (60.5)	18 (46.2)	

*statistically significant (p < 0.05)   # Chi-square test   Є Independent t test

4.1.2   Self-care and Knowledge about Diabetes and self-care

Diabetes self-care can determine outcomes in glycemic control and complication progression among patients. In this study, more participants had higher score than median (72 of total score 85, at baseline). Participants with higher score increased when compared between baseline (n = 40, 51.9%) and endline (n = 49, 63.6%), and distributions of participants between groups were not significant difference (p = 0.565 and 0.389 at baseline and endline, respectively).

Knowledge is one of factors which may influent behavior. Trend of knowledge and self-care was congruent in this study. Most of participants (n = 52, 67.5% at baseline) had higher score than median (12 of total score 15, at baseline), and participants with higher score increased at endline (n = 58, 75.3%). Distributions of participants between groups were not significant difference (p = 0.747 and 0.467 at baseline and endline, respectively).

Table 3   *Self-care and knowledge about Diabetes and self-care between control and intervention groups, at baseline and after intervention, by Chi-square.*

Variable	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Self-care				
At baseline				
Higher score	40 (51.9)	21 (55.3)	19 (48.7)	0.565 [#]
Lower score	37 (48.1)	17 (44.7)	20 (51.3)	
At endline				
Higher score	49 (63.6)	26 (68.4)	23 (59.0)	0.389 [#]
Lower score	28 (36.4)	12 (31.6)	16 (41.0)	
Knowledge				
At baseline				
Higher score	52 (67.5)	25 (65.8)	27 (69.2)	0.747 [#]
Lower score	25 (32.5)	13 (34.2)	12 (30.8)	
At endline				
Higher score	58 (75.3)	30 (78.9)	28 (71.8)	0.467 [#]
Lower score	19 (24.7)	8 (21.1)	11 (28.2)	

*statistically significant (p < 0.05)   # Chi-square test

4.1.3 Stress and mindfulness

Negative effects of stress may lead to both physical and psychological reactions, including the difficulty of blood sugar control in diabetic patients. According to four groups of Suanprung stress score meaning; low, moderate, high, severe; most of participants (64.94 %) had moderate stress and no one had severe stress. Around 1 out of 5 (24.68 %) had high stress at baseline. There were some changes at endline. The number of participants lessened from 19 (24.7%) to 15 (19.5%) in high stress group, and increased from 8 (10.4%) to 17 (22.1%) in low stress group. In addition, number of participants with low stress increased from 5 to 14 in intervention group, while the number of participants with low stress in control group was stable. The distribution of participants, by stress level, was significant different between control and intervention group at endline ($p = 0.007$).

Table 4   Comparison of stress level between control and intervention groups at baseline and after intervention.

Variable	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Stress				
at baseline				
Low stress	8 (10.4)	3 (7.9)	5 (12.8)	0.882 [a]
Moderate stress	50 (64.9)	25 (65.8)	25 (64.1)	
High stress	19(24.7)	10 (26.3)	9 (23.1)	
Severe stress	-	-	-	
at endline				
Low stress	17(22.1)	3 (7.9)	14 (35.9)	**0.007** [# b]
Moderate stress	45(58.4)	28 (73.7)	17 (43.6)	
High stress	15(19.5)	7 (18.4)	8 (20.5)	
Severe stress	-	-	-	

[a]: Fisher's Exact Test   [b] statistically significant (p < 0.05)   [#] Chi-square test

For mindfulness, there are 2 components: awareness and acceptance. More than half of participants had awareness score and acceptance score higher than median (23 for awareness, 39 for acceptance) at baseline (55.8% for awareness, 53.2% for acceptance). However, more participants in control group ($n = 26$) had higher acceptance, compared with those in control group (n=15) (p = 0.008). After intervention, participants with higher awareness score increase in intervention group, and decreased in control group. Distribution of participants was significantly different between control and intervention groups (*p < 0.001*). Distribution of participants by acceptance level also changed. Number of participants with higher score more increased in control group, from 26 (68.4%) to 32 (84.2%), while number of participants in intervention group increased from 24 (61.5%) to 29 (74.4%), in lower score level. Participant distribution, by acceptance, was significantly different between group ($p < 0.001$).

Table 5 Mindfulness characteristic of control and intervention groups, at baseline and after intervention, by Chi-squre.

Mindfulness	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Component 1: Awareness				
At baseline				
Higher score	43 (55.8)	18 (47.4)	25 (64.1)	0.138[#]
Lower score	43 (44.2)	20 (52.6)	14 (35.9)	
At endline				
Higher score	39 (50.6)	10 (26.3)	29 (74.4)	<0.001 [# b]
Lower score	38 (49.4)	28 (73.7)	10 (25.6)	
Component 2: Acceptance				
At baseline				
Higher score	41 (53.2)	26 (68.4)	15 (38.5)	0.008 [# b]
Lower score	36 (46.8)	12 (31.6)	24 (61.5)	
At endline				
Higher score	42 (54.5)	32 (84.2)	10 (25.6)	<0.001 [# b]
Lower score	35 (45.5)	6 (15.8)	29 (74.4)	

[b] statistically significant (p <0.05)   [#] Chi-square test

4.1.4   Quality of life

Quality of life (QOL) is a major goal of DM treatment. Most of participants in this study perceived their position in quality of life, according to tool in fair level, as moderate (n = 50, 64.9 % at baseline, and n = 55, 71.4% at endline). Distributions of participants were significantly different (p = 0.009). Most of control group (81.6%) perceived their QOL as moderate quality of life, but around half of intervention group (n =19, 48.7%) perceived their QOL as moderate and another half (n =19, 48.7%) perceived their QOL as good. However, average QOL was not significant different between control and intervention group (M = 89.55, SD = 7.09 in control group; M = 92.62, SD = 14.39 in intervention group). Trend of participant distribution changed after intervention. There was lessen participants in good QOL. Average QOL score also decreased in control group. QOL score was significant different between control and intervention group (M = 85.87, SD = 6.75 in control group; M = 93.62, SD = 12.05 in intervention group) (p = 0.001).

For domain 1 physical health, most of participants also reported having moderate QOL at baseline (n = 60, 77.9%) and endline (n = 62, 80.5%). Distribution of participants was significantly different (p = .016). Proportion of participants in good was higher in intervention group (n = 13, 33.3%), compared with that of control group (n = 4, 10.5%). After intervention, there was some change. Proportion of participants in each QOL level was not significantly different between control and intervention group at endline (p = .050).

Around half of participants (n=38, 49.4%) reported their position in domain 2 psychological domain as good level. There was no significant difference between control and intervention groups. Similar to trend of domain 1, there was some change after intervention. Proportion of participants in good psychological QOL was lessen, especially in control group (from n = 15 to n = 5). Participant distributions were significantly different between control and intervention group at endline (p < 0.001).

For domain 3 social relationship, most of participants (*n*=50, 64.9%) perceived their quality of life in social relationship as moderate. There was no significant difference between control and intervention group (*p* = 0.390). At endline, number of participants who reported as good QOL was decrease in control group (from *n* = 10 to *n* = 6). While participants who reported as poor QOL was decrease in intervention group (from *n* = 7 to *n* = 3), participants who reported as good and moderate QOL slightly increased. However, there was not significant difference between control and intervention group (*p* = 0.894)

More than half of participants also perceived their environment as moderate quality (*n* = 45, 58.4% at baseline and *n* = 53, 68.8% at endline). However, distribution of participants in intervention group (*n* = 21, 53.6% at baseline and *n* = 20, 51.3% at endline) was higher in good QOL when compared with control group (*n* = 8, 21.1% at baseline and *n* = 8, 7.9% at endline) (*p* = 0.007 and <0.001, respectively).

Table 6   Comparison of Quality of life (QOL) between control and intervention
groups, at baseline and after intervention.

Variable	Total (*N* = 77) *n* (%)	Control group (*N* = 38) *n* (%)	Intervention group (*N* = 39) *n* (%)	*P*-value
Quality of life **Total** At baseline				
- Good	26 (33.8)	7 (18.4)	19 (48.7)	0.009 [#] [b]
- Moderate	50 (64.9)	31 (81.6)	19 (48.7)	
- Lower	1 (1.3)	-	1 (2.6)	
At endline				
- Good	22 (28.6)	5 (13.2)	17 (43.6)	0.003 [#] [b]
- Moderate	55 (71.4)	33 (86.8)	22 (56.4)	
- Lower	-	-	-	

[b] statistically significant (p <0.05)   [#] Chi-square test

4.1.5 Blood sugar

Blood sugar is main targets for controlling the progression of diabetes complications. All participants in this study were uncontrolled diabetes patients. Their blood sugars were higher than recommend levels. At baseline, mean of $HbA1_c$ (SD) among participants in control and intervention groups were 8.32 (0.758) and 8.21 (.729), respectively. There was not significantly different between control and intervention group ($p = 0.510$), but it was significantly different at endline ($p = 0.008$). Mean of $HbA1_c$ in intervention group decrease from 8.21 ($SD = 0.729$) to 7.84 ($SD = 0.613$), while those of control group were quiet stable overtime.

Table 7   Comparison of $HbA1_c$ between control and intervention groups, by t-test.

Variable	Total (N = 77) Mean ± SD	Control group (N = 38) Mean ± SD	Intervention group (N= 39) Mean ± SD	P-value
HbA1_c				
At baseline	8.26 ± 0.74	8.32 ± 0.758	8.21 ± 0.729	0.510 $^{∈}$
At endline	8.11 ± 0.88	8.38 ± 1.036	7.84 ± 0.613	0.008 $^{∈\ b}$

[b] statistically significant (p < 0.05)   ∈ Independent t test   [u] Mann-Whitney U Test

4.1.6 The changes after intervention

After intervention, there were some change among study factors from baseline to endline. Degree of change were not significantly different for self-care (p = 0.340), knowledge (p = 0.570), and stress (p = 0.788). However, degree of change was significant difference between control and intervention group for awareness (p <0.001), acceptance (p <0.001), quality of life (p = 0.041), and HbA1$_c$ (p = 0.009).

Table 8 Comparison of self-care, knowledge, stress, mindfulness, quality of life, $HbA1_c$, and their change, among control and intervention groups, at baseline and endline.

Variable	Total (N = 77) Mean (SD)	Control group (N = 38) Mean (SD)	Intervention group (N = 39) Mean (SD)	P-value
Self-care				
At baseline	71.69 (7.15)	72.42 (4.69)	70.97 (8.92)	0.568 [u]
At endline	72.81 (7.28)	72.47 (4.88)	73.13 (9.09)	0.350 [u]
△ self-care	1.12 (8.74)	.053 (6.71)	2.15 (10.33)	0.340 [u]
Knowledge				
At baseline	12.16 (1.51)	12.03 (1.37)	12.28 (1.64)	0.414 [u]
At endline	12.19 (1.25)	12.21 (1.07)	12.18 (1.14)	0.584 [∈]
△ knowledge	.03 (1.78)	0.18 (1.59)	-.10 (1.96)	0.570 [u]
Stress				
at baseline	35.04(9.47)	36.03(10.20)	34.08(8.71)	0.530 [u]
at endline	33.64(10.19)	35.05(8.58)	32.26(11.49)	0.734 [u]
△ stress	-1.40 (13.75)	-.97 (10.77)	-1.82 (16.28)	0.788 [∈]

*statistically significant (p < 0.05)   ∈ Independent t test   [u] Mann-Whitney U Test

Table 8   Comparison of self-care, knowledge, stress, mindfulness, quality of life, HbA1$_c$, and their change, among control and intervention groups, at baseline and endline (continue).

Variable	Total (N = 77) Mean (SD)	Control group (N = 38) Mean (SD)	Intervention group (N =39) Mean (SD)	P-value
Mindfulness				
Component 1:				
Awareness				
At baseline	24.23 (7.00)	22.97 (6.74)	25.46 (7.13)	0.120 ^{u}
At endline	24.29 (8.95)	18.24 (4.81)	30.21 (8.08)	<0.001 ^{u*}
△ awareness	.07 (10.63)	-4.74 (7.31)	4.74 (11.33)	<0.001$^\epsilon$ *
Component 2:				
Acceptance				
At baseline	38.48 (6.32)	40.47 (4.99)	36.54 (6.92)	0.005 ^{u*}
At endline	37.45 (9.27)	43.39 (4.78)	31.67 (8.93)	<0.001 ^{u*}
△acceptance	-1.03 (9.92)	2.92 (6.46)	-4.87 (11.21)	<0.001$^\epsilon$ *
Quality of life				
Total				
At baseline	91.10 (11.43)	89.55 (7.09)	92.62 (14.39)	0.240 ^{u}
At endline	89.79 (10.49)	85.87 (6.75)	93.62 (12.05)	<0.001 ^{u*}
△ QOL	-1.31 (10.13)	-3.68 (5.89)	1.00 (12.65)	0.041$^\epsilon$ *
HbA1$_c$				
At baseline	8.26 (.74)	8.32 (.758)	8.21 .729 ()	0.340 ^{u}
At endline	8.11 (.88)	8.38 (1.036)	7.84 (.613)	0.008 ^{u} *
△ HbA1$_c$	-.13 (.62)	0.056 (.77)	-.32 (.34)	0.009$^\epsilon$ *

*statistically significant (p < 0.05) ϵ Independent t test ^{u} Mann-Whitney U Test

4.2   The effectiveness of Intervention

To see the effect of intervention on the change of $HbA1_c$ and quality of life (QOL), hierarchical regression analysis was used. The first model was bivariate analysis between outcome and intervention. The change score of total quality of life ($\triangle$ QOL) and the change of $HbA1_c$ ($\triangle$ $HbA1_c$) was set as dependent variable. In model 2 and 3, we selected covariates to put into the model based on the bivariate analysis (e.g. chi-square, independent t test). In model 2, we adjust the change of awareness and acceptance as covariates. In model 3, we added more covariates - occupation, physical activity, exercise, BMI and complication.

4.2.1   The effect of the intervention program on the significant change of $HbA1_c$, with hierarchical regression analysis

Table 4-9 showed the effect of the program associated with the change of $HbA1_c$ with some other predictors in 3 models.

Model 1 showed the effect of the intervention program on the change of $HbA1_c$ using simple linear regression. R^2 was .092. Intervention program had significant association with the outcome. (β = -0.304, p = 0.007)

In model 2, two more predictors were added. R^2 increased to .162. When other factors were control, intervention program and the change of awareness were statistically significant associated with the change of $HbA1_c$ (β = -0.401, p = 0.001 and β = 0.602, p = 0.021; respectively)

In model 3, all selected predictors - included the change of awareness, the change of acceptance, occupation, physical activity, exercise, BMI and complication – was entered to estimated coefficients with the change of HbA1c. R^2 was .183. Same as in model 2, only intervention program and the change of awareness were statistically significant associated with the change of $HbA1_c$ (β = -0.498, p = 0.002 and β = 0.668, p = 0.023; respectively).

