MULTIFACETED HEALTHY COACHING PROGRAM IMPROVE HbA1c AND QUALITY OF LIFE
IN OLDER ADULT AND ELDERLY WITH DIABETES MELLITUS TYPE 2 : SEMI-URBAN
DWELLER BANGKOK THAILAND

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โปรแกรมการสนับสนุนและดูแลรอบด้าน เพื่อพัฒนาการควบคุมระดับฮีโมโกลบิน เอ วัน ซี และ
คุณภาพชีวิตในผู้ป่วยเบาหวาน กลุ่มวัยผู้ใหญ่ตอนปลาย และผู้สูงอายุในเขตกึ่งชนบทกึ่งเมือง เขตสาย
ไหม กรุงเทพมหานคร ประเทศไทย

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ธิวาพร จันทร์ขาว : โปรแกรมการสนับสนุนและดูแลรอบด้าน เพื่อพัฒนาการควบคุมระดับ ฮีโมโกลบิน เอ วัน ซี และคุณภาพชีวิตในผู้ป่วยเบาหวาน กลุ่มวัยผู้ใหญ่ตอนปลาย และ ผู้สูงอายุในเขตกึ่งชนบทกึ่งเมือง เขตสายไหม กรุงเทพมหานคร ประเทศไทย (MULTIFACETED HEALTHY COACHING PROGRAM IMPROVE HbA1c AND QUALITY OF LIFE IN OLDER ADULT AND ELDERLY WITH DIABETES MELLITUS TYPE 2 : SEMI-URBAN DWELLER BANGKOK THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ศ. นพ. สุรศักดิ์ ฐานีพานิชสกุล, 333 หน้า.

จากสถานการณ์ความชุกของโรคเบาหวานที่เพิ่มขึ้นอย่างต่อเนื่อง มีการกำหนดกลยุทธ์ที่ หลากหลายในการดำเนินการควบคุมและป้องกันที่แสดงให้เห็นถึงประสิทธิภาพการบริการที่ส่งผลต่อ การพัฒนาการควบคุมระดับน้ำตาลสะสม (HbA1c) ทั้งยังส่งผลต่อคุณภาพชีวิตของผู้ป่วยด้วย การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อประเมินผลของโปรแกรมการสนับสนุนและดูแลสุขภาพผู้ป่วย เบาหวานรอบด้าน ต่อการพัฒนาระดับน้ำตาลสะสม และคุณภาพชีวิตในผู้ป่วยเบาหวานชนิดที่ 2 กลุ่มวัยผู้ใหญ่ตอนปลายและกลุ่มผู้สูงอายุ ในเขตกึ่งเมืองกึ่งชนบท กรุงเทพมหานคร ประเทศไทย การศึกษาแบบสุ่มทดลองในครั้งนี้ แบ่งเป็น 2 ระยะ โดยการสุ่มผู้ป่วยเบาหวานจำนวน 274 เพื่อ ศึกษาสถานการณ์ปัญหาในระยะแรก และสุ่มผู้ป่วยเบาหวาน 40 คน ที่ไม่สามารถควบคุมระดับ น้ำตาลสะสมได้ และมีความรอบรู้ด้านสุขภาพในระดับต่ำ-ปานกลางเข้าร่วมโปรแกรม โดยจะได้รับ คู่มือการดูแลตนเองของผู้ป่วยเบาหวาน ฉบับประชาชน, สมุดออมสุขภาพ, กลุ่มศึกษา, ข้อความสั้น เตือนการดูแลสุขภาพและการรับประทานยาอย่างสม่ำเสมอ และการให้คำปรึกษาทางโทรศัพท์ราย เดือน สถิติวิเคราะห์ใช้ paired t-test และ independent t-test ส่วนการเปลี่ยนแปลงระดับน้ำตาล ในพลาสมาในเดือนแรก เดือนที่ 3 และเดือนที่ 6 ใช้สถิติ Repeated TWO WAY ANOVA ผล การศึกษาพบว่ามีผู้ป่วยเบาหวานที่ไม่สามารถควบคุมระดับน้ำตาลสะสมได้ และมีระดับความรอบรู้ ด้านสุขภาพระดับต่ำ-ปานกลาง กว่าร้อยละ 50 ผู้ป่วยส่วนใหญ่เป็นผู้หญิงร้อยละ 7.01 ,อายุเฉลี่ย มากกว่า 60 ปี ทั้งนี้ยังพบว่ามีดัชนีมวลกายเกินมาตรฐาน ร้อยละ 85.4 และ ร้อยละ 90.5 มีโรคร่วม ด้านประสิทธิผลของโปรแกรม ฯ เมื่อเปรียบเทียบกับกลุ่มควบคุม พบว่ากลุ่มทดลองมีระดับความรอบ รู้ด้านสุขภาพ, ความมั่นใจในการดูแลตนเอง, การดูแลตนเองของผู้ป่วยเบาหวาน ,การลดลงของ น้ำตาลสะสม และคุณภาพชีวิต เพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ p-value <0.01) สรุปได้ว่าโปรแกรม นี้ได้รับการยอมรับของผู้ป่วยเข้าสู่ระบบการรักษา ทั้งยังมีประโยชน์ต่อผู้ที่มีข้อจำกัดด้านความรอบรู้ ด้านสุขภาพ ในกลุ่มผู้ป่วยโรคเบาหวานชนิดที่ 2.

สาขาวิชา สาธารณสุขศาสตร์	ลายมือชื่อนิสิต	....
ปีการศึกษา 2559	ลายมือชื่อ อ.ที่ปรึกษาหลัก	....

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KEYWORDS: HEALTH EDUCATION / HEALTH COACHING / TYPE 2 DIABETES MELLITUS / THAILAND

TIWAPORN JUNKHAW: MULTIFACETED HEALTHY COACHING PROGRAM IMPROVE HbA1c AND QUALITY OF LIFE IN OLDER ADULT AND ELDERLY WITH DIABETES MELLITUS TYPE 2 : SEMI-URBAN DWELLER BANGKOK THAILAND. ADVISOR: PROF. SURASAK TANEEPANICHSKUL, M.D., 333 pp.

Currently, prevalence of diabetes is risen. The variety strategies of prevention and control, commonly held view is that multi-approached interventions are more effective approach in improving glycated hemoglobin (HbA1c) controlling and influencing quality of life. The aim of this study was to evaluate the effect of the Multifaceted Healthy Coaching Program to improve HbA1c and quality of life among older adult and elderly type 2 diabetics semi-urban dweller, Bangkok, Thailand. A randomized control trial was performed 2 phases and involved 274 T2DMt in phase I and randomized 40 uncontrollable to receive the DM management booklet, diary records for healthy behaviors group education, short message (SMS) reminder for healthy behaviors and drug adherence and individual telephone counselling monthly. Statistical analysis were used paired t-test and independent t-test. Changing in fasting plasma glucose (FPG) from baseline, 3 and 6 months were applied Repeated ANOVA measurement. The situation highlight reported uncontrollable T2DM and low-moderate quality of life. Additional, almost of them were majority female (70.1%) with the average of aged over 60 year, over normal BMI (85.4%) and 90.5% having comorbidity. At 6 month were a significant improvement of health literacy, knowledge of diabetes, self-efficacy, self-care activity, HbA1c and quality of life (p<0.01) in the intervention group when compared to the control group (P<0.01). The Multifaceted Healthy Coaching was an acceptable intervention in their ongoing care. It appears to lead a significant benefits for limited of health literacy with poorly controlled type 2 diabetes.

Field of Study: Public Health	Student's Signature ....
Academic Year: 2016	Advisor's Signature ....

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CHAPTER I

INTRODUCTION

1.1 Background and Rationale

In 2010, it was estimated that there were 285 million adults worldwide with diabetes, with projections that this will increase to nearly 440 million people by 2030 [1]. About 347 million people worldwide have diabetes. There is a core global issue in term of epidemic of diabetes that can be traced back to rapid increases in weight, including obesity and physical inactivity [2] .By the year diabetes is become to predictor ranking 7th cause of death in the world. Furthermore, next 10 years diabetes death rate will be risen by more than 50%. Its depend on type of diabetes mellitus symptom as mostly found type 2 diabetes(T2DM) more common than type 1 around 90% of all diabetes worldwide. Cardiovascular disease is responsible for between 50% and 80% of deaths in people with diabetes. Diabetes has become to major causes of premature illness and death in most countries, mainly through the increased risk of cardiovascular disease (CVD).

In 2012 diabetes was the direct cause of 1.5 million deaths as 80% of diabetes deaths occur in low- and middle-income countries. In developed countries most people with diabetes are above the age of retirement, whereas in developing countries those most frequently affected are aged between 35 and 64. Diabetes is a leading cause of blindness, amputation and kidney failure. Lack of awareness about diabetes,

combined with insufficient access to health services and essential medicines, can lead to complications such as blindness, amputation and kidney failure. Burden of diabetes in worldwide had been found in every country. In most countries diabetes has increased alongside rapid cultural and social changes via ageing populations, increasing urbanization, dietary changes, reduced physical activity and unhealthy behaviors. There were most commonly metabolic disorders in the world and the prevalence of diabetes in adults has been increasing in the last decades [2]. It is not only trend increased but also urbanization has driven dramatic changes in lifestyle due to unhealthy behavior particularly in developing countries. These are rapid transitional risk factors for diabetes as well. Estimates of the current and future burden of diabetes are important to appropriately allocate resources, drive health-promoting policies, and encourage action to prevent diabetes in future generations. The International Diabetes Federation (IDF) has produced estimates of diabetes prevalence since the year 2000.

Previous estimates of the prevalence of diabetes have demonstrated a large and increasing burden, with significant regional variability. T2DM accounts for 85% to 95% of all diabetes in high-income countries and may account for an even higher percentage in low- and middle-income countries that present a common condition and a serious global health problem. Protection and prevention complication have to find out the effective program or model for deducted high rate of diabetes. Since 2010-2014, Thailand found almost patients with DM drawn into the elderly population. Most

of patients show average of age over 60 years according to 61.4, 61.4, 61.5, 62.6 and 62.4 in each year. Moreover, more than 50 percent of them had been comorbidity with hypertension and other non-communicable disease [3]. Moreover, other leading course of comorbidity is over of BMI due to high risky rate to get complication and other chronic disease. The average of duration diabetes medication at least 9 years lead to suffering mode in patients with T2DM which is threat of well-being. According to statistics report risen of health care cost, loss of life expediency among T2DM patients which were not only reflection barriers of well-being but also included urbanization and economy. In 2014, National Health Security Office (NHSO.) reported diabetes outcome such as 62.1% of T2DM patients uncontrollable FPG level and 64.0% uncontrollable HbA1c [4]. The cross-sectional study that was done by NSHO purpose to evaluate the effective of diabetes mellitus treatment outcome finding that almost of patients with T2DM drown in older adult and elderly group than other. It predict risen of major public health problem in older adult and elderly. Next 10 year, Thailand will become elderly society which is pragmatic concerning for policy maker. Preparation of health care system for elderly and reduced major health problem as DM were concerned. Study area, Saimai district is shown semi-urban characteristic. It is vicinity which is broader connection rural area as Tumbon Lumlooka Pathumthani province and urban as Bangkok. Saimai district was classified as yellow areas broader leading to less populated and semi-urban community. The local climate change from rural to semi-urban life style. Resident people were almost farmers and retirement

more than other occupation and rice field cover almost area but recently, its change to be the housing development village [5]. The climate change of social, economic and environment lead to limit of physical activities food assumption as taking from shop, market than prepared by themselves that are similar as other semi-urban community. In term of health was report high prevalence of chronic disease, high risky health behavior and uncontrollable dramatically chronic disease as diabetes. The large number of uncontrollable drown in older adult and elderly group more than 50% and prevalence of complication increasing [4].

Many reasons has drown in variety mode with many causes. The causation is not only individual capacity for controlling blood glucose but also a less activities or non-adherence regimen. However, there are other threat that found from several studies. Some studies were apply Explanatory Model to ascertain in-depth of hidden threat which lead them to non-adherence in diabetes therapy. Understanding, perception, cultural, norm and carrier surrounding were related to patient respondent in medication. Inconvenience travelling, financial, without care takers, living alone were dramatic story in several qualitative researches. Moreover, acceptable of diabetes treatment among shown that currently regimen was not the best way to happiness life because they think that diabetes is come from bad thing done in the past life. In these problem lead them chose other way to reduce illness suffering by done more merit or did not trust modern medication which could be help them. Someone was chosen

traditional medication to cure diabetes due to high risky for severity and complication of illness [6] Review for explaining about the illness of the disease varies was the theory established by Klienman since 1980 [7]. It would shade to a charge to behave toward their illness varies with physician, health providers and nurses to meet each patient will receive a physical examination. Check blood sugar levels may raise questions and make suggestions. In order to make patients understand what doctors and nurses introduce and implement it correctly. Communication between patients and health care providers need to be effective which taken 1) to explain the individual's Explanatory model and disease definition of the illness, 2) to explain the cause of the disease and illness, and 3) to maintenance of the disease, which results in the treatment of individual diseases. In order to make patients, physician and nurses communicate well and have mutual understanding was that both sides need to understand the information well. In 2014, World Health Organization (WHO) has occurred regularly self-management of diabetes care for people with T2DM as integrated multi-strategies consist of education approach, life style management, and self-monitoring, controlling glucose blood level. Interactive communication and tool of transferring information have been elaborated into health education for T2DM patients [8]. Several studies were applied these strategies to develop varieties of intervention. However, a few study was applied multi-strategies based on patient's needed and their capacity due to diabetes outcome still under estimated. It should be with the integration communication between patients and health care providers

based on conceptual of "perspective to describe the disease" attributed. The suggestion of Explanatory model was applied in health promotion for a long time. However, a few study was applied integrated Explanatory model and interactive communication to develop the appropriate intervention of diabetes care fulfilled the gap. Understanding hidden threat was suggest for uncontrollable in T2DM patients for a long time. Moreover, the self-management of diabetes has involved interpretation of quantitative information. However, a large number of patients have poor health literacy and numeracy, which lead to incomprehension of basic health information, lower likelihood of receiving preventive care, limited ability to take medications appropriately, higher hospitability, poorer glycemic control status, and worse clinical outcomes [9]. Health literacy was well known and preferred to explain this problem that patients do not understand health information or lack of intelligence on health for a long time. Moreover, the other core component, recently innovative scientific discoveries to advance our understanding of diabetes mellitus and to develop novel approaches to therapy, the burden of diabetes continues to escalate and treatment often remains substandard [10]. Optimal management of diabetes mellitus requires collaboration between multidisciplinary healthcare providers and patients to encourage effective self-care in many tasks including adherence and manipulation of complex medication schedules, executing detailed dietary recommendations, promoting physical activity and participation in preventative care strategies [11] . Although there are many determinants that contribute to the process of care and

health outcomes for patients with complex chronic disease, over the past two decades the literature has been growing, illustrating the concept of health literacy as a relevant and influential factor related to diabetes mellitus. However study of health literacy in Thailand especially in older adult and elderly patients with diabetes are limited.

Health Literacy is one out of recommendation from WHO to apply for DM management promotion. Health literacy is the ability of a person to understand and act on instructions given by a healthcare professional on how to manage a health condition. More than assessing reading level, health literacy includes numeracy, which is the understanding and manipulation of numbers; navigating the healthcare system; communicating with their health care team and care takers; and decision making [12]. Health literacy is described by Parker and as the intersection between the demands and complexity of the condition and the skills and ability necessary to manage the condition[13]. There were several factor related Health literacy and several research try to define strengthen factor correlated with its. Discovery was meaningful to develop the intervention support achievement goal of DM management in many country. However, a few study integrated variety of theories and multi technique approach for developing the model for people with diabetes based on limited of health literacy in Thailand. The argument of complicated health information among patients, health providers and the public is often described as health literacy. Limited health literacy is usual related with healthcare processing and focusing to health outcomes. In

diabetes mellitus (DM), health literacy skill is associate with knowledge of DM, self-efficacy and self-care activities and blood glucose controlling. Health literacy always due to a better understanding of racial disparities observed in patients with diabetes. Strategies to improve health literacy, based on understanding role of its, provide a meaningful of high potential of self-care management [14]. The conceptual of health literacy skills hypothesized was defined the relations between health literacy, health-related and diabetes outcome. Moreover, health literacy functions individual level and external factor-related had powerful blood glucose controlling in T2DM diabetics (e.g., family, setting, community, culture, and media). It is organized into 4 primary components: (a) factors that influence the development and use of health literacy skills; (b) health-related stimulating (c) health literacy skills needed to comprehend the stimulus and perform the task; and (d) mediators between health literacy and health outcomes. The Health Literacy concept could be used to guide the development of interventions to improve health literacy.

In addition, understanding health information involved multi-strategies to enhance effective of transferring health information between patients and health care providers. The pattern of health information need to be further studied to identify an appropriated ways to improve diabetes health care system [15]. Communication toolkit was the one instrument in health promotion part which was found some kind of high attractive, easy to make understanding but a few criteria for usability by patients with

low literacy, limited prior medical knowledge, and/or limited resource availability. The setting of available criteria and methods for increasing reach of print education materials to these underserved patient populations is indicated. This study relevant with Cavanaugh K. in 2009 and Maria C.E. Rossi in 2011 [16] [17]. Even though, there were variety of communication pattern between health providers and patients had high effective supporting T2DM diabetics with limited of health literacy the interactive communication should be consider for primary care level. Conclusion support recommendation Wallace AS. (2009) study preferred literacy-appropriate education materials and brief counseling in primary care settings are efficient strategy for imparting skills necessary for diabetes self-management [18]. Similar with Dewalt DA. study had suggested that provider or care taker have to provide DM interactive communication with explanation clearly the information on level of health literacy and concern the sustainable of maintain health behavior. Keeping health care communication between health providers and supporters were recommence for maintain healthy behavior improving diabetes outcome and reduction of complication [19]. In term of public health communication as health promotion or health education approach for T2DM usually many kind of presentation. Although, health literacy was concerned recently it should be integrated other theories or other techniques to complete variety factors related to improve potential of health information assessment or health care following conceptual of health literacy skill. Consumer information processing model (CIP) is the most popular theory in social marketing site

recently, it was applied into health promotion used for developing the toolkit communication of health information between health providers and people. This concept useful for fulfill understanding process of how do consumer gaining and interpretation health information that influence their making decision for health behaviors. Meaningful of CIP model was apply to explore how to develop the appropriate design of toolkit for health communication. This point relevant with interactive communication and Explanatory Model as fulfill gap in term of health promotion [20]. The effective of communication was recognized as one focal point in the part of health education and health promotion. New technologies and innovations have promised to make tasks faster, safer, and more efficient, more effective and easy to make the continuous communication. Technological innovations have already been used to bridge health disparities and meet unmet needs of populations. While many previous systems were constructed with clinical professionals and healthcare administration in mind, there has recently been an increasing interest in applying these new technologies to consumer health, empowering patients to take control and play an active role in managing their health. Consumer health technology interventions have been used, for example, to help individuals monitor their own health, to provide information and social support and for remote home monitoring. One example of a technology that is potentially support a consumer health focus includes mobile phones. According to, using mobile phone behavior in Thailand, more than 33 million, found mobile phone user in elderly people 27 % while assess the internet only 7 %

with in urban area [21]. Although trend of smartphone using were risen so fast but in semi-urban and rural area still a little bit increasing. For older patients with diabetes T2DM which could be maintain level of disease and get healthy by maintain healthy behavior. Since self-management of diabetes requires patient adherence to best practice recommendations (e.g. dietary management, glucose monitoring, physical activity, etc.), there has been an interest in increasing compliance with self-care advice [10]. One method of increasing compliance is via reminders, which was explored by large number of researches. They are found similarly the outcome that using mobile phone communication for continuous health care ,reminder medication regimen , coaching healthy behavior , provider continuous knowledge of self-management lead to improve the diabetes outcome. Performance of diabetes management, especially blood glucose controlling was effect to quality of life in older adult and elderly with T2DM. The several studies were found the association between diabetes management and quality of life such as Chodchoi Wattana et al. in 2007 evaluated the effect of diabetes self-management program on HbA1c controlling and QOL in Thai people with T2DM, ≥35 years aged and uncontrollable glycemic demonstrated a significant decrease in the HbA1c level and CHD risk, with an increase in quality of life (QOL) [22]. Additional, improvement of diabetes quality of life was related with frequency of diabetes symptoms , the number of comorbidity chronic conditions, family income, gender, age, income, marital status, household size [23] [24] [25]. It same sound with the effect of education level, prescription adherence, exercise and feet care as well as

healthy behavior to reduce risk of diabetes complication almost factors affected to quality of life among T2DM patients[26] [27].

This study, aim to explore situation of patients with T2DM who are dwelling and 50-79 year aged in Saimai district and seeking health care at the 61th Sungwan Thusanarom Health Center. The situation analysis consist of factor related diabetes outcome from literature review; socio-demographic, history of medication, health literacy, self-efficacy, self-care activities ,social support, blood glucose level and quality of life. Second, aim to develop the Multifaceted Healthy Coaching program based on their health literacy level, priority of problem and needed which find out hidden threat by explanatory model of their illness. In addition the pattern of interactive communication between patient and health care providers and information processing were considered. Implementation and evaluation was determined the effect of the Multifaceted Healthy Coaching Program to improve HbA1c and quality of life in patient with T2DM dwelling in semi-urban; Saimai district Bangkok . Randomized control trial was employed to achieve research objective.

1.2 Research Gap

1.2.1 Study of health literacy in Thailand especially in older adult and elderly patients with diabetes are limited.

1.2.2 A few study integrated variety of theories and apply multi-technique to develop health promotion program for T2DM management based on health literacy.

1.2.3 A few study was developed an interactive communication toolkit or education program provided for older adult and elderly shade to their needed and health literacy skill. (Cut 1.2.3 replaced by 1.2.4 and change 1.2.4 to 1.2.3)

1.3 Research question

1.3.1 What are the situation of diabetes in older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center, Saimai district, Bangkok?

1.3.2 What are the appropriate of multifaceted healthy coaching model to improve FPG,HbA1c and quality of life for older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center Saimai district, Bangkok?

1.3.3 What are the effectiveness of Multifaceted healthy coaching program for blood glucose level and quality of life in older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center Saimai district, Bangkok?

1.4 Research objective

1.4.1 General Objective

1) To explore the situation of diabetes in older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center, Saimai district, Bangkok.

2) To apply participatory communication developing the multifaceted healthy coaching model based on problems and needed of patients for improving blood glucose control and quality of life.

3) To evaluate the effect of Multifaceted healthy coaching program to improve blood glucose level and quality of life in older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center, Saimai district, Bangkok.

1.4.2 Specific Objective

1) To describe socio-demographic characteristic, medical history of DM, health literacy, knowledge of DM management, self-efficacy, self-care activity , glycemic control clarified by level of FPG and HbA1c and quality of life among older adult and elderly patients with T2DM.

2) To determine the association between, health literacy, knowledge of DM management, self-efficacy, self-care activity and HbA1c level.

3) To determine the association between, health literacy, knowledge of DM management, self-efficacy, self-management behavior, HbA1c level and quality of life.

4) To investigate the explanatory model of DM management, the pattern of interactive communication and consumer information processing among older adult and elderly patients with T2DM, care takers and health care providers.

5) To develop the appropriate Multifaceted Healthy Coaching program to improve glycemic controlling and quality of life in older adult and elderly patients with T2DM.

6) To compare, health literacy, knowledge of DM management, self-efficacy, self-care activity score, HbA1c and quality of life before and after implement

Multifaceted Healthy Coaching program within and between intervention and control groups.

7) To compare changing over time of fasting plasma glucose (FPG) level at the base line ,3rd month and 6 month within the intervention group and between the intervention and the control groups.

8) To compare HbA1c level and quality of life at base line to after implement the Multifaceted Healthy Coaching program within the intervention group and between the intervention and the control group.

1.5 Research Hypothesis

1.5.1 Health literacy, knowledge of DM management, self-efficacy, self-care activities were related with HbA1c level and quality of life in older adult and elderly with T2DM in the 61th Sungwan Thusanarom health center, Saimai district ,Bangkok.

1.5.2 Application of participatory communication would be develop the appropriate of Multifaceted Healthy Coaching Program to improve HbA1c and quality of life in older adult and elderly with T2DM in the 61th Sungwan Thusanarom health center, Saimai district, Bangkok.

1.5.3 Multifaceted healthy coaching program have effectiveness to improve FPG, HbA1c level and quality of life in older adult and elderly with T2DM than usual care in the Public Health Center 61th ,Saimai district Bangkok Thailand.

1.6 Conceptual Framework

This study is performed randomized control trail to fulfill the research questions and achieving the research objectives shown in the conceptual in the (figure 1)
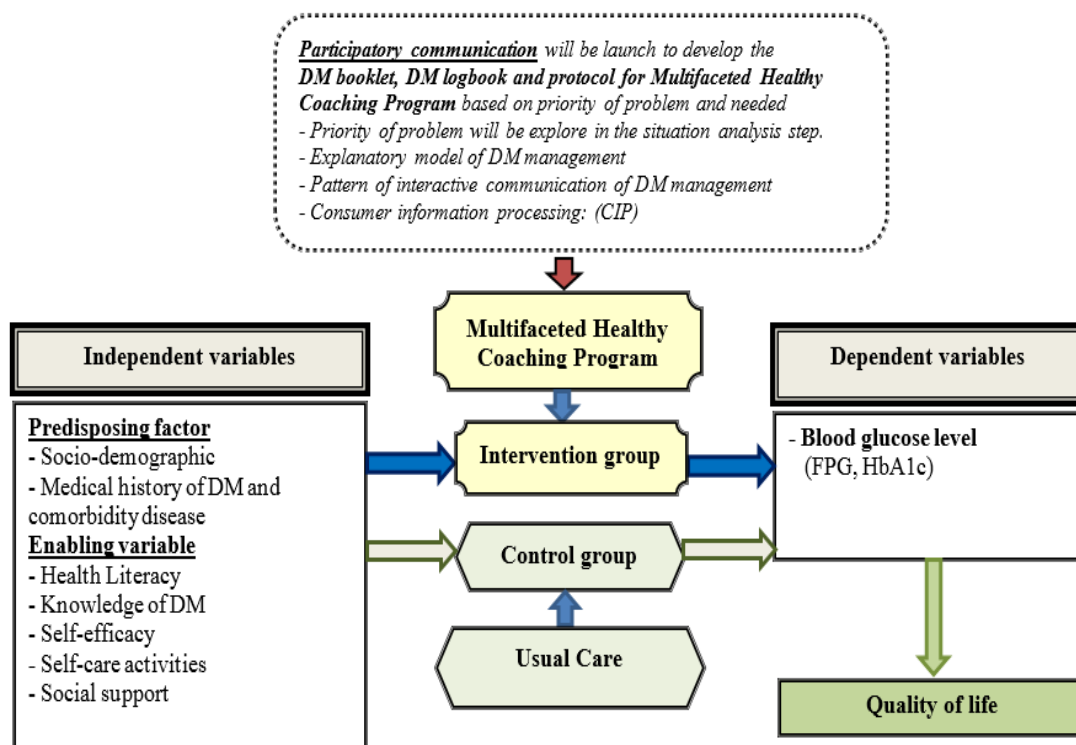
Figure 1 Conceptual framework

1.7 Operation Definition

   All of operation definition which are following are apply by the author for serving

the aim of this study.

Table 1 Operation Definition of this study

Term	Operation Definition
Multifaceted Healthy Coaching Program	- Integrated of verities coaching technique and using multi-instrument for healthy coaching to improve HbA1c and quality of life consist of 1) DM management booklet 2) DM diary(Self record drug administration and food consumption) 3) Group education (group discussion + case-based learning) 4) SMS drug adherence, reminding healthy behavior 5) Individual telephone counselling
HbA1c [28]	- Test of glycosylated hemoglobin A1c that is the best biomarker of blood glucose controlling. This is measure average of blood glucose over the previous 2-6 months. Blood samples are taken from a vein in the arm by medical technician and test at the 61th Sungwan Thusanarom Health Center laboratory. The level of HbA1c 6.5- 7.0 % is recommendation of blood glucose level for T2DM patients.

Table 1 Operation Definition of this study (cont.)

Term	Operation Definition
FPG [28]	- Test of blood glucose for immediate blood glucose level every time of follow up. It is performed after a participant has fasted for at least 8 hours. A sample of blood is taken from a vein in the arm by medical technician and test at laboratory Center, BKK. The level of FPG 126-140 mg/dl (7.0 mmol/l) is recommendation to reduce medical complications of DM.
Quality of life [29]	- Refer to treatment impact and satisfactions with diabetes treatment were measured by DQOL (short-brief) which developed by Dr.Thomas F. Burroughs St. Louis University Center. Thai version was applied by Srithongsuk since 2000.
Older Adult [30]	- Refer to people are 50-59 year aged that using classification aged group in the National Health and Nutrition Examination Survey (NHANES).This study refer to participant who are age 50-59 year with T2DM seeking care at the 61th Sungwan Thusanarom Health Center.

Table 1 Operation Definition of this study (cont.)

Term	Operation Definition
Elderly [30]	- Refer to people are 60-79 year aged that using classification aged group in the National Health and Nutrition Examination Survey (NHANES).This study refer to participant who are age 60-79 year with T2DM seeking care at the 61th Sungwan Thusanarom Health Center.
Socio-demographic	- Characteristic of older adult and elderly with DM type 2 compose of age, gender, education, income, occupation, marital status, insurance scheme, member of family, participant's care takers in their family and telephone using behavior.
Knowledge of diabetes mellitus management [31]	- Comprehensive of knowledge following the National Standard of Diabetes Self-Management Education and Support theme. This study consist of 5 components which are appropriate for Thai culture. 1) Eating behavior dietary food; high sugar, fatty food, Salty food consumption) 2) physical activity 3) risk-reduction behaviors: Smoking and alcohol consumption. 4) Medication (drug adherence) 5) Feet care

Table 1 Operation Definition of this study (cont.)

Term	Operation Definition
Medical history of DM and comorbidity	History of DM including: including years of diabetes, current diabetes medications, glucose monitoring frequency, medical regimen adherence (drug administration and medical follow up)

Health literacy [32]	- The degree to which individuals have the capacity to assess, understand health information and services needed to make appropriate health decisions .This study follow the concept of ABCDE-Health Literacy scale of Thai adult as three levels of health literacy which consist of 6 components as follow(MOPH,2013).
	
	1) Functional skill
	
	   - Needed health knowledge and understanding
	
	   - Accessing information and service
	
	2) Interactive communication
	
	   - Communicating for improving performance
	
	   - Managing their health condition
	
	3) Critical level
	
	   - Getting media and information literacy
	
	   - Make appropriate health decision to good practice

Table 1 Operation Definition of this study (cont.)

Term	Operation Definition
Self-care activities	- This study refer to suggestion self-care for T2DM including 5 components: 1) Healthy eating (High sugar, fat food, Salty food consumption) 2) Exercise 3) self-monitoring 4) Medication 5) Foot care. Measurement of self-car activities will be use the Summary of Diabetes Self-care Activities questionnaire (SDSCA)
Self-efficacy	- Refer to the confidential of diabetes self-care that can lead participants maintain their healthy behavior. This study will be use the Thai version questionnaire to assess self-efficacy. The questionnaire is modified by Stanford Education Research Center.
Blood glucose level [33]	- Fasting Plasma Glucose (FPG) and Hemoglobin A1c indicator to clarify DM management for controlling the level of glucose in the blood.
Explanatory Model of diabetes management [34]	- The notions about an Episode of diabetes mellitus and its treatment that are employed by all those engaged in the clinical process. Including 3 elements in medical system ; 1) defining illness 2) explaining causes of illness 3) Process of treatment

Table 1 Operation Definition of this study (cont.)

Term	Operation Definition
Interactive communication [35]	- The two-way communication sending and receiving diabetes medication information between health care providers and patients or care takers.
Pattern of communication between health care providers and patient & care takers	- The pattern of communication refer to model or path way of referral medication information of diabetes from health care providers to patients & care takers in Saimai district.
Consumer information processing model [36]	- Explanation for what are health information supporting DM management do they need and what kind of health information easy to assess, to understand and appropriate for older adult and elderly with T2DM in the 61th Sungwan Thusanarom Health Center.
Risk of diabetes mellitus complication [37]	- Risk level on complication of diabetes which are classified three levels by criteria as follow. 1) Low risky complication lead to level of HbA1c < 7% and non-complication, FPG/CBG 80-150 mg.%> 3 time. 2) Moderate risky of complication lead to patients who found HbA1c ≥7.0-7.9% , FPG/CBG 151-190 mg.% > 3 times. 3) High risky of complication lead to patients who found HbA1c ≥8.0%, FPG/CBG > 190 mg.% > 3 time, CBG<70mg./dL., found hypoglycemia > 3 times per week. , Hypertension ≥ 180/1100 mm.Hg.

1.8 Limitation

1.8.1 The study population may not have been fully representative of older adult and elderly patients with T2DM in Bangkok and other area.

1.8.2 The Interactive communication of DM health literacy in this study was created under the natural of patients in Saimai district which shown life-style as semi-urban area. Its might be limited to apply for other semi-urban community.

1.8.3 Self-report in the diary records of self-care activity and drug adherence were recall bias information and limited strongly generalized meaningful of information.

1.8.4 This study was conduct in one Health Center that was not found high income T2DM patients seeking care at 61th Health Center leading to limited of DM situation among high income patients in semi-urban area.

CHAPTER II

LITERATURE REVIEW

2.1 Burden of Diabetes Mellitus (DM)

In 2000, estimated all aged group with diabetes as prevalence in worldwide was reported 2.8% and projection will be become 4.4% in 2030. In 2000, the total number of people with diabetes is shown 171 million even more risen to 366 million in 2030. Prevalence of diabetes was found higher is higher in male than female, even though its higher in male but in the setting area report higher rate of female T2DM diabetics than male. Trend of diabetes could be explained by change of urban society and increasing of urban population in developing countries caused projected to double of prevalence between 2000 and 2030. The most important demographic change to be increasing proportion of people > 65 year of aged with diabetes across the world [38]. In 2010, diabetes was look like a common chronic disease distribute all around the world and become to be the major of health problem in both of developed and developing countries. The prevalence of diabetes in 2010 was increase to be 285 billion as 1.6 time of prevalence by the year 2000 and nearly projected of diabetes prevalence in 2030. This number of people with diabetes none stop to increase globally due to an elderly population, growth of population size, urbanization and high prevalence of obesity and sedentary lifestyle[1]. In 2013, next update globally, 392 million people had diabetes and amount 80% of people with diabetes are in low and middle income

countries. WHO had estimated 175 million people with diabetes are undiagnosed. Its

due to the number of people with diabetes may be more than estimated report.

Projected prevalence of diabetes in 2035 will be risen to be 587 million as in figure 2.

There had been established the serious public health problem since diabetes come

to people across the world as an estimated 1.5 million deaths were directly caused

by diabetes [39]. More than 80% of diabetes deaths occur in low- and middle-income

countries .WHO projects that diabetes will be the 7th leading cause of death in 2030

[40].
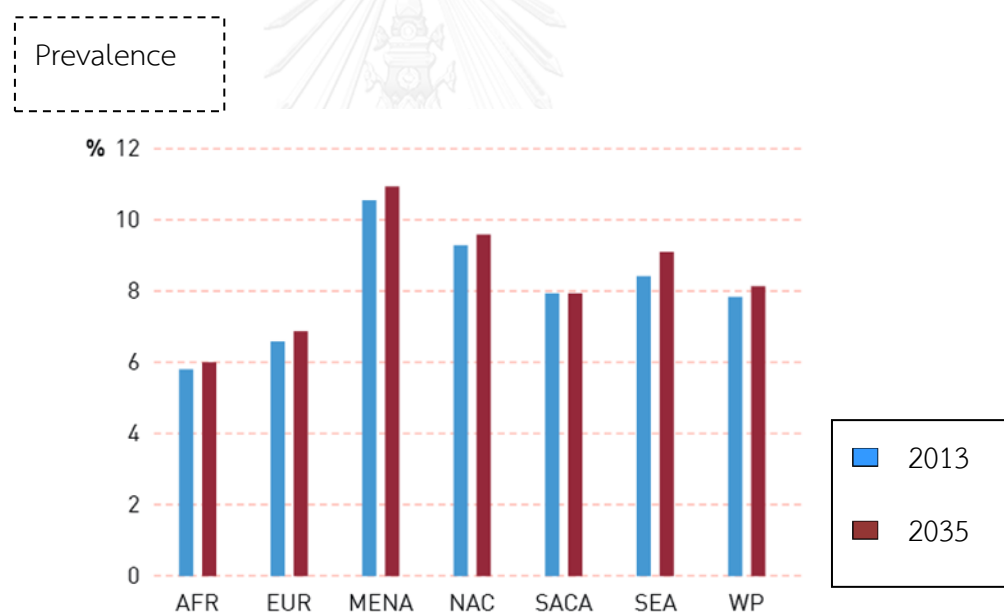
Figure 2 Prevalence (%) of diabetes in aged 20-79 year by International Diabetes
Foundation Region, 2013 and 2035

Diabetes is a chronic disease which increases the risk of several conditions, such as
heart disease and stroke. It also increases the risk of other diseases, such as
tuberculosis (TB) and malaria. However, 80% of diabetes cases are preventable by
adopting healthy lifestyles, healthy diet like regular physical activity, maintaining a

healthy weight or a normal body and avoiding tobacco and harmful use of alcohol[8]. .

 2.1.1 Diabetes Mellitus in Thailand

2.1.1.1 Situation of DM in Thailand

Ten year ago, Thailand has struggle through admirable social of economic and health development that lead to upper-middle income country in South-East Asia. Moreover reducing of people who are live under poverty from 21% to 8.1 % by the year 2007-2011 (World Bank, 2012). Thailand, has present high prevalence of Non-Communicable diseases (NCDs). In 2010, diabetes was ranking the 3rd cause of death account 6 % out of 42 % causation of death by NCDs [41]

The National Health Examination Survey (NHES) has been done for fourth time since 1991, 1997, 2004 and 2009 report the prevalence of diabetes in 15 year of aged and over as 2.3%, 4.6%, 6.8% and 6.9% respectively that shown in figure 3 [21]. According to the NHES in 2009, comparison of the prevalence of diabetes between urban and rural area was statistical significantly higher prevalence in urban areas than rural areas by P < 0.001 for both sexes. In addition, the prevalence of diabetes has increase with 55 year aged and over. Nevertheless, NHES found an important point in diabetes care is under-diagnosis meaning its delays for initial treatment and increasing risky level of complication which leads to higher treatment costs. The proportion of undiagnosed patient still risen from 66.5% to 47.3% in men and from 51.4% to 23.4% in women between 2004 and 2009 [21] .
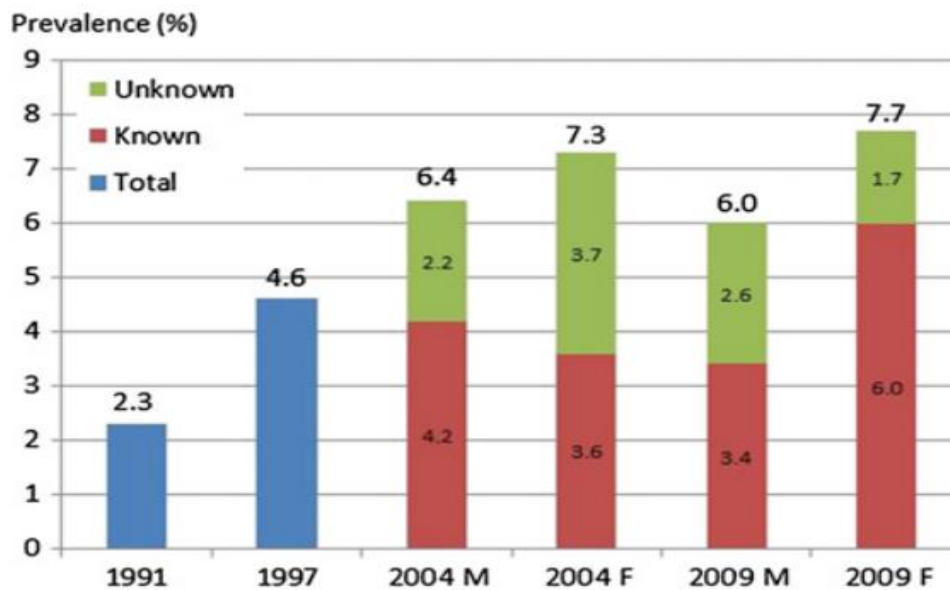
Figure 3 Prevalence of diabetes mellitus in Thailand from National Health Examination Survey in 1991-2009

In 2005, three studies in urban areas on incidence of T2DM in Thai adults from a high socio-economic background. All of studies were used the diagnostic criteria from the American Diabetes Association (ADA) including fasting plasma glucose tests (FPGs) and were used oral glucose tolerance tests (OGTTs) in one study. Participants in these studies were involved aged-group 35-60. There were cooperated among professionals and office workers in Bangkok. An incidence rate in the age-group 35-60 were report 17.8 per 1000 person-years (PY) in male and 9.2 per 1000 PY in female [42] . Other one study was employed by the team from University hospital in Bangkok between 2001 and 2005 present an incidence of 13.6 per 1000 PY in men and 6.4 per 1000 PY in women. Participants in this study were not specific maximum of age enrollment which included participants over 35 years old and predominantly female with high BMI as >25 kg/m2 , elevated FPG and alanine aminotransferase levels. The

result shown to be independent predictors of T2DM. Risk of diabetes in men was approximately twice as high as in women. Although high risk of diabetes drown in male higher than female there were not association confounded by higher BMI and FPG levels [42]. Between 2010-2014, National Health Securiy office were present the incidence of T2DM account 34.4%, 35.8 %, 32.9 %, 29.1 % and 54.3 %. It was highest in 2014 because Ministry of Public Health had launched the policy enforcement an active cased finding of T2DM that due to the incidence rate of T2DM increasing. Even the incidence rate of T2DM was risen but comorbidity hypertension in patient with T2DM was decreased (NHSO, 2014). In 2005 focusing to mortality, diabetes was ranking the 2nd cause of death in women (8.0%) and the 10th cause of death in men (3.2%) proportion of deaths attributable to diabetes reaches its maximum at age 50-79 [43].