Table 9 The effect of the intervention program on with the change of HbA1$_c$ with hierarchical regression analysis (n = 77)

Model	Factors	Unstandardized Coefficients		Standardized Coefficients	P-value[#]	95.0% CI for b	
		b	SE	β		LB	UB
1	(Constant)	.056	.096		0.562	-.135	.247
	Intervention	-.372	.135	-.304	**0.007***	-.640	-.104
2	(Constant)	.142	.100		0.163	-.058	.342
	Intervention	-.490	.147	-.401	**0.001***	-.783	-.198
	△ Awareness	.035	.015	.602	**0.021***	.005	.064
	△ Acceptance	.027	.015	.438	0.082	-.004	.058
3	(Constant)	.553	.547		0.315	-.538	1.645
	Intervention	-.610	.189	-.498	**0.002***	-.986	-.234
	△ Awareness	.039	.017	.668	**0.023***	.005	.072
	△ Acceptance	.029	.017	.461	0.090	-.005	.062
	Occupation	.044	.152	.036	0.776	-.261	.348
	Physical activity	-.107	.187	-.067	0.570	-.481	.267
	Exercise	.065	.150	.052	0.667	-.234	.363
	BMI	-.016	.018	-.105	0.376	-.052	.020
	DM complication	.101	.168	0.080	0.548	-.233	.436

[#] Multiple linear regression   *statistically significant p < 0.05

R^2 (Model 1) = 0.092 R^2 (Model 2) = 0.162 R^2 (Model 3) = 0.183

4.2.2 The effect of the intervention program on the significant change of quality of life (QOL) with hierarchical regression analysis

Table 4-10 showed the effect of the program associated with the change of quality of life. Model 1 showed statistical significance association between intervention and the change of QoL (β = 0.233, p = 0.042). R^2 was .054.

In model 2 and 3, there was no statistical significance between intervention and the change of QoL after adding covariates such as $\triangle$ awareness, $\triangle$ aacceptance, occupation, physical activity, exercise, BMI and DM complication. R^2 was 0.061 and 0.063, respectively. The effect of the intervention program on with the change of QOL in model 2 was 0.213 (p = 0.098), and, in model 3, was 0.201(p = 0.226)

Table 10 The effect of the intervention program on with the change of QOL with hierarchical regression analysis (n = 77)

Model	Factors	Unstandardized Coefficients		Standardized Coefficients	P-value[#]	95.0% CI for b	
		b	*SE*	β		*LB*	*UB*
1	(Constant)	-3.684	1.608		0.025*	-6.888	-.481
	Intervention	4.684	2.260	.233	0.042*	.183	9.186
2	(Constant)	-3.313	1.747		0.062	-6.795	.168
	Intervention	4.280	2.555	.213	0.098	-.812	9.371
	△ Awareness	.185	.257	.195	0.473	-.327	.698
	△ Acceptance	.174	.268	.170	0.519	-.360	.707
3	(Constant)	-1.178	9.623		0.903	-20.381	18.024
	Intervention	4.053	3.318	.201	0.226	-2.567	10.674
	△ Awareness	.156	.293	.164	0.596	-.428	.740
	△ Acceptance	.140	.292	.137	0.634	-.444	.724
	Occupation	.134	2.683	.007	0.960	-5.220	5.487
	Physical activity	-1.749	3.294	-.067	0.597	-8.322	4.823
	Exercise	-.143	2.630	-.007	0.957	-5.391	5.106
	BMI	-.058	.318	-.023	0.857	-.691	.576
	DM complication	-.471	2.948	-.023	0.874	-6.353	5.412

[#] Multiple linear regression   * statistically significant $p < 0.05$

R^2 (Model 1) =0.054 R^2 (Model 2) =0.061 R^2 (Model 3) = 0.065

Chapter V
Discussion, Conclusion and Recommendation

The study "Effectiveness of self-management education through crocheting in improving quality of life and blood glucose level among adult female patients with type 2 diabetes mellitus in public health centers Bangkok Thailand: Quasi-experimental study" aims to explore an alternative technique for facilitating ability of glycemic control and promoting healthy living for type 2 diabetes patients. By incorporate crocheting practice as a part of diabetes self-management education program for gaining benefit of crocheting practice as mindfulness trigger and stress coping method, researcher designed the program for target group in primary health care settings in Bangkok. Purposive sampling technique was used in this quasi-experimental study. Researcher studied in 2 public health centers where were as contact points for control and intervention group. To estimate the effectiveness of intervention, data was collected and the result showed as follows:

5.1   Discussion

5.1.1   Participants' characteristics

The average age of participants was around 59 years old. Most of them (79.2%) had primary education. Most of control group had occupation (63.2%) such as salesclerk or shop assistant of small shop in community, freelance for general job in the market, while most of participants in intervention group were housewife. Most of control group had more active in physical activity (28.9%) compared with intervention group (7.7%), but less favored in exercise (44.7%). All of participants were not smoker and not alcohol drinker. Most of them were not do blood sugar self-monitoring (59.7%), but they had always available for doctor's appointments (92.2%). For health status, most of participants were overweight or obese (62.4%). The average BMI was higher in control group (27.66 kg/m2) compared with that of intervention group (25.61 kg/m2) (p = .024). The prevalence of complication (78.9%) was higher too. Hypertension was the highest

prevalence (51.9%) among participants. Average years of diabetes they had was around 8. By the way, most of them did not report symptom of hypoglycemia (55.8%), nor hyperglycemia (53.2%).

According to characteristics of participants in this study, they were patients of government public health centers which seem to had relevant socio-demographic characteristics as those in Hong Kong [154]. The study compared experiences of adult patients of publicly-funded general outpatient clinic and private general practice clinics indicated that, in public clinic, around half of patients aged equal or older than 60, around 87% had secondary and below education, 76.5% had low income, 81% had no insurance; while 87% of patients of private clinic younger than 60, around 40% had above secondary education level, 55% had high income and had insurance. A systematic review reported that private sector mainly served wealthy people, and out-of-pocket fees for patients were lowest for public providers[155] .

Although, in this study, most of participants aged equal or older than 60, had primary education, and was house wife. However, almost of them always available for medical appointment. These may be impact of universal health coverage and other public health insurance schemes which cover 99.93 % of population [156]. By the way, participants' characteristics had some differences between groups.

Most of intervention group were housewife, sedentary, but have more exercise: while most of control group had other occupations, more active in physical activity, but less exercise. They had different lifestyle according to behavior pattern on 2 continuum of sitting time line and moderate-to-vigorous activity line in Figure 12 [157]. These may due to their occupations. Work was reported as one of barriers to exercise, and other self-cares [158] [159] [160] [161] [162].

Healthier behavior pattern

Peripatetic & Inactive
Low sitting
Insufficient moderate-to-vigorous activity

Peripatetic & Active
Low sitting
Sufficient moderate-to-vigorous activity

Riskier behavior pattern

A c t i v i t y

S i t t i n g

Healthier behavior pattern

Sedentary & Inactive
High sitting
No/Insufficient moderate-to-vigorous activity

Sedentary & Active
High sitting
Sufficient moderate-to-vigorous activity

Riskier behavior pattern

Note   peripatetic = "to move around, and/or perambulate" and denotes not participating in moderate-to-vigorous activity, but sitting very little.

Figure 12   Continuum of time spent sitting (vertical line) and in moderate-to-vigorous activity (horizontal line) as 2 distinct classes of behavior (Adapted from: Dempsey, P.C., et al., Managing sedentary behavior to reduce the risk of diabetes and cardiovascular disease. Current diabetes reports, 2014. 14(9): p. 522.) [144], Illustration of people credited to Rawpixel, https://www.vecteezy.com/

Beside this, more than 50% in each intervention and control group never do blood sugar self-monitoring. Another study on self-monitoring of blood glucose (SMBG) in adults with type 2 diabetes also reported that 50.3% of participants was not reported self-monitoring behaviors [163]. Frequency of SMBG also varied, among patients who done SMBG, from in a day, in a month, or just occasional time [164]. A survey also indicated that SMBG was significantly less frequently than was recommended [165]. Barriers to blood glucose self-monitoring may cause by factors such as complexity or inconvenience of blood sugar self-monitoring method, negative emotion, lack of motivation, busy schedule, cost of monitoring [163] [166] [167] . However, a study indicated that once daily SMBG is helpful to maintain glycemic control [168]

For health status, compared with control group, intervention group had higher $HbA1_c$, BMI, level and ration of patient with complication. These characteristics relevant to those in some previous literatures which showed correlation between $HbA1_c$, BMI and DM complication [169] [170] [171] [2]. In addition, most of participants did not report experience of hypoglycemia and hyperglycemia. Prevalence of hypoglycemic symptoms among patients with type 2 diabetes mellitus were reported in range from less than 1% to more than 50%, across different factors such as hypoglycemia severity, DM time duration, patient age, medication [172] [173] [174] [175] [176] . A study on continuous glucose monitoring indicated that hypoglycemia was frequently unrecognized by patients. 75% of participants did not report signs/symptoms of their hypoglycemia at all times when detected by the continuous glucose monitoring system [177] Another on 3 days continuous glucose monitoring of glycemic excursions among 21 well-controlled type 2 diabetes patients indicated that 14.2% of participants experienced total 9 hypoglycemic events, and 94.7% had hyperglycemic events. All events were asymptomatic[178].

For knowledge and self-care, most of participants had higher level score of knowledge (67.5%) and self-care (51.9%), and number of these groups increased after intervention (75.3% and 63.6% , respectively). However, participants had quite high score at baseline in both factors. Average knowledge score was around 80% of total score. Thirty-two point five percent of participants was in lower knowledge score group. Average self-care score was higher than 60% of total score. Around half of participants were in higher self-care score group. But they were uncontrolled diabetes patients. Similar phenomenon was found in some previous studies. A study among 200 Iranian patients with type-2 diabetes found that the levels of patients' good knowledge and practice were 61.41%, and 52.23%, respectively, however, their average $HbA1_c$ was 9.3 (*SD* 2.04) [179] . In some case, higher knowledge on diabetes did not bring about good practice [180] And sometime good knowledge or practice scores may be no correlation with glycemic [181] [182] [183] Other factors had influence on blood sugar control such as self-monitoring of blood glucose [184] [185] [186] , physical activity and sedentary lifestyle [187] [188] [189]. Though intervention in this study cannot brought about significant improvement in any group, intervention group showed good trend in increment number of participants in higher self-care score. Furthermore, average HbA1c decreased. Average HbA1c change was -.32 (*SD* .67), and quality of life (QOL) score was improved.

For emotional experience, most of participants (64.9%) had moderate stress. Around 1 out of 4 (24.7%) had high stress. However, average stress score decreased after intervention, from 35.04 to 33.64. stress profile of participants in this study seem relevant to those in previous studies [25]. Prevalence of high stress was high, around 1fifth. However, most of participants had moderate stress. After intervention, stress score trended to be more decrease in intervention group. Average stress score of intervention group decreased 1.82 (SD 16.28), while overall average of stress score change was -1.40 (SD 13.75). Number of participants in low stress group increased from 12.8% to 35.9% in intervention group, while it was stable in control group at 7.9%.

For mindfulness, most of them (55.8% and 53.2%) were in higher score group of awareness and acceptance. However, more participants in intervention group (64.1%) were in higher awareness level, while more participants in control group (68.4%) had higher acceptance level. In short, awareness increased in intervention group, but decreased in control group. Acceptance trended to decrease in intervention group, but increased in control group. In addition, although the acceptance component of mindfulness is redundant with the awareness component in theoretical and empirical basic, it cannot assume that increased awareness will necessarily occur with enhanced acceptance, and increased acceptance may not correspond with enhanced awareness [190]. However, the change of mindfulness and stress may cause by crocheting practice which were relevant with those mention by Vercello [191] and Haque [192]

For quality of life (QOL), most of participants (64.9%) reported QOL in moderate level in total and each domain. QOL score trended to lessen along time, and downward trend seem to be markedly in control group (M = 85.87, SD = 6.75; compared with those of intervention group (M = 93.62, SD = 12.05) (p = 0.001). HbA1$_c$ also was in downward trend, but the trend was notable in intervention group (M = 7.84, SD = 0.613); compared with those of control group (M = 8.38, SD = 1.036) (p =0.008).

At baseline, most of participants had moderate QOL for total QOL and each of four domains. Social relationship score was the lowest QOL score. Although there was few different in detail, this QOL profile was relevant to those of previous studies [193] [194] [195]. After intervention, trend of QOL was less decrease in intervention group than those among control group. Number of participants in poor social relationship domain decreased. Average total QOL of intervention group increased 1 (SD 12.65), while overall average of total score change was -1.31 (SD 10.13).

A healthy lifestyle is a way of living that lowers the risk of being seriously ill. [196] Beside knowledge of AADE7^{TM}, evidence-based self-care behaviors which line up core content of diabetes self-management education curriculum that every diabetes patients have to learn to implement for their healthy behavior, health consciousness,

individuals' comprehensive orientations toward health [197] , may be one of various factors which may affect patients' ability to be healthy lifestyle as follows:

A study about relations between health behaviors, health consciousness and emotional intelligence among young adult population found that individuals whose healthy behaviors tend to have higher levels of emotional intelligence than those whose unhealthy behaviors Health consciousness was on intervening pathway that explained the relation between emotional intelligence and health behaviors in that person with low emotional intelligence also had low health consciousness, so that person had a higher propensity to engage in unhealthy behaviors relative to person with high emotional intelligence. The study also suggested for programs seeking to improve health behaviors that improvements in emotional competencies are likely to influence the development of health consciousness and accordingly improve behaviors that promote health and well-being. [198]

A study about health conscious in an indirect path from mindfulness to ecological behavior that is mediated through health behavior, such as improved nutrition and increased exercise, by Geiger, found that increased mindful awareness of momentary experience indeed favors more healthy lifestyles. The findings open up a path for environmental educational interventions based on mindfulness practices and personal health gains. [199]

A study on health consciousness, knowledge, beliefs, and milk consumer behavior found that consumers' health consciousness has a positive impact on knowledge, belief, and attitude. Although consumers' knowledge is too low to constitute their attitude towards milk, it has a positive, significant impact on the purchase behavior intent. Beside this, consumption behavior patterns have a positive and significant influence on purchase behavior intent. [200] While another study among people living in Bangkok about healthy lifestyle and attitude toward organic food found that health consciousness have positive impacts on the attitude towards organic foods. Healthy lifestyle does not have an impact on an attitude. However, health consciousness has a positive significant impact on healthy lifestyle. [201]

5.1.2 The effect of self-management education through crocheting program on the change of blood sugar level.

For HbA1$_c$, regression model showed significant coefficient of the self-management education through crocheting program on the change of HbA1c.