Comparison mortality rate of diabetes mellitus in whole country and Bangkok, Thailand 2007-2014
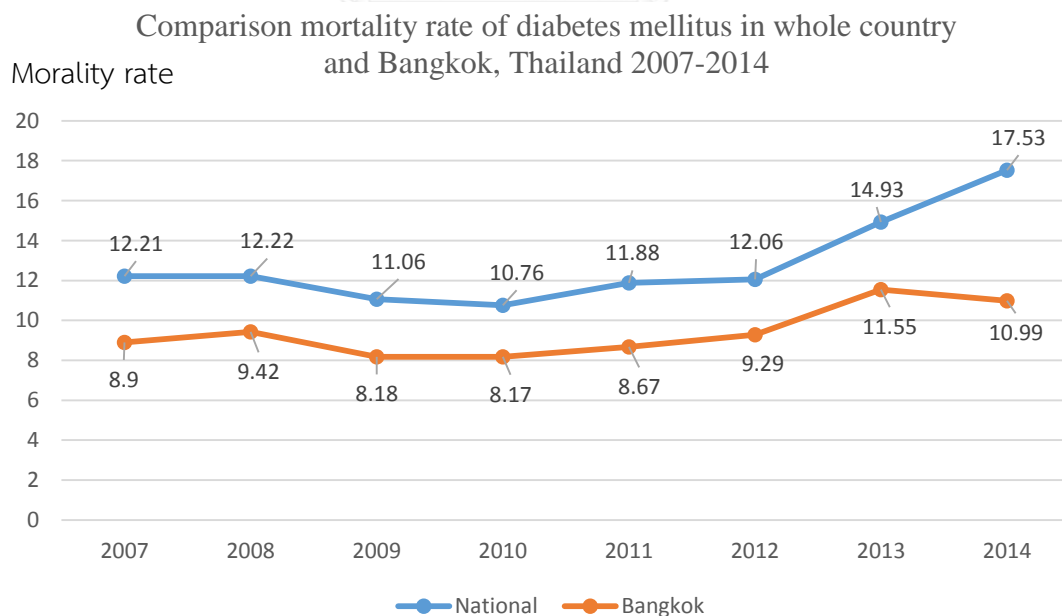
Figure 4 Mortality rate of diabetes in the National level compare with Bangkok, 2007-2014

Figure 4, since 2007 – 2014 the mortality rate of diabetes Nationwide was risen every year. The causation had been explained by a long time of onset symptom relevant the prevalence of undiagnosed that were delay of treatment and high risk of complication. Furthermore patients with diabetes flow in the elderly group due to high risk of severe symptom and comorbidity addition. In Bangkok, even mortality was lower than nationwide but risen of mortality rate had to consider for improvement of health care system.

2.1.1.2 Diabetes Mellitus outcome in Thailand

Thailand has developed guidelines for treatment, prevention and control indorsed by the Thai Diabetes Association, the Endocrine Society of Thailand, and the Ministry of Public Health. Every three or four years, the guidelines will be revise, recently Ministry of Public Health using version published in 2011 [21]. Anyhow, prevalence of using these guideline by physician is not appear the evidence support. It is no more difference from World Health Organization or International Diabetes Foundation guidelines. A few difference only recommendation HbA1c as uncommon test for diagnosis because the method for measuring HbA1c in Thailand disappear standardization. On the other hand FPG is used for diagnosis replace with HbA1c. Otherwise MOPH suggest that is a generally for glucose monitoring detection. The Policy has established strategies for solving diabetes problem. Reducing incidence of diabetes is the first strategy launched in 2014, second remaining normal of BMI, increasing of controllable of diabetes over 40 % and the last strategy engagement the

prevalence of unhealthy behavior. Three Key Performance Indicators were set in 2014 comprising of sustainable of prevalence or reduced from 2013 (6.9%), an average of BMI abnormal decreased from 26.8 to normal level and decreased of mortality rate from 12%. In addition, reduction of diabetes complication and maintain healthy behavior are recommend [37].

The DM outcome has evaluated by National Health Security Office in 2014 that shading to core outcome including BMI, FPG and HbA1c level that due to the achievement of blood glucose controlling in patient with T2DM. This study was involved 33,828 patients with T2DM represent of patients with T2DM from government hospital and Health Care Center in both of regions and Bangkok. From table 2, T2DM patients in event evaluation 65.8 % were female, an average of aged 62.4 year, an average of duration with T2DM amount 7.4 year. Prevalence of diabetes comorbidity was 45.7 % while the most of comorbidity disease was reported hypertension more than other chronic disease. In addition uncontrollable classified by FPG higher than 130 mg./dL was reported 62.1%, and HbA1c level higher than normal level such as 7.0 percent 64.4 % of T2DM diabetics. Almost of uncontrollable T2DM patients were 50 year of aged and over while BMI average found 26.8 that was higher than normal BMI 18.5-22.9. Comparison of diabetes outcome between Bangkok and Nationwide were seen lower of HbA1c checking up per year and high level of FPG. Nevertheless an average of BMI was closely with the Nationwide. Surprising of controllable of HbA1c

both of them was lower than 50.0%. Although this point could be imply that in Bangkok may be high performance of diabetes monitoring, facility supporting and responding small area.

Table 2 Achievement following KPI for prevention and control diabetes in 2014 in National and Bangkok.

	Key Performance Indicator (KPI)	National (%)	Bangkok(%)
1	An average of BMI 18.5-22.9	26.8	26.08
2	Fasting Plasma Glucose level (70-130 mg.dL)	37.9	35.6
3	HbA1c < 7 %	35.6	46.3
4	Check up HbA1c at least 1 time per year	77.6	68.3

* National Health Security Office, Data report from evaluation diabetes outcome cross-sectional study involed 33,828 patients with T2DM in whole country, 2014.
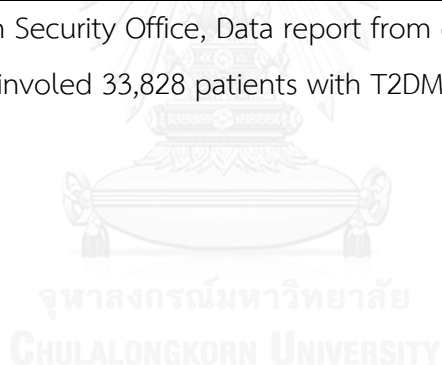
Table 3 The number and percent of controllable HbA1c by gender and aged group in 2014

| Aged group (year) | Controllable of Hemoglobin A1C level < 7% | | | |
| | Male | | Female | |
	N	Percent (%)	n	Percent (%)
35-39	52	38.0	69	20.1
40-44	109	32.1	170	22.8
45-49	207	33.1	334	23.2
50-54	347	34.8	545	24.7
55-59	467	34.5	847	28.8
60-64	551	37.4	1097	33.9
65-69	487	39.8	1045	39.3
≥ 70	866	46.2	1952	48.7

* National Health Security Office, Data report from evaluation diabetes outcome cross-sectional study involved 33,828 patients with T2DM in whole country, 2014.

Observation this report from table 2 almost of patients in cross-sectional survey were older adult and elderly. Controllable of HbA1c is not reach goal of achievement suggestion from MOPH in 2014 that have to increase controllable of HbA1c to ≥ 40 % of the number of patients with T2DM. Although it look like so far of the achievement in diabetes management but it is no difficult to hold on together collaboration with organization network.

2.1.2 Situation of DM in Saimai district, Bangkok Thailand
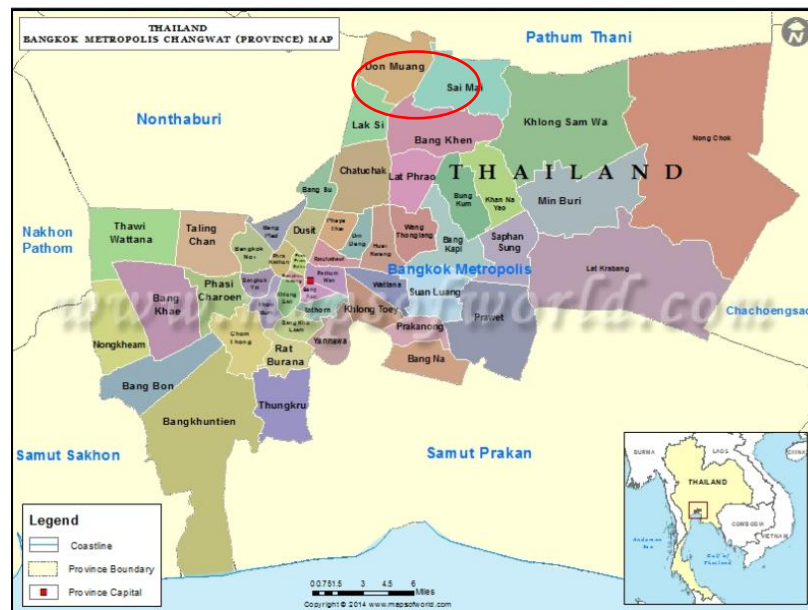
Figure 4 Bangkok administrative districts map

This study was launched in the 61th Sungwan Thusanarom Health Center Saimai

district Bangkok, Thailand. It is one out of the 50 districts of Bangkok located in the

North of Bangkok and present condition as semi-urban area. Boarder of Saimai

community is territories in the north by Lumlukka district of Patumthani province, to

the South by Bang Khen district, to the Weast by Don Mueang of Bangkok and to the

East Klongsamwa district of Bangkok. From the data based the total number of

population is 191,536 persons. Population in aged group 50 year and over is 42,512

persons (25.3 % of whole population) and especially the total number of elderly over

60 is 22,284 persons (11.6 % of whole population). Patient with T2DM in older adult

and elderly were report 545 patients. All of them seeking health care and treatment

in the 61th Sungwan Thusanarom Health Center. In 2014, uncontrollable HbA1c were

report 57.1 % in older adult and elderly patients. Additional data reported in 2014, there are 44 newly diagnosed T2DM patients. Health care management for diabetes controlling composes of 1) FPG examination once in 3 month coverage reporting 88.6% 2) blood pressure measurement 100% coverage of patient 3) evaluation diabetes complication 88.6%. Patients with T2DM were high risk to get the complication amount 59.6% especially found in older adult and elderly [5].

The 61th Sungwan Thasanarom Health Center has revised health care system supporting diabetes problem and other NCDs. Diabetes health care system was set appointment for treatment follow up T2DM patients every day. Next follow up was set 1-2 month based on level of FPG/DTX checking up, severe complication and estimated time to see doctor 5-10 minutes. FPG was check in that time follow up and HbA1c in the 6 month period to evaluate glucose monitoring. After met doctor patients uncontrollable who had found DTM > 160mg./dl/ had received diabetes management counseling from clinician nurse amount 10-20 minutes, waiting advised drug administration by pharmacist. Reminder for drug adherence and regimen adherence were disappear in the diabetes health care system. However, calling for reminder appointment doctor for patient was done for T2DM patients who loss follow up at least 3 times but there wasn't found presenting coverage and improving diabetes outcome.

2.2 Diabetes

Diabetes has defined as a metabolic disorder of multiple etiologies– a syndrome or a collection of disorder, clarified by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from detects in insulin secretion, insulin action or both. Given that a collection of disorders with a spectrum of etiologies are put together under one clinical term, it's not surprising that the effects of are also diverse, with a range of possible long term damages, dysfunctions and failures of various organs. The symptom that diabetes may present, such as thirst, polyuria, blurring of vision and weight loss, are various and neither obligatory nor specific. In its most severe forms, ketoacidosis or a non-ketosis hyperosmolar state may develop, but often symptom are not severe or may even be absent, and consequently hyperglycemia sufficient to cause a pathological and functional changes may be present for a long time before the diagnosis is made. The long term effects of diabetes again include a variety of complication that progressively develop, such as retinopathy (the most specific medical complication), nephropathy, neuropathy or feature of automatically dysfunction including sexual dysfunction. In addition people with diabetes are increased risk of cardiovascular, peripheral vascular and cerebrovascular disease. This variation in possible causes and consequence characterized the quest to define diagnosis threshold for diabetes [44].

2.2.1 Classification and diagnosis of Diabetes

2.2.1.1 Classification of diabetes

Historical of diabetes classification has developed how to set categorized and how to classify type of diabetes since 6th century by the Indian physician Surhuta. The sweet taste of urine was indicator to detect diabetes. Recently, the latest revision of detection is based on stage of glucose tolerance with a complementary sub-categories according to type of etiology. Hyperglycemic is characterized of diabetes which is result from defects in insulin secretion or insulin action or both. Hyperglycemia could be sub-categories regardless of the underlying cause by staging as explanation in table 4.
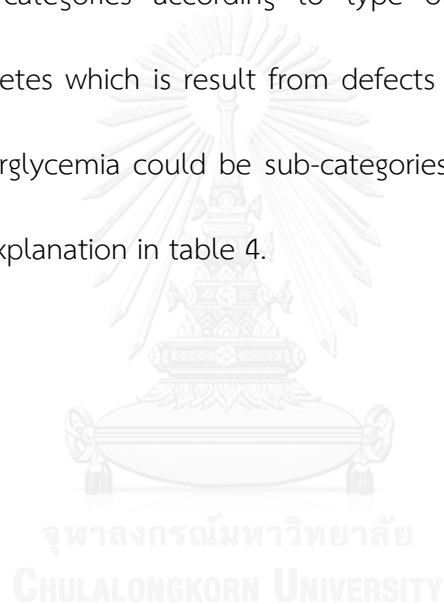
Table 4 Disorder of glycaemia etiological types and stages for classification of diabetes

Stages / Types	Norm glycaemia	Hyperglycemic			
	Normal glucose regulation	Impaired glucose or Impaired Fasting glucose	Diabetes Mellitus		
			Not insulin requiring	Insulin requiring for control	Insulin requiring for survival
Type I	←				→
Type II	←			→	
Other specific type*	←			→	
Geslational diabetes**	←			→	

* Event after present ketoacidosis, these patient can briefly return to normal glycaemia without continuous therapy.

** In care instance, patient in these categories may require insulin for survival.

World Health Organization. Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycemia: Report of a WHO/IDF/ Consultation WHO, Geneva, 2006.

From table 4 was present the classification of glycemic disorder. As additional subtype are discover, it is anticipated that they will be reclassified within their own specific category. Determining the classification in term of etiology allows the identification of the detect or process that lead to diabetes .Type 1 diabetes due

to beta-cell destruction, usually leading to absolute insulin deficiency detection as autoimmune and Idiopathic. Type 2 diabetes due to rage from predominantly insulin resistance with relative insulin deficiency to a predominantly secretory defect with or without insulin resistance. In addition other specific types are include genetic defect of beta-cell function, genetic defect in insulin action, disease of exocrine pancreas, endocrinopathy, drug or chemical included, infection cause diabetes; e.g. congenital rubella, uncommon form of immune-mediated diabetes and other genetic syndrome sometime associated with diabetes. The last type of diabetes is Gestational diabetes due to the former categories of gestation impaired glucose tolerance and gestational diabetes [44] .

2.2.1.2 Diagnosis of Diabetes

Diabetes can be diagnosed on any of the following World Health organization (WHO) criteria as below.

1) Fasting plasma glucose (FPG) ≥7.0 mmol/l (126 mg/dl) or

2) 75 g oral glucose tolerance test (OGTT) with FPG ≥7.0 mmol/l (126/dl) and/or 2 hour plasma glucose ≥11.1 mmol/l (200 mg/dl) or

3) Glycated hemoglobin (HbA1c) ≥6.5% / 48 mmol/mol, or

Random plasma glucose ≥11.1 mmol/l (200mg/dl) in the presence of classical diabetes symptoms.

4) Asymptomatic individuals with a single abnormal test should have the test repeated to confirm the diagnosis unless the result is unequivocally elevated.

5) Where a random plasma glucose level ≥5.6 mmol/l (≥100 mg/dl) and < 11.1 mmol/l (< 200 mg/dl) is detected, a FPG should be measured, or an OGTT performed, or an HbA1c measured.

6) Use of HbA1c as a diagnostic test for diabetes requires that 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.

HbA1c test is measure an average accumulated level of blood glucose back to previous 3 months in patient with diabetes. The reason why measurement back to previous 3 month due to catch up of hemoglobin in red-blood cell taking approximately 3 months. HbA1c is useful for evaluation the effective of treatment or self-care management than FPG that is immediately checking level of blood glucose. The benefit of HbA1c can be used to explain the effect of current blood glucose condition. The association between percentage of hemoglobin A1C average converting into mean of blood glucose which could be estimated blood glucose level in either mg/dL. or mmol.L show in table 5 [45].

Table 5 The rate of Hemoglobin A1C compare with mean of plasma glucose

Percentage of Hemoglobin A1C	Mean plasma glucose	
	FPG mg/dL.	FPG mmol/L
6	126	7.0
7	154	8.6
8	183	10.2
9	212	11.8
10	240	13.4
11	269	14.9
12	298	16.5

American Diabetes Association. (2014). Standards of medical care in diabetes--2014. Diabetes care, 37, S14 [33].

2.2.2 Diabetes Mellitus Type 2 (T2DM)

    2.2.2.1 Risk factor of T2DM

        In comparison of diabetes mellitus type 2 (T2DM) and type 1 are large effecting from unhealthy lifestyle choices leading to obesity that is most found in adult afflicting 90-95% (American Diabetes Association, (2012). Recently, it was one of core factor influencing type 2 diabetes. In addition certain factors increase the risk such as 1) Weight. Being overweight is a primary risk factor for type 2 diabetes. The more fatty tissue leading more resistant cells become to insulin. 2) Fat distribution, if body stores fat primarily in abdomen increasing risk of type 2 diabetes is greater than

body stores fat elsewhere, such as hips and thighs. 3) Inactivity, the less active are greater risk of type 2 diabetes. Physical activity helps to control weight, uses up glucose as energy and makes cells more sensitive to insulin. 4) Family history, the risk of type 2 diabetes increases if parent or sibling has type 2 diabetes.5) Age, the risk of type 2 diabetes increases in older, especially after 45 year aged. That's probably because people tend to exercise less, lose muscle mass and gain weight as they age but type 2 diabetes is also increasing dramatically among children, adolescents and younger adults. 7) Gestational diabetes, developed gestational diabetes when women pregnant may be get risk of developing type 2 diabetes or gave birth to a baby weighing more than 9 pounds (4 kilograms), its also at risk of type 2 diabetes. 8) Polycystic ovary syndrome. For women, having polycystic ovary syndrome — a common condition characterized by irregular menstrual periods, excess hair growth and obesity — increases the risk of diabetes [46].

2.2.2.2 Complication of T2DM

Treatment Goal of type 1 and type diabetes preferred to manage blood glucose level or self-care management for preventing complication [33]. The effects of diabetes include physiological changes leading to complications, suffering with the symptom and quality of life. Uncontrolled diabetes is associated with devastating long-term complications leading the development of retinopathy, nephropathy, neuropathy, and non-traumatic amputations. Furthermore the severe complication also have a significantly increased risk for cardiovascular and stroke

usually related to hyperglycemic induced macro vascular changes. Higher incidence

rate of hypertension in patient with T2DM is more likely due to end stage renal disease

requiring dialysis or renal transplantation. The long-term complication related to

sustained hyperglycemia or uncontrollable blood glucose level in long-life [22] .

Diabetes mellitus is a major health care burden as the disease causes a

range of complications. Diabetes mellitus leads to other health problems such as

chronic kidney disease, cardiovascular disease and stroke [39] causing chronic

problems and early death. The complications of Type 2 diabetes result in loss of

physical capacity and quality of life [47]. This causes a burden on the national

economic as the health care expenditure needed to care for people with diabetes and

its complication is high. In 2008, the total cost of diabetes and its complications in

Thailand was 418,696 USD for reducing this burden, strategies to prevent diabetes

complications need to be addressed [48].

2.2.2.3 Diabetes mellitus type 2 management

Diabetes management, subsequently, healthcare providers'

interest in promoting medical management and diabetes self-management behaviors

to improve glycemic control escalated [49]. In addition, the physical effects of

diabetes-related complications can negatively affect the perceptions of quality of life

for individuals with T2DM. The demands of trying to improve glycemic control by

adjusting insulin and incorporating diabetes self-management practices into an already

busy life is perceived as challenging [50]. Quality of life in patient with T2DM has substantial effects on diabetes self-management behaviors. Higher perceived of quality of life is engage the positive health outcome for improving glycemic control. This point is challenge and diminished quality of life issues which found the estimated 10 to 24% of individuals with T2DM developing a major negative mental health [51]. Furthermore, having a diagnosis of major depression is linked with not performing diabetes self-management behaviors and subsequently a worsening of glycemic control [52]. From the significant problem of T2DM was the large proportion of problem in the large population than diabetes type 1. Especially in older adult and elderly patient with T2DM are become to the severe problem of public health in the future more than recently. Moreover, several countries were predicted to be aging society next 10 year. Strategies setting to reach achievement of diabetes management had to applied theories and integrated variety of strategies and technique.