With only program intervention, regression model 1 explains around 9% of HbA1$_c$ change. For any 1 unit of HbA1c decreased, around 30% of the change related with intervention.

In model 2, three factors together contribute to around 16% of the change of HbA1$_c$. When other factors were controlled, intervention contribute to around 40% of any 1 unit change. The change of awareness also have significant coefficient with the change of HbA1$_c$ when other factors were controlled.

In model 3, when other 5 factors were entered to the model, the magnitude of model explanation was not much increase. While other factors were controlled, only intervention and the change of awareness have significant coefficient with the change of HbA1$_c$.

In brief, this study found the effect of self-management education through crocheting program on the change of blood sugar level. After intervention, the study also found significant different changes in mindfulness components: awareness and acceptance and found that number of participants with low stress increased in intervention group. Trend of the study result was consistent with some previous studies.

Diabetic patients were benefit in blood sugar control from diabetes self-management education (DSME). Systematic review and meta-analysis showed benefit of DSEM on outcomes such as knowledge, blood sugar control, and psychosocial outcomes [88].

As of the study intervention which researcher integrated crocheting practice in self-management education program due to the characteristic of crocheting practice as mindful practice [132]. Mindfulness is a psychological factor which has

gained attention to apply for stress management technique. Mindfulness-base intervention showed promising quality in reducing stress [124] [202] [203] [204] [205]. This study found the change of average stress score from intervention group was greater reduce than those of overall change and of control group. At after intervention, number of participants with good psychological QOL also more than those in control group significantly.

Some previous literatures also reported benefit of mindfulness based intervention on blood glucose level, however, the effectiveness for glycemic control was mixed [36] [53] [206]. By the way, after intervention, this study found significant different changes of $HbA1_c$ between control and intervention group. The effect of program intervention also found after control confounding factors using multiple linear regression.

5.1.3 The effect of self-management education through crocheting program on the change of quality of life

For quality of life (QOL), multiple linear regression does not do a good job in predicting an outcome variable. When other covariates were put into the model. Not any factor showed significant coefficient of the self-management education through crocheting program on the change of QOL. However, simple regression of model 1 indicated the effect of the self-management education through crocheting program on the change of quality of life. Model 1 explains around 5% of QOL change. For any 1 unit of QOL increased, around 23% of the change related with intervention.

This study also found the effect of self-management education through crocheting program on the change of quality of life (QOL) using simple linear regression analysis. After intervention, the average score of total QOL increased in intervention group. The significant different changes between control and intervention group in QOL was found. Trend of the study result was consistent with some previous studies. Some previous studies reported benefit of diabetes self-management education (DSME) on QOL [87] [207] [208], and some mindfulness based intervention also reported its effect on QOL of diabetic patients [124] [209] [210]

From the study results and previous literatures as mention above, it could be infer that learning and practice from self-management education through crocheting program, which designed to facilitate knowledge for diabetes patients' self-care, and introduces crocheting practice as a strategy for enhancing mindfulness and coping with stress as in this study, will be benefit for DM patients in glycemic control and promote quality of life.

Crochet is representation of yarn craft in knitting area. It can create many items such as hats, gloves, scarves, sweaters. There is evidence that art-based interventions are effective in reducing adverse physiological and psychological outcomes [211] Another satisfying activity of crocheters is to crochet for charity. Crocheters experience many benefits from the craft, include stress reduction [192] and mindfulness [191] . However, regression equation cannot explain high proportion of blood sugar change and QOL change. These may be influence from other factors which interfere in-between process of mechanism from learning, behavior, blood sugar control, or individual perception. While crochet practice reduce stress and promote mindfulness, health conscious promote personal responsibility for one's health [212] So, crocheting practice in self-management education program support DM patients for better glycemic control and quality of life according to the mechanism as follow:
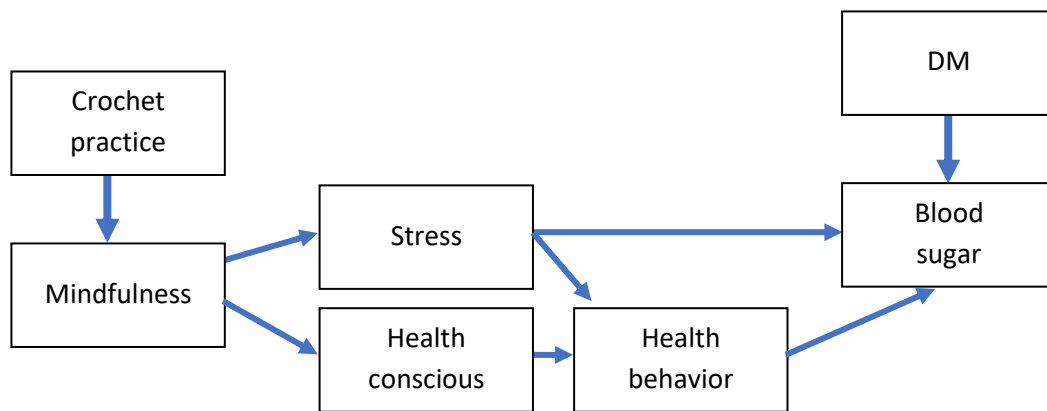
Figure 13 From crochet practice to Blood sugar level: factors in potential mechanism

From the figure above, crochet practice may improves mindfulness.[191] Mindfulness may reduce stress [124] which effect health behavior and blood sugar level. [19] [26] Mindfulness also effect health conscious [199]. Health conscious may improve behaviors [198]. So, health behavior such as mindful eating, exercise may lesson blood sugar level, while stress direct effect blood sugar via stress hormone.

5.2   Conclusion

5.2.1   Participants' characteristics

In this study, participants got health service from government public health centers. Relevant to patients who used public services in others place, they were not in hinge rang of socio-economic characteristics. Most of them were in older age, had lower education, and lower job security which may affect financial self-reliance and causes dependency. However, most of them had quite good health services accessibility which may cause by Universal coverage policy. They were good in knowledge, but they still be in need some form of support to make them achieve DM treatment targets such as how to increase exercise and lessen BMI.

5.2.2   The effect of self-management education through crocheting program on the
change of HbA1$_c$.

This study found the effectiveness of self-management education through crocheting program on the change of blood sugar level. After intervention which is combination of education program and crocheting practice which aim to be a strategy for enhancing mindfulness and coping with stress, the result indicated the downward trend of stress score and lower HbA1$_c$ in intervention group. After control confounding factors, multiple linear regression also showed effect of intervention on the change of blood sugar level. Although the regression model show small explained proportion of variation of blood sugar change; in brief, the study showed the result which was relevant to the study hypothesis in that the self-management education through crocheting program had benefit for adult female type 2 diabetes patient in decrease HbA1c level.

5.2.3   The effect of self-management education through crocheting program on the
change of quality of life

For quality of life (QOL), this study found the effectiveness of self-management education through crocheting program on the change of quality of life. By bivariate linear regression, the result showed the effect of intervention on the change of QOL in the same way as that in the study hypothesis. However, only small proportion of variation of QOL change can be explained by the regression model. In addition, the effect may interfere by influence of other variables. After control confounding factors, the effect of intervention was not significant relate with the change of QOL. In some extent, the self-management education through crocheting program had benefit for adult female type 2 diabetes patient in increase quality of life.

5.3 Limitation

Due to nature of study design, lack of random assignment leads to non-equivalent test group. In this study, 6 characteristics between control and intervention group were significant different at baseline. So, researcher employed statistical approach to control influence of confounders using multivariable regression.

A wide variety of interventions was used including education as a major component in many self-management program studies, and this study was also. The study is not found out the effectiveness of individual part of program about 7 self-care and crocheting practice. Based on objectives of self-management education program for diabatic patient which aimed to help patients in managing their condition, the program facilitated patients the knowledges, and activities necessary for them.

In spite of the fact that researcher planned to monitor each self-care and crocheting practice by monthly self-report and number of crocheting product, the plan was not accomplished. Some reports were not complete, and some were not brought back to the class although researcher tried to motivate them to do. And crochet product cannot be count. Through conversations with participants, they informed about crocheting practices in different ways. Some said they were not continued their practice because yarn was used up. They took only 1 unit of yarn. Some mentioned with proud that her daughter or neighbor help them to crochet for a reason of donation, having more crochet product for people who were in need. These may be consequence of adult learners' characteristics which distinguished by its self-directed nature. Self-directed learning is a process in which learners take the initiative in identifying their needs, formulating learning strategies, and assessing learning outcomes. Learning readiness allows them to continue learning on their own initiative. It was also side effect of motivation strategy researcher used, and of strategy to keep positive learning atmosphere. However, this situation represents real-life situation. This event may happen and effect the result of program if any primary health care unit bring this intervention to implement for its patients.

5.4   Recommendation

5.4.1   Program implementation

1. Management techniques of adult learning is important for this program implementation to adult patients. Some recommendations for adult learning management are as follows:

- Learning atmosphere which prepared learner to ready for learning such as learning room and facilities, public relation with learner.

- Make a good relationship, co-organize for learning plan and activities, and listen to learner opinions and needs. Psychological technique for interpersonal relationship is weighty. Trainer should take roll of co-operation and supporter such as facilitator, commentators, and co-planner.

- Use learner center approach. Learner participation is important for adult learning achievement.

- Consistency between new knowledge and existing knowledge make adult learner can learn faster. Analyze and familiarize learners and their needs to make more understanding, and give enough time for new knowledge and new skill learning.

- Realism of case study, problem and practical solving methods is crucial. Concomitant of learning content and activities is significant.

2. Considerate for learner's financial status or availability of learning equipment, such as yarn and needle in this intervention. Some forms of support may in need.

5.4.2   Future research

1. Future study to explore/identify factor/mechanism between the self-management education through crocheting program and $HbA1_c$/QOL may conduct for more understanding and improving effectiveness of education program. Some variables were implicitly suggested their effect according to the result of this study as follows:

After intervention, the change of total QOL was negative significant correlation with the change of HbA1c and the change of stress. The change of stress was also negative correlation with the change of self-care and the change of awareness.

These correlations were consistent with some other studies such as that of Kimura which found moderate relation between quality of life and perceived stress among adult with asthma [213]. M. A. Bujang found that stress had impact on quality of life among dialysis patients [214]. In Wollin's study, the result confirmed the adverse impact of stress and QOL in multiple sclerosis patients [215].

Furthermore, a study on yogic breathing program which had found benefit on stress alleviation found significant improvement in the QOL, but did not find significant trend toward improvement in glycemic control [216]. Another mindfulness-based intervention also effective in reducing stress and improving quality of life, but did not significant effect on HbA1c [124]. In addition, a study of Walker found negative associations of stress on both quality of life and self-care [217]. Zhao also found negative correlation between stress and diabetes-related self-care, and suggested that improving the level of self-care might effectively reduce perceived stress [218].

To estimate the effect of intervention in this study, the self-management education through crocheting program, regression analysis showed significant association of HbA1c with intervention and with the change of awareness. Negative correlation between stress on quality of life was also indicated. Aafter control influence of other independent factors, interventions was a prominent factor for explanation of the reduction of HbA1c and the increase of perceived QOL among participants in this study. However, these results were the cumulative effects from each component of the program which was evaluated the benefits for diabetic patient, such as a meta-analysis on effectiveness of diabetes self-management education intervention elements, by Fan, indicated that diabetes self-management educatin (DSME) interventions may improve knowledge, self-care, behaviours and metabolic control in adult patients with type 2 diabetes. The overall weighted mean effect size was +0.56, which signals moderate but significant improvements for all outcomes. Most of intervention in Fan's analysis was

mixed educational and behavioural or psychological types [33]. In our intervention, the curriculum was designed by the guidance of The AADE7self-care behaviors™ and the Clinical Practice Guidelines for Diabetes recommended by Diabetes Association of Thailand.

Moreover, as we already know that stress may increase blood sugar levels via stress hormone or hinder person's ability to manage the disease, stress hormone measurement may more explain and make more understanding for mechanism between the self-management education through crocheting program and HbA1c.

2. To understand more on effect of crocheting practice and factors related to mindfulness, other mindfulness measurement tools or qualitative study may use to find out in detail.

In this study, correlation between mindfulness subscales and stress were not parallel, according to the distinction between subscales. Several measures of mindfulness have been developed to assess mindfulness as a multifaceted construct. Moreover, among various mindfulness measurement tools, each of them has unique advantages but also disadvantages. Some issues were mentioned such as (1) the questionnaire coverage on aspects of mindfulness, (2) the nature of the relationships between mindfulness aspects; and (3) the validity of self-report measures of mindfulness [219].

On the other hand, property of crocheting, one of the intervention composition which was the technique used as coping stress method and mindfulness cultivation, offer a chance to pay attention on a moment-to-moment basic of the present experience of weaving, over and over again on the natural rhythm of crocheting – insert needle, wrap yarn, pull through a new stitch, repeat the lacing loop. This characteristic contributes to cultivating quality of continuous monitoring of experience with a focus on current event which was defined as awareness, but not for acceptance. The common instructions used in mindfulness training while participants focus on experiences are typically asked to bring a stance of acceptance, openness, and willingness to the

observation and to refrain from evaluation or judge even if that experiences are unpleasant These instructions were not emphasized in crocheting intervention.

3. Future study to explore or find out an element; such as self-regulation, health consciousness; to improve group intervention in the way to sustain individual ability of glycemic control is needed. According to study result with significant change in HbA1c level, participants reported, during informal conversation part of meeting class, that they had competitive feeling every time after meeting class which they had opportunity to talk about their fasting blood sugar level.

4. Future study for community health network development through crocheting activities has potential. Crochet may not popular activity, and seem to has limited interested people. But from a case observation of participant in this study, the event showed portent of making use of crocheting activities for this goal.

From an observation, the event showed side-effect in the same way as that of butterfly effect in Chaos theory. There was impact from 1 crochet beginner to many crochet knitters, the 1 crochet patter to many patterns, and a huge changing of life. In short, this participant was a housewife. Most of every day and most of the day time, she lived in her tenement building block where the front door always close or slightly open. She used most of time for watching TV program, and taking a nap. She was not good for housework, so her home was not tidy. Her mood always not quite good. She had a few neighbour guests. After she participated in the education program, new activity brought about new life journey, and new chapter of her life began. Finally, her home was tidy. She crocheted many products with new and more complicated patterns. She had more often good mood, and happier. Her family members were also. Her house was bright with wide and always open door. She had more friend and more activities with community members. Her world was wider and bigger than ever be. Nowadays, health care unit is not focus on treatment and duties within unit. Proactive strategy for health promotion and co-operation with community is attached great importance. This crocheting program may make new network between health care unit

and community members. However, action research may explore best practice for the network building.