2.3 Strategies to improve diabetes outcome

2.3.1 Public health strategies to prevent and control diabetes

Centers for Disease Control and Prevention (CDC) has summarized the evidence based of strategies application supporting the positive diabetes outcome into 4 level of the outcome and two pathways including primary prevention of diabetes and diabetes care that was structure of Logistic model of Public Health Strategies. Two components were established to explanation Public health recommendation strategies for diabetes outcome. Primary prevention of diabetes include strategies in boxes 1 to

4 , 5, 6, 9 and diabetes care include 1 to 4 , 5, 7, 8, 10&11,12&13. Logistic model of public health strategies divided for 3 outcome; Short-term outcome (box 1-4), intermediate outcome (box 7,8) ,long-term outcome (box 9-12) and impact outcome (box 13) [Center of Disease Control and Prevention (CDC), (2013)]. This study was applied strategies in short-term and intermediate-term into procedure of study to increase controllable blood glucose level.

The DDT model including 2 pathway: Primary prevention of diabetes (Boxes 1-4 5→ 6 → 9) Diabetes care (Boxes 1-4 → 5 → 7 → 8 →10&11 → 12&13)
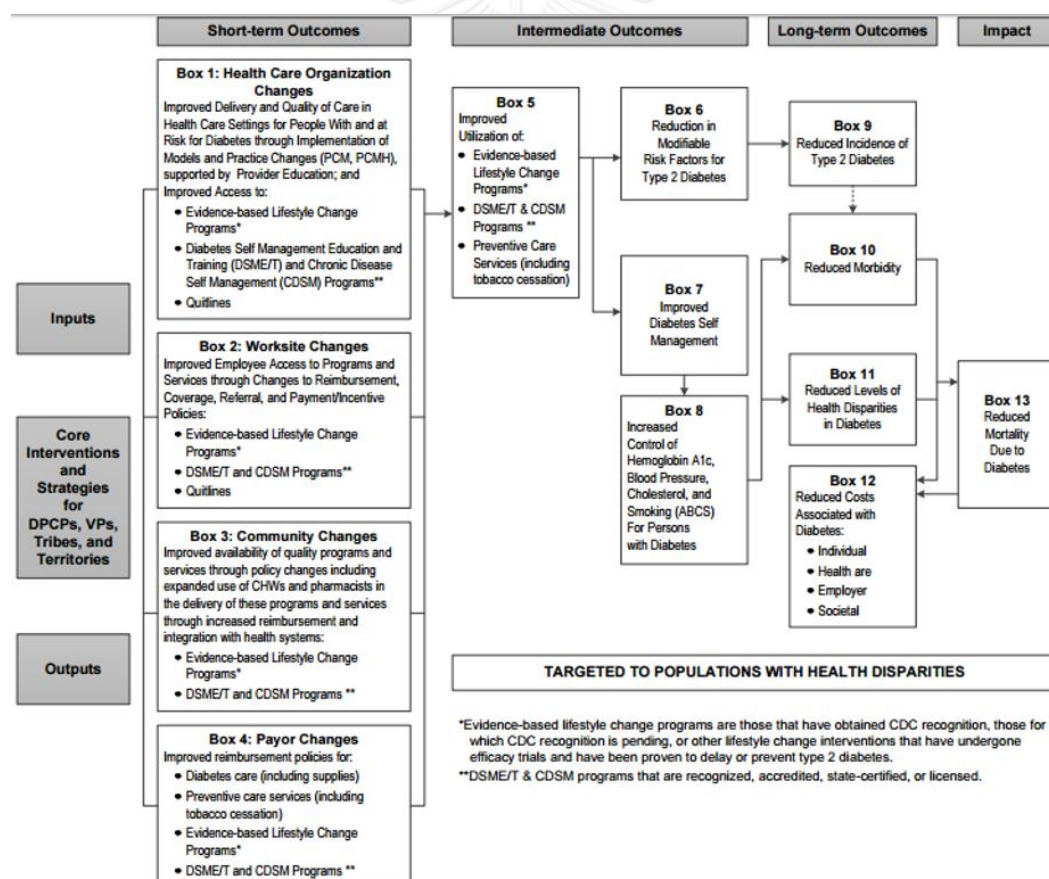
Figure 5 Logistic Model for Diabetes Prevention and Control Program Grantee.

2.3.2 Global guideline for people with T2DM 2014

Another recommendation strategies for improving diabetes outcome from World Health Organization(WHO) was occurred regularly of diabetes care for people with T2DM including self-management (control blood glucose ,self-monitoring life style) ,education approach and psychological care as show in table 6.

Table 6 A summary of the assessments to be performed at Annual Review (or annually) for each person with type 2 diabetes

Assesment topic	Guideline session
1. Self-care knowledge and beliefs	Education approach
2. Lifestyle adaptation and wishes (including nutrition, physical activity, smoking)	Life style management
3. Mental health status	Psycholigical care
4. Self-monitoring skills and equipment	Self-management (self efficacy,self-care activities)
5. Weight controlling	Life style management
6. Blood glucose control	Glucose control levels; Clinical monitoring; Glucose control therapy
7. Reducing risk of complication	Integrated self-monitoring, education, life style management ,controlling glucose blood level

2.3.2.1 Diabetes self-management (self-efficacy and self-care activity)

Self-management refers to the individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition [53] . It was involed self-efficacy as people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances. Confidence in one's ability to manage daily selfmanagement behaviors is required to achieve expected health outcomes [54] . Perceived self-efficacy is crucial to encourage, empower, and judge beliefs in personal capability for diabetes self-management activities [54] . The successful mastery and performance of self-management skills is a result of development of self-efficacy beliefs in diabetes patients by becoming partners of physicians and health care providers [55]. Studies showed that self-efficacy positively influences health behaviors in patients with diabetes [49], [56], [57]. Conclusion that both of self-management and self-efficacy were encuraged the positive health outcome and diabetes outcome. It was reason to consider self-efficacy level in T2DM patients to reach achievement of diabetes management.

Several studies were identified self-efficacy as a strong predictor of adherence across all self-care activities in patients with diabetes (King et al., 2010; McCaul et al., 1987). High self-efficacy in self-care activities was identified as having a positive relationship to self-management behaviors. Confidence in problem solving and social skills was significantly associated with self-care adherence in adolescents,

but not in adults with T1DM [57]. The extensive study by Glasgow showed that adults with T2DM were highly confident 70.0-80.0% in medicine use, self-monitoring blood glucose (SMBG) , and diet , but confidence in performing exercise was lower (59%). People with higher self-efficacy were better able to perform their self-management behaviors [56]. In a study by Sarkar in T2DM patients with low health literacy, for every 10% increase in self-efficacy score, patients were more likely to report optimal diet (0.14 day more per week, 95% CI = 0.06-0.23), exercise (0.09 day more per week, 95% CI = 0.015-0.18), self-monitoring blood glucose (odds ratio 1.16, 95% CI = 1.03-1.31) and feet care (odds ratio 1.22, 95% CI = 1.10-1.41), but not medication adherence (odds ratio 1.10, 95% CI = 0.94-1.20). This association was similar for all races/ethnicity and health literacy levels [58]. As confidence of their practices increased, people with diabetes had better self management behaviors in a variety of people with different race/ethnicity, education and socioeconomic status [59].

There are many strategies to improve self-efficacy in diabetes patients. In non-attending-school populations, there are studies on the effects of interventions that have reported both improvement [60] [61] [18] and no improvement on self-efficacy [62] [63]. Multimedia lessons for diabetes education through a computer kiosk improved perceived susceptibility to diabetes complications [62], but self-efficacy was still unchanged at 1-year follow-up. Seligman was studied whether notifying physicians of their patients' limited literacy affected patient self-efficacy. Self-efficacy was similar in both control and intervention groups [64] . In contrast, Wallace et assessed the impact of providing patients with a literacyappropriate diabetes education guide accompanied by brief counseling session at baseline and by telephone at 2 and 4 weeks follow-up. Self-efficacy was improved, and this improvement was similar across

literacy levels for English-speaking patients, but not for Spanish-speaking patients [18]. In a three-arm practical clinical, randomized, controlled trial including an automated telephone self -management program and a group medical visit program compared to usual care, both intervention arms improved self-efficacy more than usual care. Bernal study reported an adult T2DM patients whom had received diabetes classes and home visits shown risen in sense of self-efficacy, particularly related to diet and insulin self-efficacy [65]. One study in Thailand showed that family support facilitated cardiovascular disease patients' self-management activities and confidence in self-management practices [66]. People who have strong self-efficacy often perform self-management better; thus, this issue should be examined in people with diabetes.

Diabetes self-management is important for optimal glycemic control and delays diabetes complications. Developing self-management skills is necessary to help people with diabetes achieve the goals of diabetes management. In the proposed study, we were selected factors, including people's diabetes knowledge, Buddhist beliefs, social support, risk perception for developing complications, and self-efficacy, that have been observed to have a noticeable impact on self-management behaviors in various populations. Little is known about the impact of these factors on self-care behaviors among Thai population. Little evidence is available about how people with diabetes manage their diabetes and factor influencing self-management behaviors in target population. The proposed study was designed to fill this gap.

2.3.3.2 Diabetes Self-Management Education and Support

Diabetes self-management education is formally defined as a collaborative and educational process in which individuals diagnosed with diabetes or who are risk for diabetes are able to gain the knowledge and skills necessary to modify

behaviors and successfully perform diabetes self-management behaviors leading to improved overall physical and mental health [67]. It was recommended to be taught in physical activities, eating behavior, drug adherence prescribed medication regimen, self-monitoring of blood glucose, enacting diabetes problem solving skills, reducing risks of complications, and adapting psychosocially to living with diabetes. Diabetes self-management support encompasses activities that assist persons with type II diabetes in implementing and sustaining the behaviors needed to manage their condition on an ongoing basis beyond the formal DSME [31].

It is widely accepted that diabetes education is an important component of care [68]. Diabetes is a lifestyle disease that requires the person living with the disease to self-manage and make numerous daily decisions regarding food, activity and medications. It also necessitates that the person be proficient in a number of self-care skills, like blood glucose monitoring if appropriate, foot examination and taking medications [69]. Education in the broadest sense underpins diabetes care, at every contact between the person with diabetes and the health-care team. This has made it difficult to isolate those aspects of education which best contribute to its effectiveness. Despite the evidence supporting the effectiveness of diabetes self-management education(DSME) has increased dramatically [70]. In addition a meta-analysis of DSME studies was done by Norris presenting 0.8 % of T2DM patients immediatly reduction of HbA1c while at the end of DSME delivered actions present reduction of diabetes-related complications. It was translated of DMSE into a significant clinical benefit. Contact time with an educator was the only significant predictor of reduction in HbA1c. Unfortunately the benefits are not sustained and decrease 1-3 months later indicating on-going support is necessary [68] [70] .

2.3.2.3 Guideline of diabetes self-management education

People with T2DM probably have unhealthy lifestyles shading to eating and physical activity behavior which influence their health problem. It is necessary for helping soon after diagnosis to consider how they may modify lifestyle in ways which enable them to take control of their blood glucose, blood lipid and blood pressure, even if they also require pharmacokinetic therapy. Self-management is core strategy offering advisory how to prove life style for healthy status to all people with T2DM all time period and therapy. Essential information are recommend from International Diabetes Federation (IDF) in update version as follow. Provided and reminder healthy life style for all people with T2DM. Find out historical of life style influencing unhealthy and engagement often time in treatment and follow up period. Find out historical barriers of self-management for good health life style and provide ongoing counselling and assessment as a routine, or more frequency when medication are changed.

1) Advise people with type 2 diabetes that lifestyle modification, by changing patterns of eating and physical activity, can be effective in controlling many of the adverse risk factors found in the condition.

2) Provide access to a dietitian (nutritionist) or other health-care professional trained in the principles of nutrition, at or around the time of diagnosis, offering an initial consultation with follow-up sessions as required, individually or in groups.

3) Individualize advice on food/meals to match needs, preferences, and culture.

4) Advise on reducing energy intake and control of foods with high amounts of added sugars, fats or alcohol.

5) Match the timing of medication (including insulin) and meals.

6) Provide advice on the use of foods in the prevention and management of hypoglycemia where appropriate.

7) Introduce physical activity gradually, based on the individual's willingness and ability, and setting individualized and specific goals.

8) Encourage increased duration and frequency of physical activity (where needed), up to 30-45 minutes on 3-5 days per week, or an accumulation of 150 minutes per week of moderate-intensity aerobic activity (50-70% of maximum heart rate).

9) In normally of contraindications, encourage resistance training three times weekly.

10) Provide guidance for adjusting medications (insulin) and/or adding carbohydrate for physical activity.

Self-management is regularly effect to daily life of people with T2DM and significantly leading to develop diabetes disease and complications. Components of DSM consist of healthy eating, dietary behavior and physical activity, adherence medication regimens, and blood glucose monitoring [28]. There were evidence support that focusing on clinical-based treatments due to ineffective diabetes outcome. Several studies has found the integrated self-management empowerment in community-based interventions improving health behaviors and health outcomes [71] 2010). Moreover, the effective of self-management should be attain a highest level of

healthy or well-being in people with NCDs in their life. According to Chururuk study had found elderly with T2DM attention to self-management on physical, psychological and spiritual dimensions following the treatment regimen were remain healthy physical status as reduction blood glucose level. Severity of diabetes symptom are effect to awareness of people for focusing self-management [72].

However, diabetes management are not achieve from application only one strategies or adherence this guideline are not enough to improve diabetes outcome. Health care provider had had to concern variation of the different of characterized, cultural and individuals' potential. The intervention or model of intervention have been developed based on the priorities of problem ,culture , ability to gain the good knowledge ,understanding , accessing the information, interpretation the information in correct way , influencing factors and needs of people with T2DM.

2.3.2.4 Measurement of diabetes self-management

The American Association of Diabetes Educators (2008) identified seven key diabetes self-management behaviors: physical activity, healthy eating, blood glucose monitoring, medication taking, reducing risks, problem-solving, and positive coping skills. Recommends all individuals with diabetes engage in diabetes self-management practices that will support glycemic control. For this study, 1) Healthy eating (High sugar, Cholesterol, Salty food consumption) 2) physical activity 3) risk-reduction behaviors: Smoking ,alcohol consumption 4) Medication 5) Foot care measured behavioral outcomes [33] [73] [74].

Conclusion previous evidence support as mention above were recommend that patient who adhere to self-care practices have a good metabolic control, low emotional distress, and good quality of life when compare with patients

who do not adhere (Glasgow et al.,2001). Patients with diabetes should be responsible for their self-management according to diet, exercise, self-monitoring, foot care, and mediation taking. The Summary of Diabetes Self-care activities (SDSCA) developed by Toobert & Glaslow since 2001 was applied in Thai version by Paweena Keerayutwong was used to measure diabetes self-care activities [75]. The questions also ask about diabetes self-care activities during previous 1 month [76].

2.3.3 Health Literacy

Health Literacy" is the one of the most effective for improve health outcome that has apply in public health for long time . The concept of Health literacy" first appears in the Health Promotion Conference 1974 and probably worldwide. The definition was clarified on variations of concept through its was defined by The World Health Organization (WHO) in 1998 [77]. In addition there was not only definition clarified but also suggestion the strategies to promote knowledge of public health and improve potential healthy management. Furthermore, health literacy was found in public journal that indicated critical of health promotion in public health policy concerning and advertising mass media. The argument of complicated health information among patients, health providrs and the public is often described as health literacy. Low health literacy is usual related with healthcare processing and focusing to health outcomes. In diabetes mellitus (DM), health literacy is associated with knowledge of DM, self-efficacy and self-care activities and blood glucose controlling. Health literacy always due to a better understanding of racial disparities observed in

patients with diabetes. Strategies to improve health literacy, based on understanding role of its, provide a meaningful of high potential of self-care management [14]. However, recently there are several definition of health literacy which focus the difference aspect and focal point in public health experience.

2.3.3.1 Definition of Health Literacy

The review of health literacy definition were seen variety definition has preferred for extensive use as a way to resolve the problem of health promotion in the all country appeared in studies and articles in region .The World Health Organization was defined the definition of health literacy as Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health in [77]. The recommendation use this concept to develop health promotion in public health coming in the member countries of WHO. After that, health Literacy has been found and usually denote a crucial of health promotion consideration developing. However, explanation of health literacy definition appear verities aspect and shading point. Its might be make a difference understanding, experience of academic. This study have to focus on the definition which relevant the topic and the objectives consist of the list as follow. World Health Organization (WHO) was defined as health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health [77].

The Ad Hoc Committee on Health Literacy for the Council of Science Affair of the American Medical Association (AMA.,1999) has defined as all skill which include basic skill; reading and calculation essential for promoting and remain healthy [78]. United State Healthy People concept had preferred the definition as the level of ability of individuals in gathering, clarifying or making an understanding of basic information or service information that is essential for making a decision in promoting health. Institute of Medicine (IOM) (2004) has clarified as a level ability of individuals in receiving fundamental management. Explanation from Institute prefer health literacy depend on individual skill in confronting particular health condition, health care system, social and cultural, factor at home , factor at work and within community. Don Nutbeam (Nutbeam, D. 2000, 2008, 2009) has defined that (a) Health Literacy was; knowledge, understanding and social skill that determine individual ability in accessing, making understanding and utilizing information for making good health. It consist of knowledge development, understanding in health context, changing attitude and motivation for moving themselves to have healthy behavior (2000), (b) capacity of individual in accessing, understanding, evaluating, utilizing and good communication health-related information at their need and requirement for health promotion and long-term well-being (2008), (c) social skill and analysis that determine the motivation and ability of individual in accessing understanding and utilizing health-related information for health promotion and health care [79] [80] [81]. Zarcadoolas defined as the skill influencing individual's ability in evaluation public health information as a guideline in reducing

health risk and increasing quality of life [82]. Kickbush, Maag and Sann had defined as ability in making decision for health related aspect in daily life and searching information useful for health care [83]. Pleasant and Kuruvilla had given explanation as an ability in searching, making and understanding, analyzing and utilizing health-related information for appropriate health concerned decision making for good health and reduction of inequality of health care [84]. Ishikawa et. Al. has defined as an individual ability in accessing, understanding and utilizing health related information for appropriated health concerned decision making [85]. This study was applied integrated definition all of the list and following health literacy level which had written an article publication by the Faculty of Public Health Science and Community Medicine, University of Sydney, Australia. A publication article as topic A challenge for contemporary health education and communication strategies in health 21st century. Health literacy in this paper was clarified health literacy into 3 level as follow. Functional health literacy refer to skill of listening, specking, reading, and writing as basic skill that are essential to make understanding and practices of daily life. Additional it is ability in applying reading and numeric skill such as reading consent form, medical label, writing about health care, making an understanding of both written and oral information given by doctor, nurse or pharmacist, including behavior according to suggestion from physician such as having pills, making an appointment [83]. Communicative interactive health literacy refers to literate in basic health, cognitive and social skill used in participating social activities and selecting update information

for improving health behavior. Critical health literacy refers to higher cognitive and social skill; ability to apply NEWs and information based on analysis and comparison; ability to manage daily situation. This type of health literacy is shown through individuals' judgments and action, participation in moving the society and policies in their living. This is linkage between individual benefits and society and public health.

2.3.3.2 Health Literacy concept

The summarized preferred 7 core of practical points to understanding concept of health literacy. (1) Multiple definitions exist for health literacy but the core concepts include skills needed in order to obtain, process, understand and communicate specific health information. Literacy includes not only print and oral literacy but numeracy, cultural and conceptual knowledge. (2) Health literacy includes the interaction among patients, providers, systems and environment factors. (3) There are limitations to the measurement of health literacy in both research and in the clinical setting. There is no best method agreed upon at this time.(4) Health literacy is significantly related to diabetes knowledge, self-efficacy and self-care; however, the associations between health literacy and glycemic control are verities. Numeracy might have a stronger association with diabetes outcome than health literacy. (5) Racial disparities in glycemic control are in part explained by numeracy. (6) Individual educational resources to facilitate patient–provider diabetes communication have been tested in randomized controlled trials including patients with limited literacy skills. (7) Use of information technology is attractive; however,

there is limited information available regarding the efficacy and burden among limited

literacy patients with diabetes.

The health literacy skills concept hypothesizes the relations

between health literacy and health-related outcomes and depicts how health literacy

functions at the level of the individual. The conceptual framework of health literacy

also present the relationship of threes level and health outcome that was modified

from integrated definition and model by individual (e.g., family, setting, community,

culture, and media) influence the constructs and relations represented in the

framework.
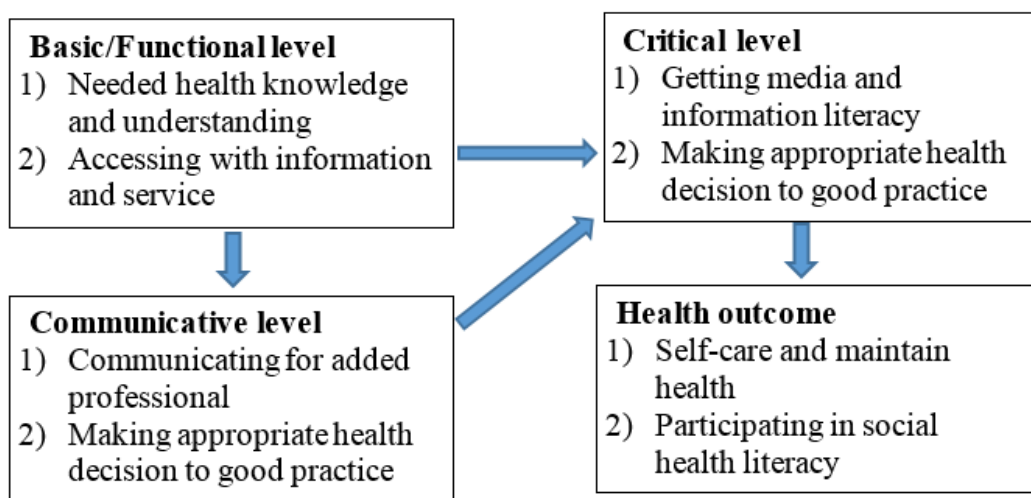
Figure 6 Concept for construct model of relationship between three level of health
literacy and health outcome

2.3.3.3 Health Literacy measurement

As with the definition, a variety of tools to measure health literacy and numeracy have been developed. Most of them are preferred for measuring characterized of memory, calculation and media reception evaluation. Some instrument widely used in adult are following.

1) Rapid Estimate of Adult Literacy in Medicine: REALM is the measurement tool for testing ability to read and write of patients in primary care units, for health education and medical research units included 125 words. This tool was designed for testing of reading technical terms of health, in order to check patient's memorized essential related term of health. Next version was develop for shortened test including 66 words as S-REALM. And the last type was develop in shortened version of REALM (REAM-R). This version consist of eight words for reducing the time for testing that is appropriate for older or elderly patients.

2) Test of Functional Health Literacy in Adults (TOFHLA) used to measure an ability of patients in reading statement or messages or phrase containing number on printed publication given by health care unit. It has two version, first version consist of 2 part; reading test preferred content related to right and responsibilities of patients and willingness of inform contents related to detail on prescription, blood glucose control, appointment and financial support. Second version, S-T TOFHLA was developed for reducing the time spent to administration the tool including 36 items.

The range of score for interpretation as 0-16 as inadequate, 17-22 marginal and 23-26 adequate.

3) Three level Health Literacy Scale was used to measure functional, communicative and critical health literacy. It consist of 3 components of questions; 1) basic health literacy compose of 5 question, 2) interactive health literacy compose of 5 questions and reflective health literacy compose of 4 questions. In this study will be use this tool to measure level of health literacy including 3 level.

In this study was applied health literacy measurement tool which was modified by collaboration between Behavioral Science Research Institute and Health Education Division, Ministry of Public Health Thailand which was shown reliability Cronbach's alpha-coefficient between 0.611 to 0.912 in 6 components.

2.3.3.4 Toolkit to enhance patient–provider communication for limited of health literacy

Although there are many resources available in brochure, fact sheet and web-based formats to deliver information to patients with diabetes, the complexity of the content, including the reading level of the text, often surpasses the skill of patients and presents a barrier for information delivery to those with low health literacy. Recently, several diabetes materials have been developed specifically to address low health literacy and to be used interactively between patients and providers to promote patient understanding, empowerment and improved self-efficacy with self-care behaviors. Review literature are existing solution as follow.

(1) Hill-Briggs F, Smith AS had evaluated American Diabetes Association (ADA) and American Heart Association (AHA) print education materials for accessibility and usability characteristics. Most of print were used for transfer the information of diabetes management. Materials were evaluated 23 addressing literacy demand and 9 addressing behavioral activation, compiled from authoritative sources on development of low literacy consumer health information. Finding, show the criteria most frequently achieved were: text case, use of cues (e.g. bullets) to emphasize key points, design of graphics/illustrations, some provision of how to information, and positive depiction of cultural images. Criteria least consistently achieved were reading grade, word usage (e.g. scientific jargon), sentence length, font size, line length, white space, visual organization, limited scope, clear and specific (e.g. step-by-step) behavioral recommendations, and demonstration of audience relevance and cultural appropriateness [15].

(2) David Kerr had assessed readability of information provide for patients with type 2 diabetes on drug treatment for their condition. Assessment had included information published on web site compare with information from three newspapers in the same day in hospital-based diabetes center. The author found that information provided for patients and medically related articles from two of three newspapers had suboptimal readability, requiring literacy skills well above the UK average [86].

The efficient of alternative way provided based on readability and assess ability of patient could be the better for patients who were limited literacy skill.

(3) Maria C.E. Rossi study had found wide spread use of carbohydrate counting is limited by its complex education. A randomized control trial compared a Diabetes Interactive Diary (DID) with standard carbohydrate counting in terms of metabolic and weight control, time required for education, quality of life, and treatment satisfaction. The DID has been use as a new telemedicine system enabling flexible diet and insulin therapy. The finding of this study concluded DID is at least as effective as traditional carbohydrate counting education, allowing dietary freedom for a larger proportion of type 1 diabetic patients. DID is safe, requires less time for education, and is associated with lower weight gain. DID significantly improved treatment satisfaction and several quality-of-life dimensions [17].

(4) Wolff K. had been approached a randomized control trail to test the toolkit format adheres to clear communication principles with a low-grade reading level, using color coding, pictures and step-by-step instructions as part of an enhanced diabetes-care program compared with standard educational materials. The effect of toolkit as DLNET reduce hemoglobin A1C in the intervention group more than those in the control group (median difference: -0.70 [95% CI: -1.10 to -0.20]; p = 0.005), but this difference was not sustained after the intervention was concluded. Recommendation for further study, strategies to enhance effective communication

between patients and providers transferring health literacy and numeracy-sensitive information need to be further studied to identify ways to improve care for patients with diabetes [87].

(5) Cavanaugh K. had implemented a randomized control trial evaluated the impact of multi-modality communication and toolkit DLNET within an enhanced diabetes care program on A1C . self-efficacy, self-management behaviors, and treatment satisfaction compare with usual care. The finding in 3 months had significant improvements in HbA1c from baseline (intervention −1.50 [95% CI −1.80 to −1.02]; control −0.80 [−1.10 to −0.30]). In adjusted analysis, there was greater improvement in HbA1c in the intervention group than in the control group (P = 0.03). While at 6 months, there were no difference in HbA1c between intervention and control groups. Self-efficacy improved from baseline for both groups. At the end, self-management behaviors and satisfaction were no differences. From research, it cloud be conclude using of materials designed to facilitate diabetes education and empower patients to effectively self-manage their condition within an environment by applying clear communication principles is a fundamental component of comprehensive diabetes care [16].

(6) Dewalt DA. Et al. (2009) . A quasi-experimental one arm to evaluate the Living with Diabetes Guide and a brief goal setting intervention to improve health behavior. They found that this program can help patients to adopt healthier behaviors.

Moreover, this study demonstrates that non-clinical personnel had been consultant for patients . Communication skill approached clearly the information based on level of health literacy and concern the sustainable of maintain health behavior are recommend for DM interactive communication. A practice may consider training nurses or other staff members to facilitate behavioral counseling using a tool like the Guide with scheduled telephone follow-up. Health literacy levels was recommend the appropriate education materials with brief counseling in primary care settings may be an effective and efficient strategy for imparting skills necessary for diabetes self-management [19].

Strategies to enhance effective communication between patients and providers transferring health literacy and numeracy-sensitive information need to be further studied to identify ways to improve care for patients with diabetes [15]. Hill-Briggs, Felicia Smith and Andrea had developed some kind of print material were achieved but a few criteria for usability by patients with low literacy, limited prior medical knowledge, and/or limited resource availability. Use of available criteria and methods for increasing reach of print education materials to these underserved patient populations is indicated. This study relevant with Cavanaugh K. and Maria in 2009 and 2011. Even though had variation of effective communication between health providers and patients not only the effective of toolkit support limited literacy but also the effective of interactive communication should be consider [16] [17]. Conclusion

support recommendation [16] [18] study preferred literacy-appropriate education materials and brief counseling in primary care settings are efficient strategy for imparting skills necessary for diabetes self-management. Similar with suggestion effective of interactive communication from Dewalt as provider or care taker have to provide DM interactive communication with explanation clearly the information on level of health literacy and concern the sustainable of maintain health behavior [19].

In addition, Pignone was same sound finding that easy-to-read materials as was a step toward empowering patients to be more active participants in their health care [88]. A health education materials, have to select those with large-font text written at or below the 5th-grade level, pictures that help explain the text, and clear headings and layout that enhance readability. Offering of important point was suggest for long time to evaluate suitability of written materials with standardized assessment tools [89]. The Suitability Assessment of Materials (SAM) method uses a set of criteria based on 22 factors within 6 categories: content, literacy demand, graphics, layout and typography, learning stimulation/ motivation, and cultural appropriateness [90]. Each factor is rated as superior, adequate, or not suitable, and the ratings can guide revisions. The Lexile Framework was a method for measuring the readability of text based on word frequency and sentence length. Scores can be translated into corresponding reading grade levels [91].

2.3.3.5 Interventions to Improve Diabetes Outcomes for People with Low Literacy and Numeracy [92].

Table 7 Interventions improve knowledge of diabetes among patients with diabetes and low literacy.

Author, Year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
Rothman et al., 2004	Pre-post, 159	I: Diabetes disease management, including educational sessions, telephone reminders, and assistance in overcoming specific barriers to care and use of specific communication techniques to improve comprehension in low-literacy populations.	• Disease management • Personalized teaching • Tools specifically targeted for low numeracy/literacy • Evidence-based treatment algorithms • Telephone counseling and reminders	A1C improvement among patients with low literacy and patients with higher literacy were no significantly difference.

Table 7 Interventions improve knowledge of diabetes among patients

with diabetes and low literacy. (cont.)

Author, Year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
Rothman et al., 200512	RCT,217	I: Diabetes disease management, including educational sessions, telephone reminders, and assistance in overcoming specific barriers to care and use of specific communication techniques to improve comprehension in low-literacy populations. C: Usual care from a primary care physician after a 1-hour educational session.	Disease management • Personalized teaching • Tools specifically targeted for low numeracy/literacy • Evidence-based treatment algorithms • Telephone counseling and reminders	- improvement Knowledge of DM in the intervention group. - Blood pressure: significant improvement in intervention versus control. -Improvements in systolic blood pressure were similar across literacy levels. - A1C <7 .0% at12-follow-up (adjusted odds ratio1.9,P= 0.05). -Improvement of A1C in patients with lower literacy in the intervention group patients (adjustedodds ratio 4.6, P = 0.02).

Table 7 Interventions improve knowledge of diabetes among patients with diabetes and low literacy. (cont.)

Author, year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
Gerber et al., 2005	RCT,244	I: Participants used an audiovisual computer kiosk to review lessons on diabetes self-care in English or Spanish. Participants were invited to use the computer as often as they would like during the following year before or after clinic visits. C: A second multimedia application with simple multiple-choice quizzes on diabetes concepts with no formal narrative instruction or testimonials.	• Multimedia education • Tools specifically targeted for low numeracy/literacy • No personal teaching	-Knowledge: no difference between intervention and control • Self-efficacy: no difference • Blood pressure: no difference • A1C: No difference except for among those with lower literacy and a baseline A1C ≥ 9%, in which there was a larger decrease in A1C in the intervention group versus the control group (–2.1 vs. –0.3%, P = 0.036)

Table 7 Interventions improve knowledge of diabetes among patients with diabetes and low literacy. (cont.)

Author, year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
Hill-Briggs et al., 2008	Pre-post, 30	I: One 90-minute education class led by a diabetes educator and an education binderadapted for low literacy.	• Group education • Tools specifically targeted for low numeracy/literacy •Personalized teaching	-Knowledge: increased for below average literacy groups (2.7 ± 1.7 to 4.7 ± 2.0, $P = 0.005$) and average (3.8 ± 1.7 to 5.7 ± 2.1, $P = 0.002$)
Ntiri et al., 2009	Pre-post, 20	I: Six group educational sessions during 3 weeks by a nurse educator.	• Group education • Tools specifically targeted for low numeracy/literacy • Personalized teaching	• Knowledge: significant increase in DM knowledge immediately following the intervention ($P < 0.01$) and 1 month after the intervention ($P < 0.05$)

Table 7 Interventions improve knowledge of diabetes among patients with diabetes and low literacy. (cont.)

Author, year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
Cavanaugh et al., 2009	RCT, 198	I: Diabetes disease management with staff instructed in the use of the Diabetes Literacy and Numeracy Education Toolkit (DLNET) to facilitate literacy- and numeracy-sensitive diabetes education and management. Two to six visits over a3-month period. C: Usual care in the diabetes disease management program. Staff not instructed in the use of the DLNET. One to six visits in a diabetes care program over a 3-month period.	Disease management •Personalized teaching • Tools specifically targeted for low numeracy/litera cy •Evidence-based treatment algorithms	Self-efficacy: improvement from baseline for both groups -Self-management behaviors: no significant improvement for either group -A1C:At 3months, both intervention and control had significant reducing in the intervention group than in Control group

Table 7 Interventions improve knowledge of diabetes among patients with diabetes and low literacy. (cont.)

Author, year	Study design	Intervention (I) and Control (C) Condition	Element of intervention	Result/Out come
				the control group. -A1c at 6 months, there were no differences in between intervention and control groups.
Kandula et al., 2009	Pre-post, 190	I: Patients viewed two 5 minute multimedia diabetes education modules on a computer.	• Multimedia education • Tools specifically targeted for low numeracy/literacy • No personal teaching	• Knowledge: patients across all literacy levels had significant increases in knowledge scores after viewing the modules (P<0.001). Inadequate literacy and adequate learned were less significantly

Self-efficacy and self-management behaviors may also play an important role in the pathway linking low literacy to worse diabetes outcomes. Low literacy may inhibit patients' ability to learn about and participate in self-management behaviors and may limit their self-efficacy—the confidence that they can carry out the recommended behaviors. A more limited number of studies attempted to measure self-efficacy or self-management behaviors. As in the case of measurement of diabetes

knowledge, there was variation among the studies in how self-efficacy and self-management behaviors were assessed. The lack of standardization in the measurement of these characteristics is an important limitation to consider in reviewing these studies.

Five studies measured the effect of an intervention on self-efficacy among patients with diabetes and low literacy. Each of these studies used a different scale to measure self-efficacy. Three studies had been done by Wallace AS and Cavanaugh showed improvement in self-efficacy scores, and two studies showed no improvement [18] [16] [93]. More personalized, intensive interventions were more likely to improve the self-efficacy of patients with diabetes than less personalized interventions. The study by Gerber et al. which evaluated a multimedia intervention for diabetes education through use of computer kiosks in clinic waiting rooms, did not find any improvement in self-efficacy scores at the 1-year follow-up [94]. Seligman et al studied the effect of notifying physicians about their patients' limited literacy before clinic visits. Patients in the intervention (physician notified of literacy) and control (physician not notified) groups had similar self-efficacy scores measured after their clinic visits [93]. In contrast, more personalized interventions did improve patients' self-efficacy. In the study by Wallace et al which assessed the impact of providing patients with a literacy appropriate diabetes education guide accompanied by an initial brief individual counseling session and two follow-up telephone counseling sessions at 2

and 4 weeks, self-efficacy scores improved after the intervention. This improvement was similar across literacy levels. Interestingly, however, self-efficacy levels improved for English-speaking patients but not for Spanish-speaking patients. Cavanaugh had evaluated the impact of providing literacy-sensitive diabetes care within an enhanced diabetes care program. Patients were randomized to an existing enhanced diabetes care program (control group) or to an enhanced diabetes care program that addressed literacy and numeracy (intervention group). Self-efficacy improved from baseline at 6 months for both control and intervention groups, but there was no significant difference between the groups. Schillinger et al. performed a three-arm, randomized, and controlled trial including an automated telephone self-management program, a group medical visit program, and usual care. Both intervention arms improved diabetes self-efficacy more than usual care.

Self-management behaviors, several studies measured the effect of an intervention on self-management behaviors among patients with diabetes and low literacy. They found that focused interventions specifically on goal setting and action plans, and the interventions resulted in an improvement in self-management behaviors [19]. In the difference one did not specifically address goal-setting and did not result in improvement in self-management behavior [60]. Addition support the event some study compared the effect of two different self-management support strategies. Patients were randomized to weekly automated telephone disease management with nurse call-back if needed, monthly group medical visits, or usual care. The measured outcomes were the self-reported number of action plans created and the percentage

of action plans achieved. Both interventions engaged a majority of participants in action planning, but interestingly, weekly automated telephone disease management yielded higher engagement, especially among patients with lower literacy and limited English [16]. In another study 9,10patients were provided with a literacy-appropriate diabetes education guide accompanied by an initial brief individual counseling session and two follow-up [18] [19].

2.4 Diabetes Quality of Life

Quality of life (QOL) has been recognized as an important health outcome that become a critically important concept for health care in recent years. The WHO QOL Group had defined as individual's 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. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, and their relationship to salient features of their environment. Individuals are the only proper judges of their quality of life, because people differ in what they value [95]. The characteristic of QOL are subjective, multi dimension nature including physical, psychological, social and spiritual and address individual's perceptions of both positive and negative dimension [96]. The demand of diabetes self-care and diabetes treatment can have a significant impact on many aspects of quality of life. In addition, the frequency of diabetes symptoms, the number of comorbidity beside DM and family income could predict quality of life in T2DM

diabetics. Moreover, characteristics were significantly related with diabetes quality of life such as gender, age, income, marital status, household size and the number of comorbidity [23] [24].

The specificity of diabetes quality of life questionnaires has an advantage over more general measures of QOL. The Diabetes Quality of Life (DQOL) measurement was developed in the early 1980 for using in the Diabetes Control and Complication Trail [97]. DQOL purposely allowed for broader application to patient with T1DM and T2DM. It was conceptualized as measuring the patient's personal experience about the burden of particular treatment, satisfaction with life and diabetes treatment and the impact of diabetes on their social life. It was modified from predictive of self-care and satisfaction as composing of 26 items as the old one in 2004. The revision was construct the Diabetes Quality of Life (DQOL) Short-From Clinical inventory consist of 15 items for T1DM I and T2DM while reported reliability 0.78-0.92 . However, recommendation to exclude one items as   feeling pass out of them for T2DM. This study was applied to measure DQOL including only components related to satisfaction with treatment and impact of treatment that applied Thai version by Srithongsuk D.in 2005 [29] [98].

2.5 Component and Theories application for Diabetes management

2.5.1 Explanatory Model of disease

Previous studies show that, there are strong areas of convergence of lay ideas and expert medical ideas that bode well for developing interventions that will be understood and accepted by the research communities. Otherwise, there are areas of divergence, principally in the areas of culture and self, which present challenges for

intervention strategies. Furthermore, improving diabetes interventions will require technical input from anthropological and psychological models of illness experience, prioritized to offer understanding of competing sociocultural and subjective theories that may undermine healthy self-care and diabetes management. The content and mode of communication of current biomedical information on diabetes prevention and treatment need revision. The narratives of research participants suggested that information was not standardized, which in turn complicated patients' ability to manage their diabetes, especially dietary practices. In the absence of appropriate medical knowledge of the complications of diabetes, some individuals self-medicated in ways that increased their risk of complications. Furthermore, there was a strong perception of the negative influence of poverty on treatment adherence. Poverty undermined treatment adherence in at least three ways; (1) preventing individuals from buying and using diabetes care products which are essential for regular monitoring of blood glucose status; (2) affecting the ability of individuals to purchase and eat the recommended foods; and (3) limiting access and use of medicines in the recommended appropriate dosages. Thus, interventions to improve treatment adherence have been informed by an understanding of the way poverty structures every day [73] [99] [100].

The cultural in the community have accumulated knowledge and beliefs about explanation of how disease happen and how to cure them. This concept is

established by Klienman Explanatory Model of Illness (EM). The model is the process was used in exploring causes races and nationalities that given the different meaning of illness and health status within the different cultures. For instance, Thai people may belief that diabetes was an outcome of what a person had done bad thing in the past life; several believes that they can know whether a person who has diabetes from person's urine swarmed by ants [101]. However, patient's Explanatory model of disease is meaningful as a reflection of their experience of illness and surrounding condition, norm, cultural of resident or characterized of their communities. They give an explanation of "what disease do they have?" "Why they are get sick or have an illness symptomatic?" "How to control or treat their sickness or illness symptoms?" and "why some are sick but other are not sick or ill?"[102] [103].

2.5.2 Communication for improving diabetes outcome

Facilitating patients' performance of diabetes self-management behaviors is a challenging and on-going endeavor for healthcare providers especially when many patients seem reluctant to engage in the recommended health behavior changes. Several studies suggest the relationship between a provider and patient is an important factor in the health behavior change process [104]. For some providers espousing a traditional or paternalistic role may try strategies such as demanding, shaming, or scare tactics to make the patient change, however these are typically ineffective. The literature suggests that for most people, these strategies do not effectively yield lasting or desired behavior changes and may create a defensive

attitude by the patient. Developing relationships that are direct, honest, supportive and non-judgmental are more likely to create a foundation for health behavior change . Patients typically want a relationship with their provider that is professional yet supportive where they can be involved with decisions affecting them. Moving from the traditional focus of advice giving to developing skills for a counseling-based approach may be more effective [105] [106]. Unclear information for diabetes management lead to poor outcome in patients with T2DM who were present limited of health literacy. It is very important point concerning to set up model, intervention for encouraged them based on health literacy level especially older adult and elderly patients with T2DM.