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APPENDIX

APPENDIX 1

Table 1:   Quality of life (QOL) of control and intervention groups, at baseline and after

intervention

Variable	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
Quality of life **Total** At baseline				
- Good	26 (33.8)	7 (18.4)	19 (48.7)	.009 [b]
- Moderate	50 (64.9)	31 (81.6)	19 (48.7)	
- Lower	1 (1.3)	-	1 (2.6)	
At endline				
- Good	22 (28.6)	5 (13.2)	17 (43.6)	.003 [b]
- Moderate	55 (71.4)	33 (86.8)	22 (56.4)	
- Lower	-	-	-	
QOL domain 1: **Physical health** At baseline				
- Good	17 (22.1)	4 (10.5)	13 (33.3)	.016 [b]
- Moderate	60 (77.9)	34 (89.5)	26 (66.6)	
- Lower	-	-	-	
At endline				
- Good	15 (19.5)	4 (10.5)	11 (28.2)	.050
- Moderate	62 (80.5)	34 (89.5)	28 (71.8)	
- Lower	-	-	-	

[b] statistically significant (p < .05)

Table 1: Quality of life (QOL) of control and intervention groups, at baseline and after intervention (continue).

Variable	Total (N = 77) n (%)	Control group (N = 38) n (%)	Intervention group (N = 39) n (%)	P-value
QOL domain 2: Psychological At baseline				
- Good	38 (49.4)	15 (39.5)	23 (59.0)	.113 [a]
- Moderate	38 (49.4)	23 (60.5)	15 (38.5)	
- Lower	1 (1.3)	-	1 (2.6)	
At endline				
- Good	28 (36.4)	5 (13.2)	23 (59.0)	.000 [b]
- Moderate	49 (63.6)	33 (86.8)	16 (41.0)	
- Lower	-	-	-	
QOL domain 3: Social relationships At baseline				
- Good	16 (20.8)	10 (26.3)	6 (15.4)	.390 [b]
- Moderate	50 (64.9)	24 (63.2)	26 (66.7)	
- Lower	11 (14.3)	4 (10.5)	7 (17.9)	
At endline				
- Good	13 (16.9)	6 (15.8)	7 (17.9)	.894 [a]
- Moderate	57 (74.0)	28 (73.7)	29 (74.4)	
- Lower	7 (9.1)	4 (10.5)	3 (7.7)	

[a] fisher exact test

[b] statistically significant (p < .05)

Table 1:   Quality of life (QOL) of control and intervention groups, at baseline and after

intervention (continue).

Variable	Total (*N* = 77) *n* (%)	Control group (*N* = 38) *n* (%)	Intervention group (*N* = 39) *n* (%)	*P*-value
QOL domain 4: **Environment** At baseline				
- Good	29 37.7()	8 (21.1)	21 (53.6)	.007 [a, b]
- Moderate	45 (58.4)	29 (76.3)	16 (41.0)	
- Lower	3 (3.9)	1 (2.6)	2 (5.1)	
At endline				
- Good	23 (29.9)	3 (7.9)	20 (51.3)	.000 [a, b]
- Moderate	53 (68.8)	34 (89.5)	19 (48.7)	
- Lower	1 (1.3)	1 (2.6)	-	

[a] fisher exact test

[b] statistically significant (p < .05)

Table 2:   Correlation between study variables (n = 77).

Pearson Correlation	Δ HbA1c	Age	Education	Occupation	Physical lifestyle	Exercise	Physical fitness	Blood glucose self-monitoring	Medical appointment adherence	BMI	Year with DM	DM complication	Hypoglycemia symptom(s)	Hyperglycemia symptom(s)	Δ Stress	Δ Awareness	Δ Acceptance	Δ Knowledge	Δ Self-care	Intervention	Δ QOL total
Δ HbA1c	.62[c]	.457[a]	.357[a]	.185[a]	.405[a]	.267[a]	.104[a]	.443[a]	.300[a]	.437[a]	.099[a]	.116[a]	.013[a]	.461[a]	.268[a]	.407[a]	.322[a]	.218[a]	.441[a]	.004[a]	.001[a]
Age	-.012[b]	.50[c]	.477[a]	.015[a]	.479[a]	.069[a]	.081[a]	.218[a]	.192[a]	.197[a]	.059[a]	.443[a]	.291[a]	.289[a]	.130[a]	.225[a]	.057[a]	.468[a]	.166[a]	.288[a]	.282[a]
Education	-.042[b]	.477[a]	.41[c]	.033[a]	.474[a]	.242[a]	.154[a]	.376[a]	.400[a]	.498[a]	.013[a]	.279[a]	.301[a]	.395[a]	.447[a]	.051[a]	.105[a]	.206[a]	.460[a]	.053[a]	.102[a]
Occupation	.103[b]	.015[a]	.33[a]	.50[c]	.416[a]	.021[a]	.098[a]	.168[a]	.409[a]	.279[a]	.486[a]	.155[a]	.418[a]	.387[a]	.395[a]	.000[a]	.000[a]	.149[a]	.047[a]	.001[a]	.272[a]
Physical lifestyle	.028[b]	.479[a]	.474[b]	-.025[b]	.39[c]	.393[a]	.121[a]	.002[a]	.161[a]	.260[a]	.251[a]	.222[a]	.048[a]	.183[a]	.010[a]	.238[a]	.414[a]	.433[a]	.234[a]	.008[a]	.131[a]
Exercise	-.072[b]	.069[a]	.242[b]	-.233[b]	.031[b]	.49[c]	.129[a]	.183[a]	.386[a]	.163[a]	.123[a]	.444[a]	.455[a]	.495[a]	.190[a]	.043[a]	.039[a]	.336[a]	.258[a]	.002[a]	.294[a]
Physical fitness	-.145[b]	.170[b]	.081[b]	-.149[b]	.135[b]	.130[b]	.16[c]	.390[a]	.341[a]	.210[a]	.389[a]	.033[a]	.055[a]	.463[a]	.382[a]	.209[a]	.445[a]	.156[a]	.114[a]	.493[a]	.255[a]
Blood glucose self-monitoring	.017[b]	-.090[b]	.118[b]	-.111[b]	-.318[b]	-.104[b]	.032[b]	.49[c]	.361[a]	.482[a]	.145[a]	.214[a]	.107[a]	.124[a]	.132[a]	.048[a]	.050[a]	.109[a]	.362[a]	.107[a]	.091[a]
Medical appointment adherence	.061[b]	.101[b]	.036[b]	-.027[b]	-.114[b]	-.034[b]	.047[b]	.041[b]	.27[c]	.199[a]	.182[a]	.138[a]	.384[a]	.435[a]	.031[a]	.037[a]	.264[a]	.491[a]	.210[a]	.049[a]	.448[a]
BMI	-.019[b]	-.098[b]	.029[b]	.068[b]	-.075[b]	-.113[b]	-.093[b]	.005[b]	.098[b]	4.01[c]	.449[a]	.012[a]	.043[a]	.148[a]	.027[a]	.281[a]	.339[a]	.466[a]	.490[a]	.012[a]	.282[a]
Year with DM	.148[b]	.180[b]	.001[b]	-.004[b]	.078[b]	-.134[b]	.033[b]	.122[b]	-.105[b]	-.015[b]	4.16[c]	.487[a]	.238[a]	.118[a]	.300[a]	.303[a]	.166[a]	.063[a]	.181[a]	.038[a]	.213[a]
DM complication	-.138[b]	.017[b]	-.254[b]	-.117[b]	-.088[b]	.016[b]	.210[b]	-.092[b]	.126[b]	-.257[b]	-.004[b]	.49[c]	.354[a]	.398[a]	.284[a]	.132[a]	.446[a]	.190[a]	.302[a]	.001[a]	.373[a]
Hypoglycemia symptom(s)	-.254[b]	-.064[b]	-.068[b]	-.024[b]	.191[b]	.013[b]	.184[b]	-.143[b]	-.034[b]	-.197[b]	.082[b]	-.043[b]	.49[c]	.000[c]	.297[a]	.283[a]	.134[a]	.240[a]	.266[a]	.104[a]	.037[a]
Hyperglycemia symptom(s)	.011[b]	-.064[b]	.060[b]	.033[b]	-.104[b]	.001[b]	.011[b]	.133[b]	-.019[b]	-.121[b]	.137[b]	-.030[b]	.530[b]	.50[b]	.036[a]	.013[a]	.007[a]	.152[a]	.139[a]	.106[a]	.342[a]
Δ Stress	-.072[b]	-.130[b]	-.031[b]	.031[b]	.265[b]	-.102[b]	.035[b]	-.129[b]	-.214[b]	-.220[b]	.061[b]	.066[b]	-.062[b]	-.207[b]	13.75[c]	.027[a]	.030[a]	.374[a]	.000[a]	.395[a]	.042[a]
Δ Awareness	.027[b]	.087[b]	-.015[b]	-.381[b]	-.083[b]	.197[b]	-.094[b]	.191[b]	-.205[b]	-.067[b]	.060[b]	-.129[b]	.066[b]	.253[b]	-.221[b]	10.63[c]	.000[a]	.282[a]	.008[a]	.000[a]	.118[a]
Δ Acceptance	.053[b]	-.182[b]	.188[b]	.378[b]	.025[b]	-.202[b]	-.016[b]	-.189[b]	.073[b]	.048[b]	-.112[b]	.016[b]	-.128[b]	-.277[b]	.216[c]	-.902[c]	.992[c]	.089[c]	.034[c]	.000[a]	.220[a]
Δ Knowledge	-.090[b]	-.009[b]	-.145[b]	.120[b]	.019[b]	-.049[b]	-.117[b]	.142[b]	.003[b]	-.010[b]	.176[b]	-.102[b]	-.082[b]	-.119[b]	.037[b]	-.067[b]	.155[b]	.48[c]	.392[a]	.151[a]	.461[a]
Δ Self-care	-.017[b]	.112[b]	-.095[b]	-.193[b]	-.084[b]	.075[b]	.139[b]	.041[b]	.093[b]	-.003[b]	-.105[b]	-.060[b]	.072[b]	.125[b]	-.409[b]	.273[c]	-.209[c]	-.032[b]	8.74[c]	.147[a]	.444[a]
Intervention	-.304[b]	.065[b]	.012[b]	-.351[b]	-.276[b]	.330[b]	-.002[b]	-.143[b]	-.190[b]	-.257[b]	-.203[b]	.338[b]	.145[b]	.144[b]	-.031[b]	.449[b]	-.395[b]	-.119[b]	.121[b]	.50[c]	.021[a]
Δ QOL total	-.337[b]	-.067[b]	.146[b]	-.070[b]	-.129[b]	.063[b]	-.076[b]	-.154[b]	.015[b]	-.067[b]	-.092[b]	.037[b]	.204[b]	.047[b]	-.199[b]	.137[b]	-.089[c]	.011[b]	-.016[b]	.233[b]	10.13[c]

[a] = P-value   [b] = correlation coefficient (r)   [c] = SD

APPENDIX 2

AF 01-12

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย

254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330

โทรศัพท์/โทรสาร: 0-2218-3202 E-mail: eccu@chula.ac.th

COA No. 235/2559

ใบรับรองโครงการวิจัย

โครงการวิจัยที่ 193.1/59 : ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิตและระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการสาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษาเชิงทดลอง

ผู้วิจัยหลัก : นางสาวมณฑลี หนูสีไส

หน่วยงาน : วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ได้พิจารณา โดยใช้หลัก ของ The International Conference on Harmonization – Good Clinical Practice (ICH-GCP) อนุมัติให้ดำเนินการศึกษาวิจัยเรื่องดังกล่าวได้

ลงนาม.. ลงนาม..

(รองศาสตราจารย์ นายแพทย์ปรีดา ทัศนประดิษฐ)   (ผู้ช่วยศาสตราจารย์ ดร.นันทรี ชัยชนะวงศาโรจน์)

ประธาน   กรรมการและเลขานุการ

วันที่รับรอง : 30 ธันวาคม 2559   วันหมดอายุ : 29 ธันวาคม 2560

เอกสารที่คณะกรรมการรับรอง

1) โครงการวิจัย
2) ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัยและใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
3) ผู้วิจัย
4) แบบสอบถาม

193.1/59

30 ธ.ค. 2559

29 ธ.ค. 2560

เงื่อนไข

1. ข้าพเจ้ารับทราบว่าเป็นการผิดจริยธรรม หากดำเนินการเก็บข้อมูลการวิจัยก่อนได้รับการอนุมัติจากคณะกรรมการพิจารณาจริยธรรมการวิจัยฯ

2. หากใบรับรองโครงการวิจัยหมดอายุ การดำเนินการวิจัยต้องยุติ เมื่อต้องการต่ออายุต้องขอขออนุมัติใหม่ล่วงหน้าไม่ต่ำกว่า 1 เดือน พร้อมส่งรายงานความก้าวหน้าการวิจัย

3. ต้องดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด

4. ใช้เอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย ใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และเอกสารเชิญเข้าร่วมวิจัย (ถ้ามี) เฉพาะที่ประทับตราคณะกรรมการฯเท่านั้น

5. หากเกิดเหตุการณ์ไม่พึงประสงค์ร้ายแรงในสถานที่เก็บข้อมูลที่ขออนุมัติจากคณะกรรมการ ต้องรายงานคณะกรรมการภายใน 5 วันทำการ

6. หากมีการเปลี่ยนแปลงการดำเนินการวิจัย ให้ส่งคณะกรรมการพิจารณารับรองก่อนดำเนินการ

7. โครงการวิจัยไม่เกิน 1 ปี ส่งแบบรายงานสิ้นสุดโครงการวิจัย (AF 03-12) และบทคัดย่อผลการวิจัยภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น สำหรับโครงการวิจัยที่เป็นวิทยานิพนธ์ให้ส่งบทคัดย่อผลการวิจัย ภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น

AF 01-12

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย
254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330
โทรศัพท์/โทรสาร: 0-2218-3202 E-mail: eccu@chula.ac.th

COA No. 228/2560

ใบรับรองโครงการวิจัย

โครงการวิจัยที่ 193.1/59 : ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการ
พัฒนาคุณภาพชีวิตและระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่
สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการสาธารณสุข กรุงเทพมหานคร
ประเทศไทย: การศึกษาเชิงทดลอง

ผู้วิจัยหลัก : นางสาวมณฑลี หนูสีใส

หน่วยงาน : วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย
ได้พิจารณา โดยใช้หลัก ของ The International Conference on Harmonization – Good Clinical Practice
(ICH-GCP) อนุมัติให้ดำเนินการศึกษาวิจัยเรื่องดังกล่าวได้

ลงนาม.....................................   ลงนาม.....................................
(รองศาสตราจารย์ นายแพทย์ปรีดา ทัศนประดิษฐ)   (ผู้ช่วยศาสตราจารย์ ดร.นันทรี ชัยชนะวงศาโรจน์)
ประธาน   กรรมการและเลขานุการ

วันที่รับรอง : 30 ธันวาคม 2560   **วันหมดอายุ** : 29 ธันวาคม 2561

เอกสารที่คณะกรรมการรับรอง
1) โครงการวิจัย
2) ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัยและใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
3) ผู้วิจัย   เลขที่โครงการวิจัย......193.1/59......
4) แบบสอบถาม   วันที่รับรอง......30 ธ.ค. 2560......
         29 ธ.ค. 2561

เงื่อนไข
1. ข้าพเจ้ารับทราบว่าเป็นการผิดจริยธรรม หากดำเนินการเก็บข้อมูลการวิจัยก่อนได้รับการอนุมัติจากคณะกรรมการพิจารณาจริยธรรมการวิจัยฯ
2. หากใบรับรองโครงการวิจัยหมดอายุ การดำเนินการวิจัยต้องยุติ เมื่อต้องการต่ออายุต้องขออนุมัติใหม่ล่วงหน้าไม่ต่ำกว่า 1 เดือน พร้อมส่งรายงาน
ความก้าวหน้าการวิจัย
3. ต้องดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
4. ใช้เอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย ใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และเอกสารเชิญเข้า
ร่วมวิจัย (ถ้ามี) เฉพาะที่ประทับตราคณะกรรมการเท่านั้น
5. หากเกิดเหตุการณ์ไม่พึงประสงค์ร้ายแรงในสถานที่เก็บข้อมูลที่ขออนุมัติจากคณะกรรมการ ต้องรายงานคณะกรรมการภายใน 5 วันทำการ
6. หากมีการเปลี่ยนแปลงการดำเนินการวิจัย ให้ส่งคณะกรรมการพิจารณารับรองก่อนดำเนินการ
7. โครงการวิจัยไม่เกิน 1 ปี ส่งแบบรายงานสิ้นสุดโครงการวิจัย (AF 03-12) และบทคัดย่อผลการวิจัยภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น สำหรับ
โครงการวิจัยที่เป็นวิทยานิพนธ์ให้ส่งบทคัดย่อผลการวิจัย ภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น

ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย (กลุ่มผู้ร่วมการฝึกอบรม)

ชื่อโครงการวิจัย...ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพ
ชีวิตและระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่
ศูนย์บริการสาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษาเชิงทดลอง ....

ชื่อผู้วิจัย.........น.ส.มณฑาลี หนูสีโส............ตำแหน่ง...นิสิตระดับปริญญาเอก.....................

สถานที่ติดต่อผู้วิจัย (ที่ทำงาน) ....สำนักอนามัย กรุงเทพมหานคร ....

(ที่บ้าน) ....199 แขวงบางพรม เขตตลิ่งชัน กทม. 10170..

โทรศัพท์ (ที่ทำงาน) ...022484853.....ต่อ .... โทรศัพท์ที่บ้าน ......024129635...............

โทรศัพท์มือถือ ...0815549800......... E-mail : ...monthalee_n@yahoo.com...................

1. ขอเรียนเชิญท่านเข้าร่วมในการวิจัย ก่อนที่ท่านจะตัดสินใจเข้าร่วมในการวิจัย มีความจำเป็นที่
ท่านควรทำความเข้าใจว่างานวิจัยนี้ทำพราะเหตุใด และเกี่ยวข้องกับอะไร กรุณาใช้เวลาในการอ่านข้อมูล
ต่อไปนี้อย่างละเอียดรอบคอบ และสอบถามข้อมูลเพิ่มเติมหรือข้อมูลที่ไม่ชัดเจนได้ตลอดเวลา

2. โครงการนี้ เป็นการศึกษาเพื่อพัฒนาโปรแกรมสนับสนุนการดูแลตนเองของผู้ป่วยเบาหวาน
ซึ่งประกอบด้วยกิจกรรมให้ความรู้ สาธิตการออกกำลังกาย และกิจกรรมนันทนาการสำหรับผู้ป่วย
เบาหวานนำไปปฏิบัติเพื่อการดูแลสุขภาพด้วยตนเองและควบคุมโรค โดยประเมินผลโปรแกรมฯจาก
คุณภาพชีวิตและระดับน้ำตาลในเลือดของผู้ป่วย

3. รายละเอียดของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

- กลุ่มประชากรผู้มีส่วนร่วมในการวิจัยนี้ คือ สตรี วัยผู้ใหญ่ อายุ 50 - 65 ปี ซึ่งได้รับการ
วินิจฉัยจากแพทย์ว่าเป็นโรคเบาหวานชนิดที่ 2 และรับการรักษาโรคเบาหวาน ณ
ศูนย์บริการสาธารณสุข 48 มีค่าน้ำตาลสะสมเท่ากับหรือมากกว่า 7% มีโทรศัพท์ที่
อนุญาตให้ติดตามสอบถามข้อมูล และยินดีเข้าร่วมโครงการฯ โดยสมัครใจ เกณฑ์การ
คัดออก คือ ผู้ที่มีประวัติการตรวจวินิจฉัยจากแพทย์ว่ามีโรคแทรกซ้อนรุนแรงหรือมี
ภาวะน้ำตาลต่ำรุนแรง ซึ่งเป็นข้อจำกัดในการร่วมโครงการฯ หรือเป็นผู้ป่วยโรค
ซึมเศร้าหรือมีภาวะสมองเสื่อม หรือเป็นผู้ต้องพึ่งพิงการดูแลจากผู้อื่นในการทำกิจกรรม
ในชีวิตประจำวัน หรือเป็นผู้ป่วยที่ใช้อินซูลิน หรือเป็นผู้มีปัญหาสายตาซึ่งเป็นอุปสรรค
ต่อการอ่าน หรือขาดทักษะการอ่านเขียนและการพูดภาษาไทย หรือไม่สามารถเข้าร่วม
กิจกรรมตลอดโครงการฯ

- จำนวนกลุ่มประชากรผู้มีส่วนร่วมในการวิจัยทั้งหมด 40 คน

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- วิธีการได้มาซึ่งกลุ่มประชากรผู้มีส่วนร่วมในการวิจัย คือ การติดประกาศและรับสมัครผู้มี
คุณสมบัติและมีความยินดีเข้าร่วมโครงการฯ ณ ศูนย์บริการสาธารณสุข 48 กรณีมี
ผู้สมัครเข้าร่วมโครงการฯจำนวนมาก จะใช้การคัดเข้ากลุ่มตัวอย่าง จำนวน 40 คน
- การแบ่งกลุ่มผู้มีส่วนร่วมในการวิจัย แบ่งเป็น 2 กลุ่ม คือ กลุ่มควบคุม 40 คน และกลุ่ม
ทดลอง 40 คน

4. กระบวนการการวิจัยที่กระทำต่อกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

กระบวนการการวิจัยเป็นการศึกษาประสิทธิผลของการจัดการเรียนรู้เพื่อสนับสนุนการดูแล
ตนเองของผู้ป่วยเบาหวาน โดยผู้เข้าร่วมการวิจัยจะได้รับทั้งบริการตามกระบวนการรักษาของศูนย์บริการ
สาธารณสุขและการร่วมกิจกรรมการเรียนรู้ของโครงการวิจัย ซึ่งประกอบด้วยกิจกรรมเรียนรู้เกี่ยวกับการ
ปฏิบัติตนเพื่อควบคุมโรคเบาหวานเกี่ยวกับการกิน การออกกำลังกาย การจัดการความเครียด การถักโคร
เชต์ การกินยา การเฝ้าระวังระดับน้ำตาลในเลือด การดูแลเท้า และแนวทางการแก้ปัญหาการปฏิบัติในการ
ดูแลตนเอง *โดยกิจกรรมที่ทำในครั้งนี้จะมุ่งเน้นไปที่การถักโครเชต์* บุคลากรที่มีส่วนร่วมใน
กระบวนการวิจัย ได้แก่ แพทย์ พยาบาลเชี่ยวชาญ นักโภชนาการ นักกายภาพบำบัด เจ้าหน้าที่สาธารณสุข
และครูผู้สอนงานฝีมือ โดยจัดกิจกรรมการเรียนเดือนละ 1 ครั้ง รวม 4 ครั้ง ๆ ละ 2 ชั่วโมง ณ ห้องประชุม
ศูนย์บริการสาธารณสุข 48

ในการประเมินผลโครงการ ผู้วิจัยจะเก็บข้อมูลจากกลุ่มผู้มีส่วนร่วมในการวิจัย ณ
ศูนย์บริการสาธารณสุข 48 จำนวน 2 ครั้ง คือ เมื่อเริ่มการศึกษา 1 ครั้ง และเมื่อสิ้นสุดการศึกษา 1 ครั้ง โดย
ผู้วิจัยจะดำเนินการเก็บข้อมูลด้วยแบบสอบถาม 1 ชุด ใช้เวลาในการตอบแบบสอบถามแต่ละชุด 35 นาที
โดยแบบสอบถามดังกล่าวจะไม่มีการระบุชื่อของผู้มีส่วนร่วมในการวิจัยแต่อย่างไร และพยาบาล
ดำเนินการเก็บตัวอย่างเลือด จำนวน 1 ช้อนชา เพื่อส่งตรวจวิเคราะห์ระดับน้ำตาลในเลือด ซึ่งผลการตรวจ
วิเคราะห์จะนำไปบันทึกในเวชระเบียนของผู้ป่วยเพื่อประโยชน์ในการให้การดูแลรักษาผู้ป่วยโดยแพทย์
ต่อไป ทั้งนี้ เมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับผู้มีส่วนร่วมในการวิจัยที่ผู้วิจัยได้รับจะถูกทำลาย
ทั้งนี้ ทางโครงการฯ จะเป็นผู้ออกค่าใช้จ่ายในการตรวจระดับน้ำตาลในเลือดดังกล่าว

5. กระบวนการให้ข้อมูลแก่กลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

ผู้วิจัยจะเป็นผู้ให้ข้อมูลรายละเอียดเกี่ยวกับงานวิจัยและสอบถามความสมัครใจในการเข้าร่วม
โครงการ เมื่อท่านยินยอมเป็นผู้มีส่วนร่วมในการวิจัย ผู้วิจัยจะให้ท่านลงลายมือชื่อในแบบฟอร์มการ
ยินยอมเข้าร่วมวิจัยที่ผู้วิจัยจัดทำขึ้น

6. ในการคัดกรองผู้มีส่วนร่วมในการวิจัย หากพบว่าท่านไม่อยู่ในเกณฑ์คัดเข้า ท่านยังคงได้รับ
บริการตามกระบวนการรักษาของศูนย์บริการสาธารณสุขตามปกติ โดยไม่ได้รับผลกระทบจากการไม่ได้
เข้าร่วมโครงการวิจัยแต่ประการใด

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7. การใช้ข้อมูลจากเวชระเบียน ผู้วิจัยจะดำเนินการขออนุมัติผู้อำนวยการศูนย์บริการ สาธารณสุขและได้รับการยินยอมจากผู้ป่วยในการใช้ข้อมูลดังกล่าว

8. ความเสี่ยงที่อาจเกิดขึ้นการวิจัยจัดเป็นความเสี่ยงระดับน้อยที่สุด ท่านจะไม่ได้รับอันตรายจาก การเข้าร่วมกิจกรรมการเรียน ข้อมูลจากแบบสอบถามจะไม่ระบุถึงตัวท่าน การเก็บตัวอย่างเลือดดำเนินการ โดยพยาบาล ซึ่งปฏิบัติงานปกติในการเก็บตัวอย่างเลือดผู้รับบริการรักษา ณ ศูนย์บริการสาธารณสุข ความ เสี่ยงที่พบได้ทั่วไป คือ เป็นรอยแผลจากปลายเข็ม และเจ็บบริเวณที่ถูกเข็มแทง การเก็บตัวอย่างเลือด จึงมี ความปลอดภัยและเชื่อถือได้

9. การเข้าร่วมการวิจัยครั้งนี้ ท่านจะได้รับประโยชน์จากการเรียนรู้แนวทางการปฏิบัติตัวในการ ดูแลสุขภาพเพื่อควบคุมโรคเบาหวานด้วยตนเอง ได้ทดลองทำกิจกรรมนันทนาการโดยโครงการฯให้การ สนับสนุนอุปกรณ์และสอนการถักโครเชต์ โดยท่านไม่ต้องเสียทุนทรัพย์หรือเวลาไปหาซื้อ ผลการตรวจ วิเคราะห์ระดับน้ำตาลในเลือดทั้ง 2 ครั้ง จะเป็นประโยชน์ในการนำไปใช้ประกอบการรักษาใน กระบวนการรักษาของท่านเอง

10. การเข้าร่วมในการวิจัยของท่านเป็นโดย**สมัครใจ** และท่านสามารถ**ปฏิเสธ**ที่จะเข้าร่วมหรือ **ถอนตัว**จากการวิจัยได้ทุกขณะ โดยไม่ต้องให้เหตุผลและไม่สูญเสียประโยชน์ที่พึงได้รับ ไม่มีผลกระทบ ต่อการดูแลรักษาที่ท่านได้รับจากศูนย์บริการสาธารณสุข

11. หากท่านมีข้อสงสัยให้สอบถามเพิ่มเติมได้โดยสามารถติดต่อผู้วิจัยได้ตลอดเวลา และหาก ผู้วิจัยมีข้อมูลเพิ่มเติมที่เป็นประโยชน์หรือโทษเกี่ยวกับการวิจัย ผู้วิจัยจะแจ้งให้ท่านทราบอย่างรวดเร็ว เพื่อให้ผู้มีส่วนร่วมในการวิจัยทบทวนว่ายังสมัครใจจะอยู่ในงานวิจัยต่อไปหรือไม่

12. ข้อมูลที่เกี่ยวข้องกับท่านจะเก็บเป็นความลับ หากมีการเสนอผลการวิจัยจะเสนอเป็นภาพรวม ข้อมูลใดที่สามารถระบุถึงตัวท่านได้จะไม่ปรากฏในรายงาน

13. ในการเข้าร่วมวิจัยครั้งนี้ ท่านจะได้รับท่านจะได้รับภาชนะบรรจุอาหาร เช่น กล่องข้าว หรือ ขวดน้ำ เป็นของที่ระลึกในการเก็บข้อมูลการวิจัย *และ ได้รับค่าใช้จ่ายในการเดินทางมาร่วมการฝึกอบรม ที่ ต้องเข้าร่วมกิจกรรมการเรียนรู้เดือนละ 1 ครั้ง รวม 4 ครั้ง ๆ ละ 2 ชั่วโมง จำนวนครั้งละ 200 บาท*

14. เมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับผู้มีส่วนร่วมในการวิจัยที่ผู้วิจัยได้รับจะถูก ทำลายทิ้ง

15. หากท่านไม่ได้รับการปฏิบัติตามข้อมูลดังกล่าวสามารถร้องเรียนได้ที่ คณะกรรมการพิจารณา จริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย 254 อาคารจามจุรี 1 ชั้น 2 ถนน พญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์/โทรสาร 0-2218-3202 E-mail: eccu@chula.ac.th

เลขที่โครงการวิจัย........193.1 /59
วันที่รับรอง........30 ธ.ค. 2559
วันหมดอายุ........29 ธ.ค. 2560

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ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย (กลุ่มผู้ไม่ได้ร่วมการฝึกอบรม)

ชื่อโครงการวิจัย...ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพ
ชีวิตและระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่
ศูนย์บริการสาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษาเชิงทดลอง.........