The innovation of mHealth or eHealth especially mobile phone communication were become world wide application into public health. Several studies were found mobile phone improving health outcome in both studies by Lim and Durso [107] [108]). While they both studied the effect of a rule-based reply based on health-related data entered via mobile phone, Lim performed a randomized controlled trial that used telemetric data from a glucometer used by the patient, along with other information from an EMR. They found improving of glycemic control in the patients who received coaching self-management message and reminder healthy behavior when compare with usual care. Durso used a mobile phone as a platform to enter personal health data, and as a way to get automated interactive voice messages for reminders in

response and the study sought to ascertain usability and satisfaction via survey, as well as a pre/post test on diabetes knowledge. Their healthcare provider could also review the data, and the subjects in the study reported a positive perception of value of diabetes management. Similar to Lim, Durso reported that subjects had improved glycemic control and diabetes knowledge increased diabetes knowledge test scores after using the system. Reducing the barriers to use of self-management tools, such as by increasing ease of use can also increase compliance with the tool. Rollo et al studied the feasibility of using a mobile phone camera to record dietary intake in diabetics using a mobile phone camera to record dietary intake in diabetics by comparing the phone system to the standard food diary, and by using questionnaires to assess usability and acceptability. When compared to a food diary, it was deemed an acceptable alternative, with some caveats. All patients reported the phone system was easier to use, and most subjects reported that it took less time than a written food diary (6/10). However, there was some underreporting of items eaten, with the energy intake on the phone being underreported on average by 649 kJ (p= 0.03) compared to the standard written food diary. This discrepancy needs to be mitigated in future studies. Another method to increase the ease of use is to allow data to be transmitted passively, rather than requiring a user to actively transmit the data.

2.5.3 Consumer Information Processing (CIP)

In consumer information processing theory or CIP model is well known in term of social marketing for engagement brand of product or encourage consumer

making decision chosen as favorite list. This concept was applied into health promotion and used for developing the material of communication health information between health providers and people. The CIP was developed for exploring, assessing when they received the information "why they chose to assess the information?" after that "What and How they believed or understanding the information?", next step when they believed or understanding "What do they decision to memorized or having activities follow the information?". Next process, want to explore "what are the factor influence their interesting, understanding, retrieving and making decision to respond. The lesson learned from this concept in the health promotion brink health providers team understanding limited of capacity reached, perceived and recognized of health information. Health educator have to concern about their needed , necessary information appropriated for their problem, perception of their health problem or health status in at that time promoting approached. Consumer Information Processing (CIP) was apply in health promotion as follow.

Easier to assess the health information and easy to understanding. May be use picture imply explanation of information. For example, drug label using the sun picture to tell patients taking drugs in morning time. Other, severity damaged lung by cancer causation on packaging of cigarettes. Picture of coaching "how to exercise for elderly who are limited of disability?". Update of information in real time of interested in social or communities. In Thailand, classical example of application CIP model were

present in update with a major health problem as NCDs high rate in Thailand, FDA, was forced producer put the GDP food label and Nutritional food label for encourage consumer consideration "how much calories that they get from food taking?". Design of presentation the information have to set based on attractive types. point shade to "what are the appropriate way to transfer health information. Capacity of consumer will be consider before construct the health communication materials. For example, recently almost of application on smartphone are appropriate for adolescent in general Y and Z but this application are not appropriate for older adult and elderly who are limited of technologies. This point relevant with interactive communication and Explanatory Model as fulfill gap in term of health promotion. When we know the in-depth of Explanatory Model and Interactive Communication of patients with T2DM. CIP model will be completely understanding necessary information to develop the appropriated intervention.

2.5.4 Formative research

Formative research looks at the community in which an agency is situated, and helps agencies understand the interests, attributes and needs of different populations and persons in their community. Formative research is research that occurs before a program is designed and implemented, or while a program is being conducted. Formative research can use a wide range of quantitative and qualitative methods depending on what program planners need to know to design an effective intervention. Quantitative methods generate numeric data and are often designed to

produce information that is statistically representative of the intended audience. Qualitative methods collect verbal, descriptive information that is often rich in detail but cannot be generalized to an entire population or intended audience.

Qualitative research can help researchers and program managers discover and explore themes or processes, generate illuminating and illustrative personal narratives, and uncover attitudes or ideas that are common among members of a population, but they cannot be used to determine the proportion of people in an intended audience who think or act in a particular way. Qualitative methods may be used when program planners have limited resources, lack formal training to collect and analyze quantitative data analysis or do not need to estimate the proportion of an attribute in the population. However, using them properly still requires particular skills and sensibilities. For these reasons, this guide focuses just on methods for qualitative formative research. Two of the most common approaches used in formative research are focus group discussions (FGDs) and in-depth interviews (IDIs). These methods are effective for gaining insight into what motivates individuals and communities to behave a certain way and how they view the world or the community around them. Both focus group discussions and in-depth interviews can reveal vital information that can help shape future quantitative research or they can be used to dig deeper or reveal additional insight into existing quantitative data, such as survey results. FGD or IDI: Which one to use?. The reasons for using a focus group discussion or an in-depth

interview are quite different. Researchers will often opt for a combination of FGDs and IDIs in an effort to comprehensively study the population and their beliefs, attitudes and behaviors. Although the pros and cons of using FGDs or IDIs are different, the process of creating, executing and analyzing FGDs and IDIs are similar in some regards.

In this study was applied three theories for developing the intervention including Explanatory model of illness [102] [103] [105] [106] and Consumer Information Processing (CIP) [109] all of information from integrated theatricals was used to arrange the appropriate way setting up the interactive communication toolkit between health care providers ,patients and care takers based on priorities of problems and needed of them . Participatory communication was approached to find out the situation, problem, factor influencing diabetes outcome, explanation of the situation, problem, needed. Finally, was implement the Multifaceted Healthy Coaching Program to evaluate the effect of the multifaceted intervention to improve HbA1c as classified achievement and quality of life in older adult and elderly patients with T2DM.

CHAPTER III

RESEARCH METHODOLOGY

The study design was randomized control trial conducting in 2 phases. The first phase had been done 3 steps such as quantitative and qualitative approached for developing the Multifaceted Healthy Coaching Program. The second phase was implemented and evaluated the effectiveness of this program. Development of the intervention had done 3 steps; the first step, employed quantitative to explore the situation of T2DM patients. Next, step was in-depth interview to prioritize problem and needed based on investigated Explanatory model of DM, pattern of communication(IC) and Consumer information processing (CIP). At the end of this phase was approached group discussion to develop DM management booklet, DM Diary and protocol of Multifaceted Healthy Coaching Program based on priority their needed and problem. In the 2nd phase was recruited T2DM diabetics who registered in Sungwan Thusanarom Health Center by computer-randomly directly ID to allocation in to the intervention and control groups. The intervention had received the Multifaceted Healthy Coaching Program while the control received usual care. The number of sample participants are 40 participants per group and total of participant are 80 participant.

Outcomes of this program were measured Health literacy, knowledge of DM, self-efficacy score self-care activities, HbA1c and quality of life at base line to six

months within the intervention and control groups. Confirmation improvement of the outcome were compare all of measurement outcome between the intervention and the control groups. In addition was look for change overtime period of FPG in each appointment doctor till the end of program to predict blood glucose controlling as short outcome.

Data analysis was used descriptive statistic and inferential statistic consist of multiple linear regression using for determine factor related HbA1c controlling and quality of life, dependent t-test and independent t-test used for compare the outcome; knowledge of DM, health literacy, self-efficacy, self-care activities, HbA1c and quality of life before and after implement the Multifaceted Healthy Coaching Program within group and between group. Additional, Repeated ANOVA used for analyzed changing overtime of FPG level within group and between group. Improving controllable of HbA1c and quality of life will define as the achievement of this study.

3.1 Study design

The study design was randomized control trial for evaluation the effective of Multifaceted Healthy Coaching Program which is developed by steak holder; patients, health care providers and care takers in Sungwan Thusanarom Health Center respond area.

3.2 Study Area

Figure 7 Bangkok administrative districts map

This study was launched in the 61th Sungwan Thusanarom Health Center Saimai district Bangkok,Thailand . It was one out of the 50 districts of Bangkok located in the North of Bangkok and present condition as semi-urban area. Boarder of Saimai community is territories in the north by Lumlukka district of Patumthani province, to the South by Bang Khen district, to the Weast by Don Mueang of Bangkok and to the Eaest Klongsamwa district of Bangkok . Patient with T2DM in older adult and elderly were report 405 patients. All of them seeking health care and treatment in the 61th Sungwan Thusanarom Health Center. In 2014, uncontrollable HbA1c were report 57.1 % in older adult and elderly patients.

3.3 Study period

This study will conduct in 10 months composing situation analysis, developing of intervention, implementation and evaluation. In 1st – 3rd month will collect situation of T2DM patients, prioritized problem & needed and developing the intervention. The

Multifaceted Healthy Coaching Program will start implementation on 4th month till 9th

month Measurement of outcomes were evaluated at the end of 9th month.
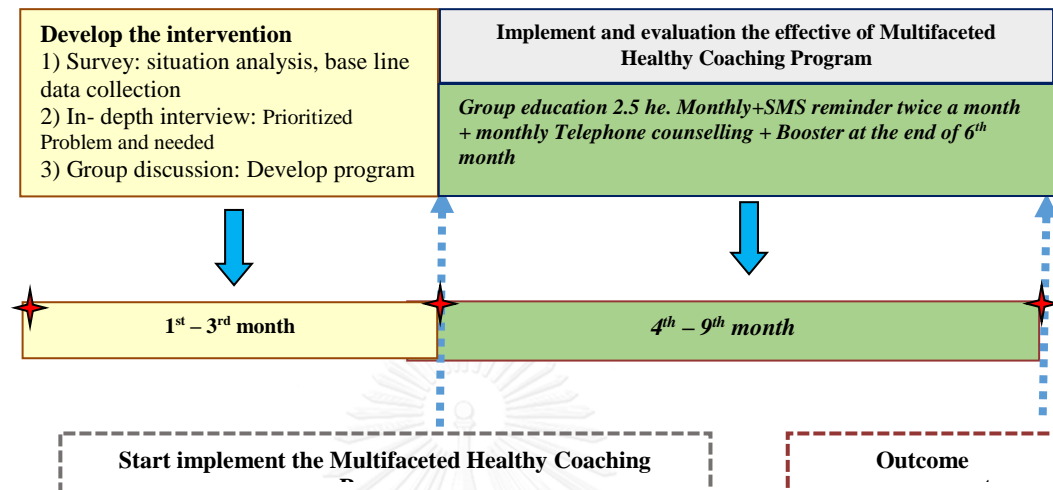
Figure 8 Time line of study period

3.4 Study population

Population were registered diabetes mellitus type 2 at the 61th   Sungwan

Thusanarom Health Center in Saimai district , care taker who are take care for T2DM

patients and health care providers in Sungwan Thusanarom Health Center in Saimai

district, Bangkok, Thailand.

3.5 Sample and sample size for phase I in 1-3 steps

3.5.1 Phase I steps 1: Situation analysis; quantitative approach

3.5.1.1 Sample

Patients who were registered T2DM and sought T2DM health care at Sungwan Thusanarom Health Center in Saimai district, Bangkok are recruited following the inclusion criterias.

1) Inclusion criteria and Exclusion criteria

Inclusion criteria

- The patients who were registered T2DM patient at the 61th Health Center in Saimai district.

- The patients who have had T2DM at least 1 year

- The patients who are sought medical care for T2DM at the 61th Health Center in Saimai district, Bangkok.

- The patients who are aged 50 – 79 year.

- The patients who are resident in Saimai district at least 1 year.

- The patients are good communication and listening.

- The patients who are accept through the part of this study

Exclusion criteria

- The patients who are non-universal insurance in Saimai district.

- The patients who are disability recognized and hearing loosed.

- The patients who are present severely complication symptom.

- The patients who are shown daily living score as very dependent

(ADL=0-4 score).

3.5.1.2 Estimation of the sample size

Estimation of the sample size use the cross-sectional study design to estimated proportion of low health literacy in term of diabetes mellitus calculation the sample size as below.

$$n = N/ [1+ (e^2N)] \qquad , e = 0.05, N = 474$$

$$n = 474 / [1+ (0.05)^2(474)]$$

$$n = 216 \text{ plus } 25 \% = 272$$

When n is the sample size needed , e is the accepted of error = 0.05 in the normal distribution two tail test at α/2 due to Z is the standard score for a confidence interval 95% = 1.96. N is the number of population in this phase = 474. Sample sized calculation involved 272 patients. However, we conducted data 274 to add up for missing data.

3.5.1.3 Sampling technique

Simple random sampling employed for participation selection from ID registered T2DM waitlist meeting doctor till reach the number of sample size. If participants were chosen reject to participate researcher was replaced the next registered number of them.

3.5.2 Phase I step 2: In-depth interview to prioritize problem and needed

3.5.2.1 Sample

Patients participated in survey for situation analysis were enrolled to in-depth interview following inclusion criteria. There are not have the role of the number of sample for qualitative approach when found patient's saturated information researcher will stop in-depth interview.

1) Inclusion criteria and exclusion criteria

Inclusion criteria: Patient with DM type 2 voluntary participation

a) Uncontrollable of blood glucose

- Patients with DM type 2 who are low of health literacy and difficulty in managing glucose levels, as demonstrated by hemoglobin A1C (HbA1c) 7.0-7.9 % at least 1 year.

- Patients with DM type 2 who are faced comorbidity disease.

- Patients with DM type 2 who are low perceived and low score of self-management.

b) Controllable of blood glucose

- Patients with DM type 2 who are regularly control diabetes outcome at least 1 year (HbA1c < 7%).

Exclusion criteria

- Patients are disability recognized and hearing loss.

- Patients cannot read and communicate well.

Inclusion criteria of care takers

- Taking care for T2DM patients at least 1 year.

- Care takers who are voluntary participation.

Health care providers 5 persons

- Leadership of NCDs clinic 1 person

- Nurse consultant NCDs clinic 1 person

- Major Respond in diabetes clinic 3 person

3.5.2.2 Sampling technique

Convenience sampling employed for select patients who faced inclusion criteria from screening in situation of T2DM patient survey. Selection of care takers will be lunch purposive selection.

3.5.3 Phase I step 3: Group discussion to develop the Multifaceted Healthy Coaching Program

3.5.3.1 Sample

Participant in prioritized problem and needed excluded. In this step were invited patients, care takers and health providers to join group discussion for developing DM management booklet, protocol of Multifaceted Healthy Coaching and DM diary. Inclusion criteria and exclusion and sampling technique explained as follow.

1) Inclusion criteria and exclusion criteria

Inclusion criteria: Patient with DM type 2

- Voluntary participation

- Patients with T2DM are 50-79 year aged.

- Patients with T2DM who are active to attend health promotion program at health center. (3 persons)

- Patients with T2DM who are non-active to attend health promotion program at health center. (3 persons)

- Controllable blood glucose at least 2 year. (3 persons)

- Uncontrollable blood glucose at least 1 year. (3 person)

<u>Exclusion</u>

- Patients are disability recognized and hearing loss

- Patients cannot read and communicate well

<u>Inclusion criteria of care takers</u> (5 participants)

- Taking care for T2DM patients at least 1 year.

- Care takers who are voluntary participation.

<u>Health care providers 5 persons</u> (They are same person who participated in in-depth interview).

- Leadership of NCDs clinic 1 person

- Nurse consultant NCDs clinic 1 person

- Major Respond in diabetes clinic 3 person

2) Sampling technique

Convenience sampling employed for select patients who faced inclusion criteria from screening in situation of T2DM patient survey. Selection of care takers lunched purposive selection.

3.5.4 Phase II: Implement and evaluation

In phase II was employed to evaluate the effect of Multifaceted Healthy Coaching Program to improve health literacy, self-efficacy, self-care activities, glucose

blood level FPG and HbA1c and quality of life. This phase was served to research question as "what are the effectiveness of Multifaceted healthy coaching program for blood glucose control and quality of life in older adult and elderly with T2DM at Sungwan Thusanarom Health Center, Bangkok Thailand?".

    3.5.4.1 Sample

        Participant who were participated in the situation survey amount 274 participants are enrolled following inclusion criteria.

1) Inclusion criteria and Exclusion criteria

<u>Inclusion criteria</u>

- Patients who were uncontrollable HbA1c > 7%

- Patients who were found level of health literacy in low to moderate in the range 0 – 80.0% scoring.

- Having their own mobile phone

<u>Exclusion criteria</u>

- Patients who were non-universal insurance in Saimai district.

- Patients who are disability recognized and hearing loosed.

- Patients who are present high complication symptom diabetic retinopathy/diabetic kidney disease / tachycardia in stable status ≥ 100/minute/severe diabetic feet.

- Patients who are shown daily living score as very dependent (ADL=0-4 score). Screening consider score of ADL questionnaire collected by health providers in the 61th Sunwan Thusanarom Health Center.

3.5.4.2 Sample size

The study was designed to evaluate meaningful changes in the primary endpoint of HbA1c level, from baseline to 6 month as the end of this program. Sample size calculation was used G-power program with formulate conservative effect size of 0.5% reduction in HbA1c with type I error of 0.05 and 80% power with an assumed correlation of 0.80 between measurement points. The sample size was use calculation .Estimated sample sized is 36 participant in each group and total of sample added up 10 % for dropout rate. Finally sample sized in each group was 40 participant and total of sample sized are 80 participant.

3.5.4.3 Sampling technique, recruitment and allocation

This pragmatic RCT proceeded with a 1:1 allocation ratio. Participants were recruited from situation survey finding inclusion criteria. Recruitment was undertaken participants from waitlist registered number in computer base. Enrollment individuals were included 174 patients who found inclusion criteria and were excluded 100 patients who found HbA1c < 7.0% and high health literacy score. Eligible participants were allocated by simple random sampling patients who were appointment meeting doctor on Wednesday in to the intervention arm and other day

into the control arm. Next step was approached simple random participant following sample

size 40 participant in each arm.

Recruitment and allocation participant in the implement and evaluation
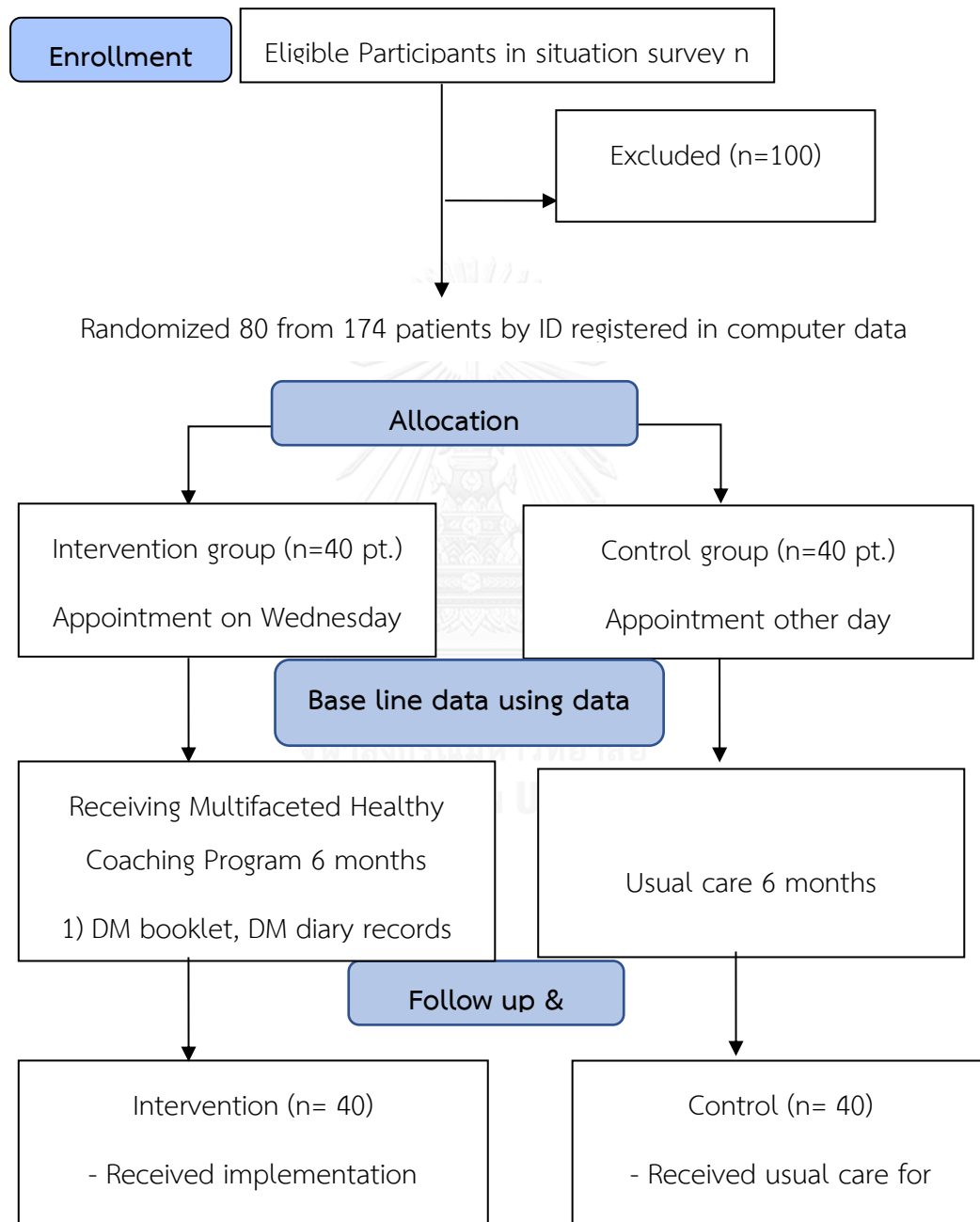
Figure 9 *CONSORT diagram of recruitment and allocation participant in phase II for* implement and evaluation.

3.6 Study Procedure
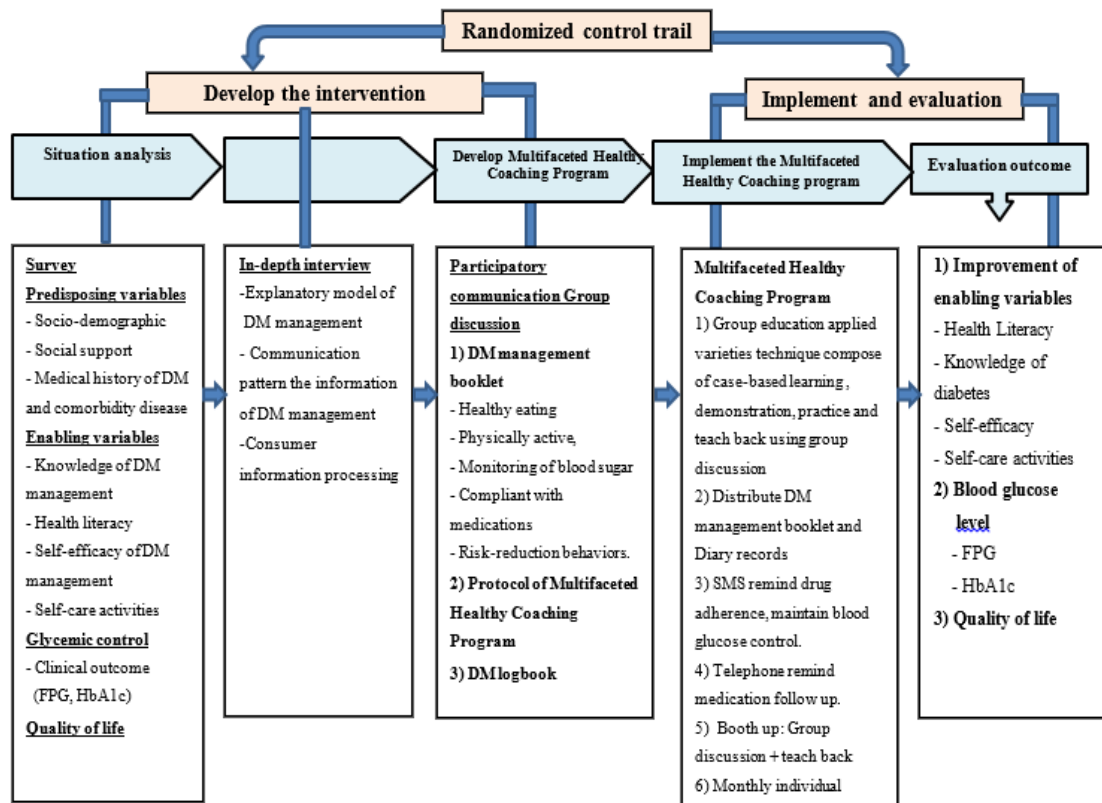
Figure 10 Procedure of this study

This study was randomized control trial which were performed 2 phases. In the first phase was divided for 3 step for developing the Multifaceted Healthy Coaching program and data collection and the second phase was implemented and evaluated the effective of Multifaceted Healthy Coaching program to improve HbA1c reduction and quality of life. Study procedure was modified based on PRECEED and PROCEED model to set up development the intervention, implement and evaluation. For situation analysis apply 3 step of PRECEED via explore existing solution factor related controllable diabetes in study setting. Next step had been developed the Multifaceted Healthy Coaching Program as Health promotion program fulfilled the gap and served prioritized of problem and needed of patient with T2DM. Finally were implement and evaluated the effect of this program within and between the intervention and the control groups that are PROCEED step.

3.6.1 Intervention development

Development of the intervention was done 3 steps including of situation analysis, prioritized problems and needed and developing DM management booklet, DM Diary for food intake and drug adherence records and protocol of Multifaceted Healthy Coaching.

3.6.1.1 Situation analysis

The first step was approached quantitative via survey for situation analysis exploring socio-demographic characteristics, history medication, health

literacy, Knowledge of DM, self-efficacy, self-care activities, blood glucose level classified by Fasting plasma glucose (FPG) and HbA1c and quality of life among older adult and elderly with T2DM sought health care services at Health Center in Saimai district, Bangkok, Thailand. It address research questions as "what are the situation of T2DM patients in Sungwan Thusanarom Health Center in Saimai district?".

Data collection

1) Preparation, Training assistant researcher

- Appointment meeting was set with leader of the 61th Sungwal Thussanarom Health Center, Health Volunteer to be assistant researcher, Leadership of community, Leadership of elderly confraternity in Saimai sub-district. Researcher preferred briefly purposes, process of data collection, intervention, training data collection, and expectation of this study.

- Researcher had trained five health workers and three assistant researchers in items comprehensive of questionnaire and data collection process.

2) Data collection

Collecting data was launched into patients who were random .If more than one patient were random in one household, patient with high level of HbA1c status was chosen and select the new one in other household for replacing. Researcher team were face to face interview using questionnaire to conduct data including socio-demographic, knowledge of DM-management, health literacy, self-

efficacy, self-management and quality of life. Data collection of clinical outcome and medical history was used information records form for review OPD card, medical records and computer data based. Researcher submitted document to ask permission assessing data record from Director of the 61th Sungwan Thusanarom Health Center and informed health provider to observe data collection. Data collecting was employed face to face interview T2DM patients who came to see doctor in the date of medical appointment follow up at the 61th Sungwan Thasanarom Health Center after meeting doctor and finished counselling.

3.6.1.2 Prioritized problems and needed

In-depth interview was launched to examine the Explanatory model of DM, pattern of interactive communication and Consumer Information Processing (CIP) of older adult and elderly patients with DM type 2, care takers and health care providers in Sungwan Thusanarom Health Centre 61th, Saimai district, Bangkok, Thailand. The comprehensive of in-depth interview as "What are the Explanatory model of illness of health care providers and patients, the pattern of interactive communication among patients, care takers and health care providers and consumer information processing in older adult ,elderly patients with T2DM in Saimai district, Bangkok Thailand?" was fully examine. Place and time of in-depth interview was done at the 61th Sungwan Thasanarom Health Center or following suggestion from participants.

<u>**Data collection**</u>

Qualitative approach in-depth interview to examine Explanatory model, pattern of interactive communication between patient or care takers and health providers. During conversation research team observed characteristic, mood for respond and nature of participants. Observation and interview data is collected by the researcher in the form of field notes and audio-taped interviews, which are later transcribed for use in data analysis. There is also some qualitative approach being done with photographs and video-taped observations as primary sources of data.

3.6.1.3 Develop the Multifaceted Healthy Coaching Program

Group discussion approach to develop DM-management booklet, DM diary and protocol of Multifaceted Healthy Coaching program. Researcher team had given back the magnitude of problem as situation analysis. Consideration was integrated based on Explanatory model, Interactive communication and Consumer information processing for examining how to make clear medication understanding and find out the appropriate way for interactive communication toolkit in demand of them.

<u>**Data Collection**</u>

Group discussion performed 3 group. Patients and care takers are invite in two groups and health care providers was separated. Researcher team had been a moderator in each group which was different time of meeting. Group discussion set up several times to find out consensus of each group in term of the protocol of

Multifaceted Healthy Coaching Program, creative of DM booklet management and DM diary. The final round of group discussion finding the final consensus were involved 3 represents of patients, care takers 2 persons and health care providers. Purposive selection employed to invite patients, care takers and health care providers participation in final round of group discussion. This process was discussed at the 61th Sungwan Thasanarom Health Center. Date and time is considered by participants.

3.6.2 Implementation and evaluation

Intervention: Multifaceted Healthy Coaching Program

The Multifaceted Healthy coaching program including DM management booklet, group education (case based learning, teach back, demonstration and practice), SMS reminder healthy behavior and drug adherence, Individual telephone counselling, DM diary records healthy behavior and drug adherence. The intervention framework included behavioral and environmental components, individual and group interventions, and interventions directed at patients and care takers. A whole of intervention was aimed at behavioral modification by empowering participants, equipping them with better knowledge and skills about DM and its management, facilitating better communication with their healthcare providers, encouraging better healthcare utilization, and enhancing their general problem-solving skills. These processes were expected to improve health literacy, self-efficacy, self-care activities influencing blood glucose controlling and quality of life. This study was approached

various techniques to encourage participants' active engagement, including group education & case-based learning, demonstration, practice, SMS stimulated and reminder self-care management, individual telephone coaching and counselling.

The group education involved this sessions over the course of monthly for 6 months. There were approached 7 subcomponents following Standard of Diabetes Self-Management Education and Support as 1) healthy eating 2) physically active 3) monitoring of blood sugar 4) compliant with medications 5) good problem-solving skills 6) healthy coping skills 7) risk-reduction behaviors. *It was considered* based on needed and the convenient time of medication follow up. The group education was employed on the waiting time to see doctor for treatment follow up. It had been done monthly following the practical of health care service in the 61th Health Center. The achievement of each session was evaluated by teach back, group discussion and practiced at the end of each session. A communication of DM management toolkit such as the DM-management booklet for made understanding easier. The group educational aimed to enhance patient's knowledge of DM-management, while reducing risk factors through improved problem-solving skills, and confidence of them. The health literacy–enhancing component addressed the strong need to enhance essential health literacy skills (e.g., reading food labels, understanding essential medical terminology, following instructions to access available healthcare resources). Self-monitoring for controlling blood glucose level as FPG were checkup in

the 3rd, 6th and HbA1c at base line and 6th month. Food consumption, exercise and drug administration were record daily in to DM diary by themselves. It was meaningful for remind and confirmation for the basically of self-care activity. Telephone counseling will be done monthly for 6 months. Calling were recorded and charted according to the implementation protocols. The goal of this telephone counseling had been assistant individualized treatment goal or healthy planning and to maintain acquired self-care skills and a healthy lifestyle. Overall, treatment goals and healthy planning were guided by the Standard of Diabetes Self-management from Global Diabetes Guideline update version in 2014. Telephone counseling was done by researcher. Researcher team were discussed monthly to review the progress of all participants. These meetings focused especially on discussing participants with challenges and on strategies to help them overcome barriers to achieve adequate glucose control. In addition, the Principal Investigators and clinical counseling team chose to review one of every ten counseling records (about 10%) to assess intervention fidelity. Participants in the control group who had found DTX >160 mg./dL received face to face counselling after meeting doctor as usual care in the 61th Sungwan Thusanarom Health Center.

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Multifaceted Healthy Coaching Program

Session in 1st – 6th month 2.5 hours monthly	→	Group education: Case-based learning based on priority of patient's problem and needed may be following Suggestion 7 essential for DM management Introduction Multifaceted Healthy Coaching Program (Case-based learning, Diabetes knowledge (general), prioritized problem, solving & Goal setting 2 – 3 Healthy eating: Food consumption, Food label; GDP label,
1st - 6th month Monthly	→	- **SMS stimulate and reminder** self-care behavior including issue; compliant with medication, healthy eating, records DM diary,exercise - **Counselling: healthy coaching** 10-15 minute/monthly for coaching self-care
Monthly, 3rd , 6th month The end of program	→	Laboratory test - DTX test monthly, FPG test at 3rd month, HbA1c test at 6th month Questionnaire data collection in the intervention evaluation

Figure 11 Components of Multifaceted Healthy Coaching Program in time period implementation

Table 8 Implement of Multifaceted Healthy Coaching Program

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement	Responsible
Evaluation of medication condition	Test & Measurement 1. Blood glucose (DTX) 2. Weight, Height 3. Blood pressure measurement 4. Circumstance 5. HbA1c (6th month)	- To Evaluate medication condition	1) Medication condition 2) DTX 3) Weight, BMI 4) Circumstance 5) HbA1c at the end of program (6th month)	- Monthly (Before starting group education session)	- Blood glucose test strip - Weight scale, Meter Height - Measuring waist	- Blood glucose level (DTX) - Weight, Height, BMI - Circumstance	- Nurse (Researcher team)
DM booklet and group education	1) Distribute DM management booklet and DM diary	- To evaluated booklet toolkit DM for developing health literacy,		2.5 hours monthly	- DM management booklet and DM diary	- Group discussion and teach back after finished the session	Researcher (Ms.Tiwaporn Junkhaw)
Session 1 1) DM management booklet and DM diary and Group education follow DM management booklet	2) Lecture, group discussion, Case-based learning, Goal setting and Teach back.	DM management knowledge, self-efficacy - To improve solving skill. from group discussion	1.Introduction Multifaceted Healthy Coaching Program (Case-based learning, Diabetes knowledge (general), prioritized problem, solving & Goal	1st month	- Case-based patients who are controllable and uncontrollable - Poster and sheet (Introduction of DM)		

Table 8 Implement of Multifaceted Healthy Coaching Program

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement	Responsible
DM booklet and group education Session 2 1) DM management booklet and DM diary and Group education follow DM management booklet	1) Distribute DM management booklet "Healthy eating: Food consumption, 2) Lecture, group discussion, Practice glucose calculation from favorite menu and setting meal in daily life	- To evaluated booklet toolkit DM for developing health literacy DM management knowledge of healthy eating for diabetics. - To improve healthy eating behavior and scoping skill for monitoring blood glucose	- Healthy eating and Food consumption " How to select healthy food : sugar and calorie calculation, dietary food, fruit, soft drink for diabetes patient."	2.5 hours monthly 2nd month	- DM management booklet - Case-based patients who are controllable and uncontrollable - Poster, sheet "Dietary food, fruit, soft drink"	- Teach back after finished session	Researcher (Ms.Tiwaporn Junkhaw)

Table 8 Implement of Multifaceted Healthy Coaching Program (cont.)

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement	Responsible
DM booklet and group education Session 3 1) DM management booklet and DM diary and Group education follow DM management booklet	1) Distribute DM management booklet "Food label; GDP label, Nutrition label" 2) Lecture, group discussion, demonstrate and practice "How to read food label, nutrition label and GDP label.	- To evaluated booklet toolkit DM for developing health literacy, DM management knowledge of Food label; GDP label, Nutrition label - To improve healthy eating behavior	- The benefit of Food label, Nutrition label and GDP label for DM management - " How to read: Food label, Nutrition label and GDP label"	2.5 hours 3rd month	- DM management booklet - Poster, sheet "Dietary food, fruit, soft drink" - Illustrative of food label, GDP label and Nutrition label	- Group practice - Teach back after finished session	Researcher (Ms.Tuvapon Junkhaw)
DM booklet and group education Session 4 1) DM management booklet and DM diary and Group education follow DM management booklet	1) Distribute DM management booklet "Diabetes complication" 2) Lecture, group discussion, case- based learning	1)To evaluated booklet toolkit DM for developing health literacy, DM management knowledge of DM complication	Diabetes complication - Eye disease, kidney, cardiovascular disease, comorbidity chronic disease and period of getting complication	2.5 hours 4th month	- DM management booklet - Poster, Manual of diabetes complication and DM management for reduce risky of DM complication	- Teach back after finished session	Researcher (Ms.Tuvapon Junkhaw)

Table 8 Implement of Multifaceted Healthy Coaching Program (cont.)

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement	Responsible
DM booklet and group education	Workshop, Walk really	- To evaluated booklet toolkit DM for developing health literacy, DM management	1) The benefit of Food label, Nutrition label and GDP label for DM management	2.5 hours 5th month	1)Case-based patients (Controllable and uncontrollable)	- Group practice - Teach back after finished session	Researcher (Ms.Tiwaporn Junkhaw)
Session 5 1) DM management booklet and DM diary and Group education follow DM management booklet (Booster group education session 1-4)	1) Healthy eating, dietary food for DM patients, 2) Glucose hidden in the Food label, Nutrition label and GDP label	knowledge of healthy eating, DM management (Food, drug, healthy behavior)	2) " How to read: Food label, Nutrition label and GDP label" Diabetes complication 3) Eye disease, kidney, cardiovascular disease, comorbidity chronic disease and period of getting complication		2) Poster and sheet (Introduction of DM) 3) Poster, sheet "Dietary food, fruit, soft drink." - Illustrative of food label, GDP label and Nutrition label 4) Poster, Manual of diabetes complication and DM management for reduce risky of DM complication		
	3) DM management - Drug compliance - healthy behavior - Reducing risky for DM complication	- To improve healthy eating behavior , blood glucose monitoring, drug compliance and healthy behavior					

Table 8 Implement of Multifaceted Healthy Coaching Program (cont.)

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement	Responsible
DM booklet and group education Session 6 1) DM management booklet and DM diary and Group education follow DM management booklet	1) Group discussion of medication evaluation 1st – 5th month 2) Empowerment DM management to reach the goal of DM management 3) Case-based learning	1) To evaluate medication condition in the individual level and group 2) To improve performance of DM management 3) To improve interactive communication health literacy skill and critical health literacy skill	1) Drug compliance for DM patient with comorbidity 2) Glucose monitoring 3) Foot care for DM patient 4) Oral health for controlling blood glucose level	2.5 hours 6th month	1) Case-based patients (Controllable and uncontrollable) 2)	- Group discussion - Demonstration board presentation - Teach back after finished session	Researcher (Ms.Tiwaporn Junkhaw)

Table 8 Implement of Multifaceted Healthy Coaching Program (cont.)

Intervention	Technique Approach	Objective	Core information	Frequency	Instrument	Measurement
SMS stimulated and reminder	- Social support via continuous health care communication	-Stimulate and engage patient maintain healthy behavior for DM management and - Reminder drug adherence - Recognized essential information of DM management	- Medication drug administration - Glucose monitoring (Healthy eating, Physical exercise) - Reduction risk of complication behavior	- twice a month (1st 3rd wk.) After finished Group education session	- DM diary records	- Drug adherence - Food consumption - Glucose monitoring
Telephone coaching and counselling	- Interactive communication - Social support : Researcher team and health providers	- Healthy coaching for reach goal of DM management - coaching for improving solving problem	- General information Prefer from patient	10-15 Minutes Monthly 1st – 6th month	- Guideline for DM management in booklet	- Understanding How to solve problem in patient - Potential for healthy behavior maintaining

<u>**Usual Care for the control group**</u>

Usual care was routine health care service such as DM follow up treatment. Health care service for treatment follow up composed of checked Dextrostix (DTX) and met doctor while T2DM who found DTX > 160 mg/dL received face to face counseling 10-15 minute.
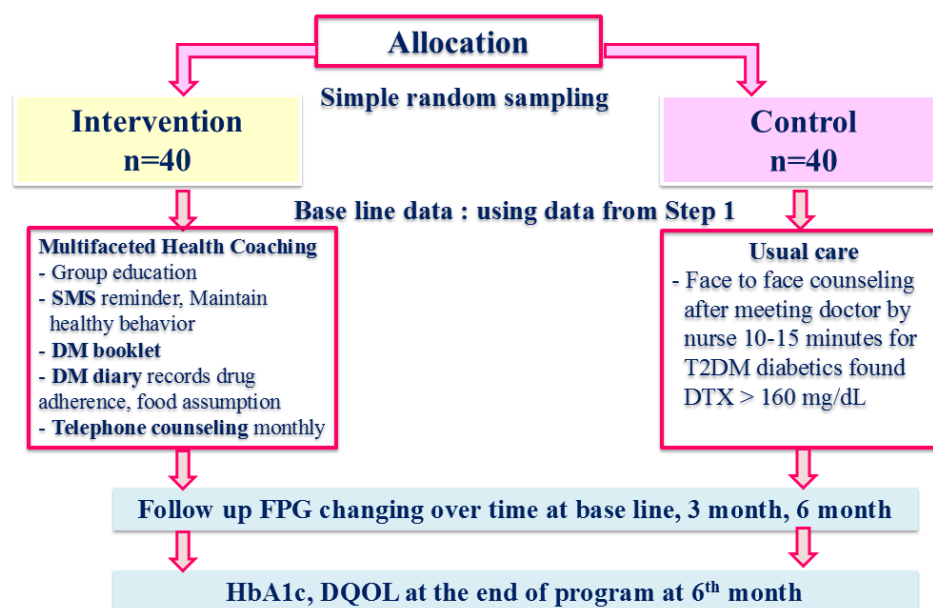
Figure 12 Diagram of intervention and control providing

3.7 Instrument

3.7.1 Questionnaire (Appendix A)

The questionnaire was used to collect socio-demographic, history medical, Health literacy, knowledge of DM, self-efficacy, self-care activities and quality of life including 6 part.