ชื่อผู้วิจัย.........น.ส.มณฑลี หนูสีใส.............ตำแหน่ง...นิสิตระดับปริญญาเอก.....................

สถานที่ติดต่อผู้วิจัย (ที่ทำงาน)....สำนักอนามัย กรุงเทพมหานคร.............................

(ที่บ้าน)....199 แขวงบางพรม เขตตลิ่งชัน กทม. 10170........................

โทรศัพท์ (ที่ทำงาน)...022484853.....ต่อ .... โทรศัพท์ที่บ้าน......024129635...................

โทรศัพท์มือถือ ...0815549800......... E-mail : ...monthalee_n@yahoo.com......................

1. ขอเรียนเชิญท่านเข้าร่วมในการวิจัย ก่อนที่ท่านจะตัดสินใจเข้าร่วมในการวิจัย มีความจำเป็นที่
ท่านควรทำความเข้าใจว่างานวิจัยนี้ทำเพราะเหตุใด และเกี่ยวข้องกับอะไร กรุณาใช้เวลาในการอ่านข้อมูล
ต่อไปนี้อย่างละเอียดรอบคอบ และสอบถามข้อมูลเพิ่มเติมหรือข้อมูลที่ไม่ชัดเจนได้ตลอดเวลา

2. โครงการนี้ เป็นการศึกษาเพื่อพัฒนาโปรแกรมสนับสนุนการดูแลตนเองของผู้ป่วยเบาหวาน
ซึ่งประกอบด้วยกิจกรรมให้ความรู้ สาธิตการออกกำลังกาย และกิจกรรมนันทนาการสำหรับผู้ป่วย
เบาหวานนำไปปฏิบัติเพื่อการดูแลสุขภาพด้วยตนเองและควบคุมโรค โดยประเมินผลโปรแกรมฯจาก
คุณภาพชีวิตและระดับน้ำตาลในเลือดของผู้ป่วย

3. รายละเอียดของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
- กลุ่มประชากรผู้มีส่วนร่วมในการวิจัยนี้ คือ สตรี วัยผู้ใหญ่ อายุ 50 - 65 ปี ซึ่งได้รับการ
วินิจฉัยจากแพทย์ว่าเป็นโรคเบาหวานชนิดที่ 2 และรับการรักษาโรคเบาหวาน ณ
ศูนย์บริการสาธารณสุข 27 มีค่าน้ำตาลสะสมเท่ากับหรือมากกว่า 7% มีโทรศัพท์ที่
อนุญาตให้ติดตามสอบถามข้อมูล และยินดีเข้าร่วมโครงการฯ โดยสมัครใจ เกณฑ์การ
คัดออก คือ ผู้ที่มีประวัติการตรวจวินิจฉัยจากแพทย์ว่ามีโรคแทรกซ้อนรุนแรงหรือมี
ภาวะน้ำตาลต่ำรุนแรง ซึ่งเป็นข้อจำกัดในการร่วมโครงการฯ หรือเป็นผู้ป่วยโรค
ซึมเศร้าหรือมีภาวะสมองเสื่อม หรือเป็นผู้ต้องพึ่งพิงการดูแลจากผู้อื่นในการทำกิจกรรม
ในชีวิตประจำวัน หรือเป็นผู้ป่วยที่ใช้อินซูลิน หรือเป็นผู้มีปัญหาสายตาซึ่งเป็นอุปสรรค
ต่อการอ่าน หรือขาดทักษะการอ่านเขียนและการพูดภาษาไทย หรือไม่สามารถเข้าร่วม
กิจกรรมตลอดโครงการฯ
- จำนวนกลุ่มประชากรผู้มีส่วนร่วมในการวิจัยทั้งหมด 40 คน

เลขที่โครงการวิจัย 193.1/59
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29 ธ.ค. 2560
วันหมดอายุ

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- วิธีการได้มาซึ่งกลุ่มประชากรผู้มีส่วนร่วมในการวิจัย คือ การติดประกาศและรับสมัครผู้มี
คุณสมบัติและมีความยินดีเข้าร่วมโครงการฯ ณ ศูนย์บริการสาธารณสุข 27 กรณีมี
ผู้สมัครเข้าร่วมโครงการฯจำนวนมาก จะใช้การคัดเข้ากลุ่มตัวอย่าง จำนวน 40 คน
- การแบ่งกลุ่มผู้มีส่วนร่วมในการวิจัย แบ่งเป็น 2 กลุ่ม คือ กลุ่มควบคุม 40 คน และกลุ่ม
ทดลอง 40 คน

4. กระบวนการการวิจัยที่กระทำต่อกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

ผู้เข้าร่วมการวิจัยจะได้รับบริการปกติตามกระบวนการรักษาของศูนย์บริการสาธารณสุข 27
ในการประเมินผลโครงการ ผู้วิจัยจะเก็บข้อมูลจากกลุ่มผู้มีส่วนร่วมในการวิจัย ณ
ศูนย์บริการสาธารณสุข 27 จำนวน 2 ครั้ง คือ เมื่อเริ่มการศึกษา 1 ครั้ง และเมื่อสิ้นสุดการศึกษา 1 ครั้ง โดย
ผู้วิจัยจะดำเนินการเก็บข้อมูลด้วยแบบสอบถาม 1 ชุด ใช้เวลาในการตอบแบบสอบถามแต่ละชุด 35 นาที
โดยแบบสอบถามดังกล่าวจะไม่มีการระบุชื่อของผู้มีส่วนร่วมในการวิจัยแต่อย่างไร และพยาบาล
ดำเนินการเก็บตัวอย่างเลือด จำนวน 1 ช้อนชา เพื่อส่งตรวจวิเคราะห์ระดับน้ำตาลในเลือด ซึ่งผลการตรวจ
วิเคราะห์จะนำไปบันทึกในเวชระเบียนของผู้ป่วยเพื่อประโยชน์ในการให้การดูแลรักษาผู้ป่วยโดยแพทย์
ต่อไป ทั้งนี้ เมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับผู้มีส่วนร่วมในการวิจัยที่ผู้วิจัยได้รับจะถูกทำลาย
ทั้งนี้ ทางโครงการฯ จะเป็นผู้ออกค่าใช้จ่ายในการตรวจระดับน้ำตาลในเลือดดังกล่าว

5. กระบวนการให้ข้อมูลแก่กลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

ผู้วิจัยจะเป็นผู้ให้ข้อมูลรายละเอียดเกี่ยวกับงานวิจัยและสอบถามความสมัครใจในการเข้าร่วม
โครงการ เมื่อท่านยินยอมเป็นผู้มีส่วนร่วมในการวิจัย ผู้วิจัยจะให้ท่านลงลายมือชื่อในแบบฟอร์มการ
ยินยอมเข้าร่วมวิจัยที่ผู้วิจัยจัดทำขึ้น

6. ในการคัดกรองผู้มีส่วนร่วมในการวิจัย หากพบว่าท่านไม่อยู่ในเกณฑ์คัดเข้า ท่านยังคงได้รับ
บริการตามกระบวนการรักษาของศูนย์บริการสาธารณสุขตามปกติ โดยไม่ได้รับผลกระทบจากการไม่ได้
เข้าร่วมโครงการวิจัยแต่ประการใด

7. การใช้ข้อมูลจากเวชระเบียน ผู้วิจัยจะดำเนินการขออนุมัติผู้อำนวยการศูนย์บริการ
สาธารณสุขและได้รับการยินยอมจากผู้ป่วยในการใช้ข้อมูลดังกล่าว

8. ความเสี่ยงที่อาจเกิดขึ้นการวิจัยจัดเป็นความเสี่ยงระดับน้อยที่สุด ข้อมูลจากแบบสอบถามจะ
ไม่ระบุถึงตัวท่าน ท่านจะไม่ได้รับอันตรายจาก การเก็บตัวอย่างเลือดซึ่งดำเนินการโดยพยาบาล
ผู้ปฏิบัติงานปกติในการเก็บตัวอย่างเลือดผู้รับบริการรักษา ณ ศูนย์บริการสาธารณสุข ความเสี่ยงที่พบได้
ทั่วไป คือ เป็นรอยแผลจากปลายเข็ม และเจ็บบริเวณที่ถูกเข็มแทง การเก็บตัวอย่างเลือดจึงมีความปลอดภัย
และเชื่อถือได้

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9. การเข้าร่วมการวิจัยครั้งนี้ ท่านจะได้รับประโยชน์จากผลการตรวจวิเคราะห์ระดับน้ำตาลใน เลือดทั้ง 2 ครั้ง ซึ่งเป็นประโยชน์ในการนำไปใช้ประกอบการรักษาในกระบวนการรักษาของท่านเอง

10. การเข้าร่วมในการวิจัยของท่านเป็นโดย**สมัครใจ** และท่านสามารถ**ปฏิเสธ**ที่จะเข้าร่วมหรือ **ถอนตัว**จากการวิจัยได้ทุกขณะ โดยไม่ต้องให้เหตุผลและไม่สูญเสียประโยชน์ที่พึงได้รับ ไม่มีผลกระทบ ต่อการดูแลรักษาที่ท่านได้รับจากศูนย์บริการสาธารณสุข

11. หากท่านมีข้อสงสัยให้สอบถามเพิ่มเติมได้โดยสามารถติดต่อผู้วิจัยได้ตลอดเวลา และหาก ผู้วิจัยมีข้อมูลเพิ่มเติมที่เป็นประโยชน์หรือโทษเกี่ยวกับการวิจัย ผู้วิจัยจะแจ้งให้ท่านทราบอย่างรวดเร็ว **เพื่อให้ผู้มีส่วนร่วมในการวิจัยทบทวนว่ายังสมัครใจจะอยู่ในงานวิจัยต่อไปหรือไม่**

12. ข้อมูลที่เกี่ยวข้องกับท่านจะเก็บเป็นความลับ หากมีการเสนอผลการวิจัยจะเสนอเป็นภาพรวม ข้อมูลใดที่สามารถระบุถึงตัวท่านได้จะไม่ปรากฏในรายงาน

13. ในการเข้าร่วมวิจัยครั้งนี้ ท่านจะได้รับภาชนะบรรจุอาหาร เช่น กล่องข้าว หรือ ขวดน้ำ เป็น ของที่ระลึกในการเก็บข้อมูลการวิจัย

14. เมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับผู้มีส่วนร่วมในการวิจัยที่ผู้วิจัยได้รับจะถูก ทำลายทิ้ง

15. หากท่านไม่ได้รับการปฏิบัติตามข้อมูลดังกล่าวสามารถร้องเรียนได้ที่ คณะกรรมการพิจารณา จริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย 254 อาคารจามจุรี 1 ชั้น 2 ถนน พญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์/โทรสาร 0-2218-3202 E-mail: eccu@chula.ac.th

แจ้งกรรมการวิจัย 1931/59

วันที่รับรอง 3 ธ.ค. 2559

วันหมดอายุ 2 9 ธ.ค. 2560

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หนังสือแสดงความยินยอมเข้าร่วมการวิจัยสำหรับกลุ่มผู้ไม่ได้ร่วมกิจกรรมฝึกอบรม

ทำที่...

วันที่...........เดือน...พ.ศ.............

เลขที่ ประชากรตัวอย่างหรือผู้มีส่วนร่วมในการวิจัย.........................

     ข้าพเจ้า ซึ่งได้ลงนามท้ายหนังสือนี้ ขอแสดงความยินยอมเข้าร่วม โครงการวิจัย

ชื่อโครงการวิจัย ...ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิต

     และระดับกูลโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการ

     สาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษาเชิงทดลอง ....

ชื่อผู้วิจัย ...น.ส.บณฑลี หนูสีใส ....

ที่อยู่ที่ติดต่อ ...วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย...โทรศัพท์ ...081 554 9800 ...

..........สำนักงานพัฒนาระบบสาธารณสุข สำนักอนามัย กรุงเทพมหานคร ..โทรศัพท์ ...02 248 4853......

     ข้าพเจ้า ได้รับทราบรายละเอียดเกี่ยวกับที่มาและวัตถุประสงค์ในการทำวิจัย รายละเอียด
ขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ความเสี่ยง/อันตราย และประโยชน์ซึ่งจะเกิดขึ้นจากการ
วิจัยเรื่องนี้ โดยได้อ่านรายละเอียดในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด และได้รับคำอธิบายจากผู้วิจัย
จนเข้าใจเป็นอย่างดีแล้ว

     ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้ ตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย
โดย 1) ข้าพเจ้ายินยอมตอบแบบสอบถาม จำนวน 2 ครั้ง เมื่อเริ่มการศึกษาและสิ้นสุดการศึกษา 2) ข้าพเจ้า
ยินยอมให้เจาะเลือด จำนวน i ซ้อนชา จำนวน 2 ครั้ง เมื่อเริ่มการศึกษาและสิ้นสุดการศึกษา ให้ใช้ผลการ
วิเคราะห์เลือดและข้อมูลจากเวชระเบียน ซึ่งเมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับข้าพเจ้าถูกทำลาย
ทั้งหมด

     ข้าพเจ้ามีสิทธิถอนตัวออกจากการวิจัยเมื่อใดก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล
ซึ่งการถอนตัวออกจากการวิจัยนั้น จะไม่มีผลกระทบในการได้รับบริการบริการตามกระบวนการรักษาของ
ศูนย์บริการสาธารณสุขตามปกติต่อข้าพเจ้าทั้งสิ้น

     ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติต่อข้าพเจ้าตามข้อมูลที่ระบุไว้ในเอกสารชี้แจง
ผู้เข้าร่วมการวิจัย และข้อมูลใดๆ ที่เกี่ยวข้องกับข้าพเจ้า ผู้วิจัยจะเก็บรักษาเป็นความลับ โดยจะนำเสนอข้อมูล
การวิจัยเป็นภาพรวมเท่านั้น ไม่มีข้อมูลใดในการรายงานที่จะนำไปสู่การระบุตัวข้าพเจ้า

     หากข้าพเจ้าไม่ได้รับการปฏิบัติตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย
ข้าพเจ้าสามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1

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V.2.4/2558

จุฬาลงกรณ์มหาวิทยาลัย 254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์/
โทรสาร 0-2218-3202 E-mail: eccu@chula.ac.th

    ข้าพเจ้าได้ลงลายมือชื่อไว้เป็นสำคัญต่อหน้าพยาน ทั้งนี้ข้าพเจ้าได้รับสำเนาเอกสารชี้แจง
ผู้เข้าร่วมการวิจัย และสำเนาหนังสือแสดงความยินยอมไว้แล้ว

ลงชื่อ.......................................   ลงชื่อ.......................................

    (นางสาวมณฑลี หนูสีใส)   (.......................................)

    ผู้วิจัยหลัก   ผู้มีส่วนร่วมในการวิจัย

    ลงชื่อ.......................................

เลขที่โครงการวิจัย 193.1/59   (.......................................)

วันที่รับรอง 30 ธ.ค. 2559   พยาน

วันหมดอายุ 29 ธ.ค. 2560

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หนังสือแสดงความยินยอมเข้าร่วมการวิจัยสำหรับกลุ่มผู้ร่วมกิจกรรมฝึกอบรม

ทำที่...

วันที่...........เดือน.........................พ.ศ. ....

เลขที่ ประชากรตัวอย่างหรือผู้มีส่วนร่วมในการวิจัย..........................

     ข้าพเจ้า ซึ่งได้ลงนามท้ายหนังสือนี้ ขอแสดงความยินยอมเข้าร่วมโครงการวิจัย

ชื่อโครงการวิจัย ...ประสิทธิผลของโปรแกรมการจัดการตนเองด้วยการถักโครเชต์ต่อการพัฒนาคุณภาพชีวิต

     และระดับกลูโคสในเลือดของผู้ป่วยเบาหวานชนิดที่สองหญิงวัยผู้ใหญ่ที่ศูนย์บริการ

     สาธารณสุข กรุงเทพมหานคร ประเทศไทย: การศึกษาเชิงทดลอง ....

ชื่อผู้วิจัย ...น.ส.มณฑลี หนูสีใส ....

ที่อยู่ที่ติดต่อ ...วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย...โทรศัพท์ ...081 554 9800 ...

...........สำนักงานพัฒนาระบบสาธารณสุข สำนักอนามัย กรุงเทพมหานคร ..โทรศัพท์ ...02 248 4853......

     ข้าพเจ้า ได้รับทราบรายละเอียดเกี่ยวกับที่มาและวัตถุประสงค์ในการทำวิจัย รายละเอียด
ขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ความเสี่ยง/อันตราย และประโยชน์ซึ่งจะเกิดขึ้นจากการ
วิจัยเรื่องนี้ โดยได้อ่านรายละเอียดในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด และได้รับคำอธิบายจากผู้วิจัย
จนเข้าใจเป็นอย่างดีแล้ว

     ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้ ตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย
โดย 1) ข้าพเจ้ายินยอมร่วมกิจกรรมการเรียนรู้ของโครงการวิจัย จำนวน 4 ครั้ง ๆ ละ 2 ชั่วโมง 2) ข้าพเจ้า
ยินยอมตอบแบบสอบถาม จำนวน 2 ครั้ง เมื่อเริ่มการศึกษาและสิ้นสุดการศึกษา 3) ข้าพเจ้ายินยอมให้เจาะ
เลือด จำนวน 1 ช้อนชา จำนวน 2 ครั้ง เมื่อเริ่มการศึกษาและสิ้นสุดการศึกษา ให้ใช้ผลการวิเคราะห์เลือดและ
ข้อมูลจากเวชระเบียน ซึ่งเมื่อเสร็จสิ้นการวิจัยแล้ว ข้อมูลที่เกี่ยวข้องกับข้าพเจ้าจะถูกทำลายทั้งหมด

     ข้าพเจ้ามีสิทธิถอนตัวออกจากการวิจัยเมื่อใดก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล
ซึ่งการถอนตัวออกจากการวิจัยนั้น จะไม่มีผลกระทบในการได้รับบริการบริการตามกระบวนการรักษาของ
ศูนย์บริการสาธารณสุขตามปกติต่อข้าพเจ้าทั้งสิ้น

     ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติต่อข้าพเจ้าตามข้อมูลที่ระบุไว้ในเอกสารชี้แจง
ผู้เข้าร่วมการวิจัย และข้อมูลใดๆ ที่เกี่ยวข้องกับข้าพเจ้า ผู้วิจัยจะเก็บรักษาเป็นความลับ โดยจะนำเสนอข้อมูล
การวิจัยเป็นภาพรวมเท่านั้น ไม่มีข้อมูลใดในการรายงานที่จะนำไปสู่การระบุตัวข้าพเจ้า

     หากข้าพเจ้าไม่ได้รับการปฏิบัติตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย
ข้าพเจ้าสามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1

เลขที่โครงการวิจัย 193.1/59

วันที่รับรอง 30 ธ.ค. 2559

วันหมดอายุ 29 ธ.ค. 2560

1/2

V.2.4/2558

AF05-07

จุฬาลงกรณ์มหาวิทยาลัย 254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์/
โทรสาร 0-2218-3202 E-mail: eccu@chula.ac.th

      ข้าพเจ้าได้ลงลายมือชื่อไว้เป็นสำคัญต่อหน้าพยาน ทั้งนี้ข้าพเจ้าได้รับสำเนาเอกสารชี้แจง
ผู้เข้าร่วมการวิจัย และสำเนาหนังสือแสดงความยินยอมไว้แล้ว

ลงชื่อ...   ลงชื่อ...

     (นางสาวมณฑลี หนูสีใส)   (...)

      ผู้วิจัยหลัก   ผู้มีส่วนร่วมในการวิจัย

      ลงชื่อ...

      (...)

เลขที่โครงการวิจัย 193-1/59

วันที่รับรอง 30 ธ.ค. 2559   พยาน

วันหมดอายุ 29 ธ.ค. 2560

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แบบสอบถาม

เรื่อง คุณภาพชีวิตและการจัดการตนเองของผู้ป่วยเบาหวานชนิดที่ 2 หญิงวัยผู้ใหญ่

ตอนที่ I ลักษณะการดำเนินชีวิตของผู้ตอบแบบสอบถาม

โปรดทำเครื่องหมาย ✓ หรือ เติมคำตอบลงใน ☐ หรือ ช่องว่างที่กำหนด

1. ท่านสูบบุหรี่หรือไม่

☐ 1. ไม่เคยสูบ ☐ 2. เคยสูบ แต่เลิกมาแล้ว ....ปี

☐ 3. สูบ มาเป็นระยะเวลา .... ปี โดยในช่วง 1 เดือนที่ผ่านมา

☐ 1. สูบทุกวัน ☐ 2 สูบบ้าง จำนวน..........................วัน

หมายเหตุ "สูบบ้าง" หมายถึง มีพฤติกรรมการสูบบุหรี่ ไม่ทุกวัน แต่มีการสูบในวันใดวันหนึ่งของช่วงเวลา

2. ท่านดื่มเครื่องดื่มที่มีแอลกอฮอล์ เบียร์ เหล้า หรือไม่

☐ 1. ไม่เคยดื่ม ☐ 2. เคยดื่ม แต่เลิกมาแล้ว ....ปี

☐ 3. ดื่ม มาเป็นระยะเวลา .... ปี โดยในช่วง 1 เดือนที่ผ่านมา

☐ 1. ดื่ม สัปดาห์ละ 4 ครั้งขึ้นไป ☐ 2 ดื่ม สัปดาห์ละ 2- 3 ครั้ง

☐ 3. ดื่มเดือนละ 2 – 4 ครั้ง ☐ 4. ดื่ม เดือนละครั้งหรือน้อยกว่า

3. ท่านออกกำลังกายหรือเล่นกีฬาหรือไม่

☐ 1. ออกกำลังกาย ครั้งละอย่างน้อย 30 นาที สัปดาห์ละ 3 วันขึ้นไป

☐ 2. ออกกำลังกายบ้าง ครั้งละอย่างน้อย 30 นาที สัปดาห์ละ 1 - -2 วัน

☐ 3. ออกกำลังกายบ้าง ครั้งละอย่างน้อย 30 นาที น้อยกว่าสัปดาห์ละ 1 วัน

☐ 4. ไม่ออกกำลังกายเลย

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4. ลักษณะกิจกรรมการงานในชีวิตประจำวันของท่าน

☐ 1. นั่งอยู่กับที่เป็นส่วนใหญ่

☐ 2. เดินเคลื่อนไหวเป็นส่วนใหญ่

☐ 3. ต้องออกแรงใช้กำลังในการทำงานเป็นส่วนใหญ่

5. สมรรถภาพทางกายในการทำกิจกรรมส่วนตัวในชีวิตประจำวัน
เช่น อาบน้ำ แต่งตัว ทำงานบ้าน เดินขึ้นบันได ใช้บริการรถโดยสารสาธารณะ

☐ 1. ไม่สามารถทำได้   ☐ 2. ต้องการความช่วยเหลืออย่างมาก

☐ 3. ต้องการความช่วยเหลือบ้าง   ☐ 4. ปกติ สามารถทำเองได้ดี

6. ในช่วง 3 เดือนที่ผ่านมา ท่านตรวจระดับน้ำตาลในเลือดเพื่อเฝ้าระวังระดับน้ำตาล
ด้วยตนเองหรือไม่

☐ 1. ตรวจเป็นประจำ มากกว่าสัปดาห์ละครั้ง   ☐ 2. ตรวจบ้าง สัปดาห์ละครั้ง

☐ 3. ตรวจบ้าง น้อยกว่าเดือนละครั้ง   ☐ 4. ไม่ได้ตรวจ

7. ในช่วง 3 เดือนที่ผ่านมา ท่านมีอาการภาวะน้ำตาลในเลือดสูง ได้แก่ ปัสสาวะบ่อย ปากแห้ง
หิวน้ำมาก ซึม ตาพร่ามัว คลื่นไส้อาเจียน หายใจหอบ หรือไม่

☐ 1. บ่อย มากกว่าสัปดาห์ละครั้ง   ☐ 2. มีค่อนข้างบ่อย สัปดาห์ละครั้ง

☐ 3. มีบ้าง น้อยกว่าเดือนละครั้ง   ☐ 4. ไม่มีเลย

8. ในช่วง 3 เดือนที่ผ่านมา ท่านมีอาการภาวะน้ำตาลในเลือดต่ำ ได้แก่ ใจสั่น หวิวๆ มือสั่น
เหงื่อออกมาก ตัวเย็น หิวมาก มึนหัว แขนขาอ่อนแรง หรือไม่

☐ 1. บ่อย มากกว่าสัปดาห์ละครั้ง   ☐ 2. มีค่อนข้างบ่อย สัปดาห์ละครั้ง

☐ 3. มีบ้าง น้อยกว่าเดือนละครั้ง   ☐ 4. ไม่มีเลย

9. ท่านไปพบแพทย์ตรงตามกำหนดหรือไม่

☐ 1. ตรงตามกำหนดเสมอ   ☐ 2. ค่อนข้างตรงตามกำหนด

☐ 3. ปานกลาง ตรงบ้าง ไม่ตรงบ้าง พอๆกัน

☐ 4. ค่อนข้างไม่ตรงตามกำหนด   ☐ 5. ไม่ตรงตามกำหนดเสมอ

ตอนที่ 2   พฤติกรรมการดูแลตนเอง

โปรดทำเครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความถี่ของการปฏิบัติของท่าน
เป็นการประเมินว่าในช่วง 1 เดือนที่ผ่านมา ท่านทำกิจกรรมต่างๆ ต่อไปนี้ในชีวิตประจำวัน
บ่อยเพียงใด โดยมีเกณฑ์การประเมิน ดังนี้

ไม่ได้ทำ	หมายถึง	ท่านไม่ได้ทำกิจกรรมนั้นเลย
ทำนานๆ ครั้ง	หมายถึง	ท่านทำกิจกรรมนั้นน้อยกว่าสัปดาห์ละครั้ง
ทำบางครั้ง	หมายถึง	ท่านทำกิจกรรมนั้นประมาณสัปดาห์ละ 1-2 วัน
ทำได้บ่อย	หมายถึง	ท่านทำกิจกรรมนั้นประมาณสัปดาห์ละ 3-4 วัน
ทำได้ประจำ	หมายถึง	ท่านทำกิจกรรมนั้นสัปดาห์ละ 5-6 วัน ขึ้นไป

การปฏิบัติของท่าน	ไม่ได้ทำ	ทำ นานๆ ครั้ง	ทำ บางครั้ง	ทำได้ บ่อย	ทำได้ ประจำ
1. ควบคุมปริมาณการกินอาหารพวก แป้งและน้ำตาลได้เหมาะสม					
2. ดื่มน้ำหวาน/เครื่องดื่มที่มีรสหวาน เช่น น้ำผลไม้ที่ใส่น้ำตาล					
3. กินขนมที่มีรสหวานจัด					
4. กินอาหารผัด หรือทอดที่มีน้ำมัน มาก					
5. กินอาหารไขมันสูง เช่น หมูยอ ไส้กรอก เครื่องในสัตว์					
6. กินอาหารหรือของหวานที่ปรุงด้วย กะทิ					

การปฏิบัติของท่าน	ไม่ได้ทำ	ทำ นานๆ ครั้ง	ทำ บางครั้ง	ทำได้ บ่อย	ทำได้ ประจำ
7. กินอาหารที่ทำจากเนยหรือครีม					
8. กินขนมขบเคี้ยวเช่น มันฝรั่งทอด ข้าวเกรียบ ถั่วทอด					
9. กินผลไม้ที่รส<u>ไม่</u>หวานจัด					
10. ดื่มนมที่ปรุงแต่งให้มีรสหวาน					
11. กินอาหารกระป๋องหรืออาหารกึ่ง สำเร็จรูป เช่น บะหมี่กึ่งสำเร็จรูป โจ๊กซอง					
12. เติมเกลือหรือน้ำปลา เพิ่มใน อาหาร					
13. กินอิ่มมากเกินไป หรือร่วมงาน เลี้ยง กินอาหารมื้อพิเศษโดยไม่ จำกัดชนิดและปริมาณ					
14. ดื่มเครื่องดื่มที่มีแอลกอฮอล์ เบียร์ เหล้า					
15. ออกกำลังกาย ขยับออกแรง อย่างน้อย 30 นาที					
16. หยุดยาเอง					
17. ร่วมกิจกรรมกับครอบครัวหรือ ชุมชนโดยไม่ต้องกังวล เช่น ร่วม กิจกรรมกลุ่ม/ชมรม					
18. เจาะเลือดปลายนิ้วเพื่อทราบ ระดับน้ำตาลในเลือด					
19. ทำความสะอาดและตรวจสภาพเท้า					

ตอนที่ 3   ความเครียด Suanprung Stress Test-20 (SPST – 20)

คำชี้แจง : ให้คุณอ่านหัวข้อข้างล่างนี้ แล้วสำรวจดูว่าในระยะ 1 เดือนที่ผ่านมามีเหตุการณ์ในข้อ
ใดเกิด ขึ้นกับตัวคุณบ้างถ้าข้อไหนไม่ได้เกิดขึ้นให้ข้ามไปไม่ต้องตอบ แต่ถ้ามี
เหตุการณ์ในข้อใดเกิดขึ้นกับตัวคุณให้ประเมินว่าคุณมีความรู้สึกอย่างไรต่อเหตุการณ์
นั้นแล้วทำเครื่องหมายให้ตรงช่องตามที่คุณประเมิน โดย

คะแนนความเครียด 1 คะแนน   หมายถึง   ไม่รู้สึกเครียด

คะแนนความเครียด 2 คะแนน   หมายถึง   รู้สึกเครียดเล็กน้อย

คะแนนความเครียด 3 คะแนน   หมายถึง   รู้สึกเครียดปานกลาง

คะแนนความเครียด 4 คะแนน   หมายถึง   รู้สึกเครียดมาก

คะแนนความเครียด 5 คะแนน   หมายถึง   รู้สึกเครียดมากที่สุด

ในระยะ 6 เดือนที่ผ่านมา	คะแนนความเครียด				
	1	2	3	4	5
1. กลัวทำงานผิดพลาด					
2. ไปไม่ถึงเป้าหมายที่วางไว้					
3. ครอบครัวมีความขัดแย้งกันใน เรื่องเงินหรือเรื่องงานในบ้าน					
4. เป็นกังวลกับเรื่องสารพิษหรือ มลภาวะในอากาศน้ำเสียงและดิน					
5. รู้สึกว่าต้องแข่งขันหรือ เปรียบเทียบ					
6. เงินไม่พอใช้จ่าย					
7. กล้ามเนื้อตึงหรือปวด					
8. ปวดหัวจากความตึงเครียด					

ในระยะ 6 เดือนที่ผ่านมา	คะแนนความเครียด				
	1	2	3	4	5
9. ปวดหลัง					
10. ความอยากอาหารเปลี่ยนแปลง					
11. ปวดศีรษะข้างเดียว					
12. รู้สึกวิตกกังวล					
13. รู้สึกคับข้องใจ					
14. รู้สึกโกรธหรือหงุดหงิด					
15. รู้สึกเศร้า					
16. ความจำไม่ดี					
17. รู้สึกสับสน					
18. ตั้งสมาธิลำบาก					
19. รู้สึกเหนื่อยง่าย					
20. เป็นหวัดบ่อย ๆ					

ตอนที่ 4 การมีสติ/ความตระหนักรู้/การรับรู้ Philadelphia Mindfulness Scale Thai version (PHLMS_TH)
โปรดทำเครื่องหมาย ✓ ลงในช่องว่างที่สะท้อนระดับประสบการณ์ที่เกิดกับตัวท่าน

ประสบการณ์	ไม่เคยเลย	เคยบ้าง	ปานกลาง	บ่อย	บ่อยมาก
1. ฉันตระหนักรู้ว่ามีความคิดอะไรผ่านเข้ามาในใจฉัน					
2. ฉันพยายามเบี่ยงเบนตนเองไป เวลาที่ฉันมีความรู้สึกไม่สบอารมณ์					
3. เวลาที่ฉันพูดคุยกับคนอื่น ฉันตระหนักรู้การแสดงออกทางสีหน้าและท่าทางของเขา					
4. มีบางแง่มุมเกี่ยวกับตัวฉันเอง ที่ฉันไม่ต้องการคิดถึงมัน					
5. เวลาฉันอาบน้ำ ฉันตระหนักรู้ว่าน้ำไหลผ่านผิวกายของฉันอย่างไร					
6. ฉันพยายามทำตัวให้ยุ่งๆ เพื่อไม่ให้ความคิดหรือความรู้สึกเข้ามาในใจ					
7. เมื่อฉันตกใจ ฉันสังเกตว่ามีอะไรเกิดขึ้นภายในร่างกายของฉัน					
8. ฉันปรารถนาว่า ฉันจะสามารถควบคุมอารมณ์ของฉันได้ง่ายขึ้น					
9. เมื่อฉันเดินอยู่ข้างนอก ฉันตระหนักรู้กลิ่นหรือลมที่สัมผัสใบหน้าของฉันได้					
10. ฉันบอกกับตัวเองว่า ฉันไม่ควรจะมีความคิดบางอย่าง					

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	ไม่เคย เลย	เคยบ้าง	ปาน กลาง	บ่อย	บ่อยมาก
11. เมื่อมีใครถามว่าฉันรู้สึกอย่างไร ฉัน สามารถระบุอารมณ์ของฉันโดยง่าย					
12. มีหลายสิ่งที่ฉันพยายามไม่คิดถึงมัน					
13. ฉันตระหนักรู้ความคิดที่ฉันกำลังมี อยู่ ขณะที่อารมณ์ของฉัน เปลี่ยนแปลง					
14. ฉันบอกกับตัวเองว่า ฉันไม่ควรรู้สึก โศกเศร้าเสียใจ					
15. ฉันสังเกตการเปลี่ยนแปลงภายใน ร่างกาย เช่น หัวใจเต้นเร็ว หรือ กล้ามเนื้อเกร็ง					
16. หากว่ามีบางสิ่งที่ฉันไม่อย่างคิดถึง มัน ฉันจะพยายามหลายๆอย่างที่จะ ขจัดมันออกจากใจของฉัน					
17. เมื่อใดก็ตามที่อารมณ์ของฉัน เปลี่ยนแปลง ฉันระลึกรู้ได้ทันที					
18. ฉันพยายามผลักปัญหาต่างๆออกไป จากใจ					
19. เมื่อพูดคุยอยู่กับคนอื่น ฉันตระหนักรู้ อารมณ์ที่ฉันกำลังประสบอยู่ได้					
20. เมื่อฉันมีความทรงจำที่เลวร้าย ฉัน พยายามเบี่ยงเบนตนเองเพื่อจะได้ไม่ คิดถึงมัน					

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วันที่รับรอง 30 ธ.ค. 2559

วันหมดอายุ 29 ธ.ค. 2560

ตอนที่ 5   คุณภาพชีวิต WHOQOL-BREF (Thai)

คำชี้แจง :ข้อคำถามต่อไปนี้จะถามถึงประสบการณ์อย่างใดอย่างหนึ่งของท่าน ในช่วง 2
สัปดาห์ที่ผ่านมา ให้ท่านสำรวจตัวท่านเองและประเมินเหตุการณ์หรือความรู้สึกของ
ท่านเลือกคำตอบที่เหมาะสมและเป็นจริงกับตัวท่านมากที่สุด

เหตุการณ์	ไม่เลย	เล็กน้อย	ปาน กลาง	มาก	มากที่สุด
1. ท่านพอใจกับสุขภาพของท่านในตอนนี้ เพียงใด					
2. การเจ็บปวดตามร่างกาย เช่น ปวดหัว ปวดท้อง ปวดตามตัว ทำให้ท่าน **ไม่สามารถทำในสิ่งที่ต้องการ** มากน้อยเพียงใด					
3. ท่านมีกำลังเพียงพอที่จะทำสิ่งต่าง ๆ ใน แต่ละวันไหม (ทั้งเรื่องงาน หรือการ ดำเนินชีวิตประจำวัน)					
4. ท่านพอใจกับการนอนหลับของท่าน มากน้อยเพียงใด					
5. ท่านรู้สึกพึงพอใจในชีวิต (เช่น มีความสุข ความสงบมีความหวัง) มากน้อยเพียงใด					
6. ท่านมีสมาธิในการทำงานต่าง ๆ ดีเพียงใด					
7. ท่านรู้สึกพอใจในตนเอง มากน้อยแค่ไหน					
8. ท่านยอมรับรูปร่างหน้าตาของตัวเอง ได้ไหม					

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เหตุการณ์	ไม่เลย	เล็กน้อย	ปาน กลาง	มาก	มากที่สุด
9. ท่านมีความรู้สึกไม่ดี เช่น รู้สึกเหงา เศร้า หดหู่ สิ้นหวังวิตกกังวล บ่อยแค่ไหน					
10. ท่านรู้สึกพอใจมากน้อยแค่ไหนที่ สามารถทำอะไรๆผ่านไปได้ในแต่ละวัน					
11. ท่านจำเป็นต้องไปรับการรักษาพยาบาล มากน้อยเพียงใด เพื่อที่จะทำงานหรือมี ชีวิตอยู่ไปได้ในแต่ละวัน					
12. ท่านพอใจกับความสามารถในการ ทำงานได้อย่างที่เคยทำมา มากน้อยเพียงใด					
13. ท่านพอใจต่อการผูกมิตรหรือเข้ากับคน อื่น อย่างที่ผ่านมา แค่ไหน					
14. ท่านพอใจกับการช่วยเหลือที่เคยได้รับ จากเพื่อน ๆ แค่ไหน					
15. ท่านรู้สึกว่าชีวิตมีความมั่นคงปลอดภัยดี ไหม ในแต่ละวัน					
16. ท่านพอใจกับสภาพบ้านเรือนที่อยู่ตอนนี้ มากน้อยเพียงใด					
17. ท่านมีเงินพอใช้จ่ายตามความจำเป็น มากน้อยเพียงใด					
18. ท่านพอใจที่จะสามารถไปใช้บริการ สาธารณสุขได้ตามความจำเป็นเพียงใด					
19. ท่านได้รู้เรื่องราวข่าวสารที่จำเป็นใน ชีวิตแต่ละวันมากน้อยเพียงใด					

เหตุการณ์	ไม่เลย	เล็กน้อย	ปานกลาง	มาก	มากที่สุด
20. ท่านมีโอกาสได้พักผ่อนคลายเครียด มากน้อยเพียงใด					
21. สภาพแวดล้อมดีต่อสุขภาพของท่าน มากน้อยเพียงใด					
22. ท่านพอใจกับการเดินทาง ไปไหนมาไหนของท่าน (หมายถึงการ คมนาคม) มากน้อยเพียงใด					
23. ท่านรู้สึกว่าชีวิตท่านมีความหมาย มากน้อยแค่ไหน					
24. ท่านสามารถไปไหนมาไหนด้วยตนเอง ได้ดีเพียงใด					
25. ท่านพอใจในชีวิตทางเพศของท่าน แค่ไหน? (ชีวิตทางเพศ หมายถึงเมื่อเกิด ความรู้สึกทางเพศขึ้นแล้วท่านมีวิธีจัดการทำ ให้ผ่อนคลายลงได้รวมถึง การช่วยตัวเอง หรือการมีเพศสัมพันธ์)					
26. ท่านคิดว่าท่านมีคุณภาพชีวิต (ชีวิต ความเป็นอยู่) อยู่ในระดับใด					

ตอนที่ 6   ความรู้เกี่ยวกับเบาหวานและการดูแลตนเอง

โปรดทำเครื่องหมาย ✓ หน้าข้อความที่ถูกต้อง หรือ ✗ หน้าข้อความที่ไม่ถูกต้อง

	ข้อความ
	1. ผู้ป่วยเบาหวานควรตรวจระดับน้ำตาลสะสมในเลือด (HbA1c) อย่างน้อยปีละ 1 ครั้ง
	2. ถ้าผู้ป่วยเบาหวานมีอาการใจสั่น หวิวๆ มือสั่น เหงื่อออกมาก ตัวเย็น หิวมาก มึนหัว แขนขาอ่อนแรง **ต้องแก้ไขด้วยการดื่มน้ำหวานหรือ อมลูกอมที่มีน้ำตาล**
	3. ถ้าผู้ป่วยเบาหวานมีอาการปัสสาวะบ่อย ปากแห้ง หิวน้ำมาก ซึม ตาพร่ามัว คลื่นไส้อาเจียน หายใจหอบ **แสดงว่าเกิดภาวะน้ำตาลในเลือดต่ำ**
	4. นอกจากการควบคุมปริมาณอาหารพวกแป้งและน้ำตาลแล้ว การกินอาหารเปลี่ยนเป็นน้ำตาลกลูโคสได้ช้า เช่น ข้าวซ้อมมือ กะหล่ำปลี ฝรั่ง มีประโยชน์ในการควบคุมระดับน้ำตาลในเลือด
	5. นมปรุงแต่งรสชาติต่างๆ โยเกิร์ตพร้อมดื่มรสต่างๆ และน้ำผลไม้กล่อง จัดอยู่ในกลุ่มอาหารที่ผู้ป่วยเบาหวานกินได้**ไม่จำกัด**
	6. การกินอาหารเช้าทุกวัน มีประโยชน์ต่อการควบคุมระดับน้ำตาลในเลือดมากกว่าการ อดมื้อเช้า
	7. **ฉลากโภชนาการบนภาชนะบรรจุอาหารพร้อมรับประทาน เช่น กล่องนมยูเอชที ซองขนมปัง** ช่วยบอกให้ผู้กินรู้ว่าอาหารนั้นให้พลังงานและมีจำนวนน้ำตาลอยู่เท่าใด
	8. การกินมื้อเช้าให้อิ่ม ในวันที่มีอาหารมื้อพิเศษในตอนเย็น และการกินอาหารอย่างช้าๆ เคี้ยวให้ละเอียด จะช่วยในการควบคุมความอยากอาหารและควบคุมระดับน้ำตาลได้
	9. ยาก่อนอาหารทุกชนิด ไม่ควรกินก่อนอาหาร นานเกิน 10 นาที
	10.การฝึกสติ สามารถนำมาใช้ให้ฉุกคิดพิจารณา เช่น ฉุกคิดเมื่ออยากกิน ฉุกคิดเมื่อเกิดความเครียด ได้

(ต่อข้อ 11.)

	ข้อความ
	11. ผู้ป่วยเบาหวานควรมีงานอดิเรกหรือกิจกรรมคลายเครียดสำหรับทำเมื่อรู้สึกไม่สบายใจ
	12. การนอนหลับพักผ่อนอย่างเพียงพอเป็นสิ่งที่ผู้ป่วยเบาหวานควรปฏิบัติอยู่เสมอ
	13. ผู้ป่วยเบาหวานควรพกลูกอมติดตัวเวลาเดินทาง/ออกนอกบ้าน
	14. ผู้ป่วยเบาหวานควรเลือกใส่รองเท้าแตะแบบหนีบเพื่อให้อาการถ่ายเทดี ไม่อับ
	15. เป้าหมายสำคัญในการรักษาเบาหวาน คือการปฏิบัติตนเพื่อป้องกันโรคแทรกซ้อน

เลขที่โครงการวิจัย 193 1/59

วันที่รับรอง 30 ธ.ค. 2559

วันหมดอายุ 2 9 ธ.ค. 2560

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