Part 1: General information including socio-demographic of patient (gender, age, occupational, education, marital status, monthly income, member of family, having care taker, Health insurance scheme), mobile using and barriers of understanding health information from varieties sources.

Part 2: Health literacy measurement use Thai version of health literacy questionnaire that was develop by cooperation between Behavioral Science Research Institutes (BSRI) ,Srinakarinwirot University and Health Education Division; Ministry of Public Health Thailand) measuring three level of health literacy which consist of 6 component, 36 items.

A) Functional skill (15 items)

- Needed health knowledge and understanding compose of 10 items .It is multiple choice answer including 4 choices. It is given "1" score for correctly answer and "0" score for wrong answer. Total score is 10 score.

- Accessing with information and service compose of 5 item. Total score is 20 score.

Functional skill classification had full score 30 and interpretation scoring of its divided three level in the range of *0 – 30 score as following.*

- 0 – 14.6 score (< 50 % of total score) = low

- 15 – 23.9 score (≥ 50 < 80 % of total score) = moderate

- 24 – 30 score (≥ 80 % of total score)   = high

B) Communicative skill (11 items)

- Communicating for improve understanding health information including 6 items. This part was Likert scale given score: never = 0 score, rarely = 1, every once in a while = 2, sometime = 3 and almost always = 4. Total is 24 score.

- Managing their health condition including 5 items. This part is Likert scale that is given score: never = 0 score, rarely = 1, every once in a while = 2, sometime = 3 and almost always = 4. Total is 20 score.

Interactive communication skill classification had full score 44 and interpretation scoring of its divided three level in the range of *0 – 44 score as following.*

- 0 – 21.9 score (< 50 % of total score) = low

- 22.0 – 35.1 score (≥ 50 < 80 % of total score) = moderate

- 35.2 – 44.0 score (≥ 80 % of total score)   = high

C) Critical skill (10 items)

- Getting media and health information literacy including 5 items. This part was Likert scale given score: never = 0 score, rarely = 1, every once in a while = 2, sometime = 3 and almost always = 4. Total score was 20 score.

- Making appropriate health decision to good practice including 5 items.

It is ordinal scale. It is given "1 – 4"score for each level of health decision. Total score

is 20 score.

Critical skill classification had full score 40 and interpretation scoring of

its divided three level in the range of *0 – 44.0 as following.*

- 0 - 19.9 score (< 50 % of total score) = low

- 20 – 31.9 score (≥ 50 < 80 % of total score) = moderate

- 32.0 – 40.0 score (≥ 80 % of total score)   = high

Part 3: Knowledge of diabetes mellitus (DNT) 20 items

Knowledge of diabetes test (DNT) was modified by Jame since 1998 and

Thai version was found several study application the SE measurement tool. In this

study was modified from [76] [110].

- 0 – 9.9 score (< 50 % of total score) = low

- 10 – 15.9 score (≥ 50 < 80 % of total score) = moderate

- 16 – 20 score (≥ 80 % of total score)   = high

Part 4: Self-efficacy (12 items)

Measurement of self-efficacy about DM management was applied Self-

efficacy (SE) questionnaire which was the Stanford Chronic Disease Self-Efficacy

modification scale consist 12 items such as given score as 0-10 Likert-type items. Thai version was used by Srithongsuk since 2009. Calculation the range of scoring was invert full score as 120 to 10 as formula calculation = $x * 10/120$ when x = patient's collection score. Range of SE score (1-10) was interpreted as follow [29].

- 0- 3.0 score = low

- 3.1 – 5.9 score = moderate

- ≥ 6.0 score = high

Part 5: Self-care activities;

Diabetes Self-Care Activities was application The Summary Diabetes Self-Care Activities: SDSCA) consist of 6 components 28 items: 1) Eating behavior; dietary food such as sweet, fatty and salty food 2) Exercise 3) smoking 4) Alcohol consumption 5) Drug administration and 6) Feet care. Total score was 60 divided three level.

- 1- 29.9 score = low

- 30 – 41.9 score = moderate

≥ 42 score = high

Part 6: Diabetes Quality of Life (14 items)

The tool measure Diabetes quality of life (DQOL) is Likert scale given 1-5 score for 14 items. It was performed among Thai T2DM patients consist of 2

components treatment satisfaction 7 items and 7 items in treatment impact. The DQOL measurement tool present Cronbach's alpha coefficient 0.77 and 0.86 in treatment satisfaction and treatment impact respectively, and total of Cronbach's alpha was 0.87. Total score 70 calculate invert to 100 percent [29].

-1- 49.9 % = low

- 50 – 79.9 % = moderate

≥ 80 % = high

3.7.3 In-depth interview guideline

Semi-structured interview use to in-depth interview patients, care takers and health providers for examining Explanatory model, pattern of interactive communication between patient or care takers and health providers.

Semi-structured interview are developed from literature review .Triangular technique Content and validity are proved. In each items are approved by expert DM researcher team and research's advisor committees. Next step researcher revised follow the suggestion and try out semi-structured interview 5 patients who are not participation in phase 2. Finally, developed the semi-structured till do not find out the different of comprehensive.

- Explanatory model semi-structure in-depth interview for patients and care takers is applied Explanatory Model Interview Cataloged (EMIC) following Klein man suggests questions to learn how patient sees his or her illness.

Semi-structured interviews based on an operational formulation of an illness explanatory model that systematically clarifies the experience of illness from the point of view of the people who are directly affected. Patterns of distress, perceived causes, and preferences for help seeking and treatment, and general illness beliefs constitute a framework for the operational formulation of the illness explanatory model. Semi-structure in-depth interview is performed 8 questions as 1) what do you think caused your problem? , 2) Why do you think it started when it did? 3) What do you think your sickness does to you? 4) How severe is your sickness?, Do you think it will last a long time or will it be better soon in your opinion?, 5) What are the chief problems your sickness has caused for you?, 6) What do you fear most about your sickness?, 7) What kind of treatment do you think you should receive? , 8) What are the most important results you hope to get from treatment? [7].

- Explanatory model in-depth interview for health providers preferred 5 questions application from Cohen et al. developed including 1) What the cause of type 2 diabetes? 2) What is the time and mode of onset of your patients'diabetes? 3) How diabetes do to your patient's body? 4) What the severity caused by diabetes do you very concern about? and 5) How do you give your diabetes patients treatment?" [102] [103].

- Interactive communication pattern semi-structure in-depth interview applied from literature review compose of 1) What kind of your favorite pattern of

interactive communication to get/give DM information? 2) What do you think about this pattern of interactive communication? 3) Do you understand clearly with DM information that you get/give? 4) What are the best pattern of interactive communication in term of health communication in older adult and elderly? 5) How do you prove the pattern of interactive communication to the best way?.

         - Semi-structure in-depth interview of Consumer information processing was applied by research based on literature review following CIP theories. The process was used to define understanding the health information including 5 process as 1) Receiving information 2) Organizing information 3) Attaching meaning to information 4) Storing information 5) Retrieving information. Triangular technique Content and validity are proved. In each items are approved by expert DM researcher team and research's advisor committees. Next step researcher revised follow the suggestion and try out semi-structured interview 5 patients who are not participation in phase 2. Finally, developed the semi-structured till do not find out the different of comprehensive.

3.8 Data analysis

     Data analysis using SPSS 16 version in computer program. Data in this phase were analyzed by descriptive statistics and inferential statistic as describe in table 9.

         3.8.1 Descriptive statistic use of percentage (%), mean ($\bar{x}$) and standard deviation (SD) were used to describe; socio-demographic, patient's life style, knowledge of DM, self-efficacy, self-care activities, FPG, HbA1c and quality of life.

Table 9 Descriptive Statistic Analysis

Variables	Scale of measurement	Statistical analysis
Socio-demographic 1) Age, member of family, income (ratio) 2) Gender, marital status, education, occupation, care taker,	- Interval and ratio - Nominal	Descriptive statistic 1) Frequency, mean , SD, minimum, maximum , percentage 2) Frequency and percentage
Life style - Physical activities ≥30 minute, Smoking , Alcohol intake, healthy eating behaviors	- Nominal & ordinal	Descriptive statistic - Frequency and percentage
Medication history 1) Duration with T2DM 2) Weight, height, BMI, waist circumference 3) drug regimen, comorbidity, T2MD status	- Interval - Ratio - Nominal	Descriptive statistic 1) Frequency, mean , SD, minimum, maximum , percentage 2) Frequency and percentage for categories variable

Table 9 Descriptive Statistic Analysis (cont.)

Variables	Scale of measurement	Statistical analysis
1) Knowledge of DM	Interval	Descriptive statistic
2) Health literacy	Interval	-Frequency, mean , SD,
3) Self-efficacy	Interval	minimum, maximum ,
4) Self-care activities	Interval	percentage
5) Quality of life	Interval	

3.8.2 Inferential statistic

Inferential statistic was divided analysis into two part. First part was the situation analysis and the second was implement and evaluation the effect of Multifaceted Healthy Coaching program to blood glucose level and quality of life in older adult and elderly with T2DM as in table 10.

Table 10 Inferential Statistical analysis

Variables	Scale of measurement	Statistical analysis	Result/present
Situation analysis			
Independent Socio-demographic - Sex, age, marital status, educational, monthly income, stay with family, having care taker, welfare health, comorbidity, BMI, suffering with DM - Health literacy - Knowledge of DM - Self-efficacy - Self-care activities Dependent Hemoglobin A1c (HbA1c)	- Categories - Interval - Interval - Interval - Interval - Ratio	t-test , ONE-WAY ANOVA - Multiple Linear regression	Determinants of HbA1c

Table 10 Inferential Statistical analysis (cont.)

Variables	Scale of measurement	Statistical analysis	Result/present
Situation analysis			
Independent - Health literacy - Knowledge of DM - Self-efficacy - Self-care activities - HbA1c Dependent: - Quality of life	- Ratio - Interval - Interval - Interval - Interval - Ratio - Interval	- Multiple Linear regression	Determinant of quality of life
Evaluation the effect of Multifaceted Healthy Coaching Program			
Socio-demographic 1) Age, member of family, income (ratio) 2) Gender, marital status, education, occupation, care taker,	- Interval and ratio - Nominal	Independent t-test Chi-square test	To test the difference between group. To test homogeneity between intervention and control group

Table 10 Inferential Statistical analysis (cont.)

Variables	Scale of measurement	Statistical analysis	Result/present
Evaluation the effect of Multifaceted Healthy Coaching Program			
Life style - Physical activities ≥30 mm., Smoking , Alcohol intake, healthy eating behaviors	Nominal and ordinal	Chi-square test	To test homogeneity between intervention and control group
Medication history 1) Duration with T2DM 2) Weight, height, BMI, waist circumference 3) drug regimen, comorbidity, T2MD status	Nominal and ordinal	Chi-square test	To test homogeneity between intervention and control group

Table 10 Inferential Statistical analysis (con't)

Variables	Scale of measurement	Statistical analysis	Objective
Evaluation the effect of Multifaceted Healthy Coaching Program			
1) Knowledge of DM 2) Health literacy 3) Self-efficacy 4) Self-care activities 5) HbA1c level 6) Quality of life	- Interval - Interval - Interval - Interval - Ratio - Interval	Independent t-test Dependent t-test	-To test mean difference before and after implement program between intervention and control group. - To test mean difference before and after in intervention , control group
FPG level baseline, 3rd ,6th month	- Ratio	Repeated measurement ANOVA	- To test mean difference of FPG changing over time between intervention and control group

3.8.3 Content analysis

Content analysis is approached to recheck, to decode, and to categorize and to interpret Explanatory model, pattern of interactive communication and Consumer information processing of participants with T2DM, health providers and care takers. In order have accurate information. Recheck is necessary the information back and forth. This step was reviewed two source of information consist video records and note taking. Information in tape or video records was performed in Thai and research team was categorized in order to maintain original meaning. Process of content analysis approached step by step after listening till coverage categorized information. All messages were computed in NVivo official version 10 (Qualitative data analysis computer software package produced by QSR International). The conclusion was rechecked completely objectives of this step.

CHAPTER IV

RESULTS

This chapter were presented both descriptively and analytically in order of the research objective posed in the chapter one. The elementary goal stimulating data collection in phase 1 were: step 1 i) To explore the situation of diabetes in older adult and elderly with T2DM seeking care at the 61th Sungwan Thusanarom Health Center, Saimai district, Bangkok, ii) To determine the factors associated with HbA1c and quality of life. In step 2 were investigated explanatory model of DM, the pattern of communication and consumer information processing among older adult and elderly patients with T2DM, care takers and health care providers. This then had been link to step 3 developing campaign of Multifaceted Healthy Coaching Program. Phase 2 of this study were elaborate the effect of Multifaceted healthy coaching program to improve HbA1c and quality of life in older adult and elderly T2DM diabetics in the 61th Sungwan Thusanarom Health Center.

The results for this study were presented in the same order in which the studies were done. First, the results for Phase 1 in step 1-3 followed by phase 2 was exposited in length as the following outline.

4.1 Phase 1: Developed the intervention

    4.1.1 Step 1: Situation analysis

        4.1.1.1 General information

           1) Socio-demographic

           2) Historical of medication

           3) Mobile phone using

           4) Barriers of accessing health information

        4.1.1.2 Health Literacy

        4.1.1.3 Knowledge of diabetes

        4.1.1.4 Self-efficacy

        4.1.1.5 Self-care activities

           1) Eating behavior

           2) Exercise

           3) Smoking

           4) Alcohol drinking

           5) Drug administration

           6) Feet care

4.1.1.6 Quality of life in T2DM diabetics

4.1.1.7 Factors associated with HbA1c in T2DM diabetics

4.1.1.8 Factors associated with quality of life in T2DM diabetics

4.1.2 Step 2: Prioritized problem and needed of diabetes in T2DM diabetics

4.1.3 Step 3: Developed the protocol of Multifaceted Healthy Coaching

program

4.2 Phase 2: Implement and evaluation of Multifaceted Health Coaching program

This part was explicit the effectiveness of the Multifaceted Healthy Coaching

Program to improve HbA1c and quality of life in T2DM diabetics by design:

Randomized Control trial

4.2.1 Characteristic of participants in the intervention and control groups

4.2.2 The effect of Multifaceted Healthy Coaching program to improve HbA1c

and quality of life within the intervention and control groups

4.2.3 The effect of Multifaceted Healthy Coaching program to improve HbA1c

and quality of life between the intervention and control groups

4.1 Phase 1: Developed the intervention

4.1.1 Step 1: Situation analysis

In this step, 274 T2DM patients seeking care at the 61th Public Health Center were simple selected at the beginning 8 April 2016 – 30 July 2016. This part were describe socio-demographic characteristic, medical history of DM, knowledge of DM management, health literacy, self-efficacy, self-care activity , glycemic control clarified by HbA1c , quality of life. The inferential analytical present the associated of health literacy, knowledge of DM management, self-efficacy, self-care activities with HbA1c and quality of life among T2DM patients.

4.1.1.1 General information

1) Socio-demographic

Of the 274 Type 2 diabetics in the sample, almost 70.1% were female and aged over 60 years old. 73.4 % had received lower than high school education, 84.6% earned monthly income 15,000 THB and 85.0 % on the government UCS welfare health care scheme. Most of them lived with family and had care taker supporting 94.5%. Care taker were daughter or son or daughter son in law 43.1 % and 23.0 % were their couples.

Table 11 Socio-demographic of participants (n = 274)

Socio-demographic	n (%) n = 274	Socio-demographic	n (%) n = 274
Sex		Occupational	
- Male	82 (29.9)	- Non-occupation	141 (51.5)
- Female	192 (70.1)	- Occupational	133 (48.5)
Age (year) Mean=63.7 SD±9.6		Merchant	65 (48.9)
- 55 – 59	73 (26.6)	Employee	32 (24.1)
- 60 – 69	121 (44.2)	Agriculture	21 (15.8)
- 70 -79	80 (29.2)	Other	15 (11.3)
Education		Source of income (more than one)	
- Not-attended school	13 (4.8)	-Family support	178 (65.0)
- Primary school		-Occupational	141 (51.5)
1) grad 1-3	71 (25.9)	-Government support	127 (46.4)
2) grad 4-6	102 (37.2)	-Other	18 (6.6)
- High school	74 (27.0)	-Pension	11 (4.0)
- higher school	14 (5.1)		
Marital status		Monthly income(THB)	
- Single	32 (11.7)	≤ 5,000	108 (39.4)
- Widow	57 (20.8)	- 5,001 – 15,000	124 (45.2)
- Married	174 (63.5)	> 15,000	42 (16.4)
- Divorce	11 (4.0)		

Table 11 Socio-demographic of participants (n = 274) (cont.)

General information	n (%)	General information	n (%)
Health insurance scheme		Having care taker When get ill or sick	
- Universal coverage Scheme	233 (85.0)	- Yes	259 (94.5)
		- NO	15 (5.5)
- State enterprise officer	29 (10.6)	Care taker person (more than one)	
- Social security scheme	1 (0.4)	- daughter/son	118 (43.1)
- Payment	11 (4.0)	/daughter-son in law	
Stay with family		- Couple	63 (23.0)
- Yes	259 (94.5)	- Sister/brother	7 (2.6)
- No	15 (5.5)	- Nephew/niece	4 (1.5)

2) Historical of medication

The medication records in table 12 had found almost 85.4% of the patients had a BMI over normal levels and 63.9% of them had diabetes for longer than 5 years. Comorbidity disease beside diabetes presented 90.5% having at least one comorbidity:81 % with hypertension, 44.2 % with dyslipidemia. For diabetes controllable diabetes in this sample was also not up to 50.0% of achievement goal because 63.5% having HbA1c levels higher than the optimum recommended levels of below 7% while 66.8% of them were seen FPG level higher than normal level as 126mg/dl.

Table 12 Historical of medication of participants (n=274)

Medication	n (%)	Medication	n (%)
BMI (normal 18.5-22.9)		Duration with DM(year)	
< 18.5	3 (1.1)	≤ 5	99 (66.1)
- 18.5 – 22.9	44 (16.1)	- 6 – 10	98 (35.8)
- 23.0 – 24.9	44 (16.1)	> 10	77 (28.1)
- 25.0 – 29.9	127 (46.4)	Mean (SD)=8.4 (5.8) Min=1 Max= 44	
≥ 30.0	56 (20.3)	Comorbidity	
Mean (SD) = 27.1(4.5) Min=16.4 Max=49.3		No	26 (9.5)
Fasting Plasma Glucose	Mg./dl.	Yes	248 (90.5)
< 100 mg/dl.	17 (6.2)	*Comorbidity disease (more than one)*	
- 100 – 126 mg/dl.	74 (27.0)	- Hypertension	222 (89.5)
> 126 mg/dl.	183 (66.8)	- Dyslipidemia	121 (48.8)
Mean(SD)= 130(84.7) Min= 70 Max= 359		- Osteoarthritis (OA)	26 (9.5)
Hemoglobin A1c	(HbA1c)	- Eye disease	23 (8.4)
< 7 %	100 (36.5)	-Cardiovascular disease	17 (6.2)
- 7.0 – 7.9 %	89 (32.5)	- Gout	11 (4.0)
- 8.0 – 9.9 %	64 (23.4)	- Kidney disease	3 (1.1)
≥ 10.0 %	21 (7.7)	- Liver disease	3 (1.1)
Mean(SD)= 7.6(1.3) Min=5.1 Max= 11.7			

3) Characteristic and using of mobile phone

The participants were largely have their own mobile phone 82.1 % despite 72.3 % of of T2DM patients were answer that was important for their life with 21.5 % had ever used SMS, 31.8 % had ever used line while 18.6 % had ever used for sending or searching health information. Most of participants with 74.1 % want to receive service of SMS reminding for DM management and telephone counselling for diabetes care service.

Table 13 Functional and using of mobile phone of participants (n = 274)

Functional and using of Mobile phone	Yes n (%)	No n (%)
1. Having their own mobile phone.	225 (82.1)	49 (17.9)
2. The mobile phone was important for daily life.	198 (72.3)	76 (27.7)
3. Using SMS mobile phone service.	59 (21.5)	215 (78.5)
4. Using line mobile phone service	87 (31.8)	187 (68.2)
5. Sending and searching health information via mobile phone/smart phone	51 (18.6)	223 (81.4)
6. Reading all of receiving SMS in mobile phone	50 (18.2)	224 (81.8)
7. Ever received SMS/Video/ of health information.	44 (16.1)	230 (83.9)
8. SMS of health information about diabetes management disturb in daily life.	26 (9.5)	248 (90.5)
9. Needed counselling or reminding of diabetes care service via SMS or calling from the 61th Health Center for patients.	203 (74.1)	71 (25.9)

4) Accessing and barriers of understanding health information

Participants were probability received health information from television 94.5 % while 72.3 % from neighborhood and 51.8 % from health provider. However, health information from television were made unclearly understand among 30.3 % of T2DM patients and 22.3 % were unclearly understand health information in the leaflet or poster or multimedia.

Table 14 Accessing sources of health information of participants (n = 274)

Source of health information	n (%)
Source of mostly receiving health information (More than one)	
- Health provider	142 (51.8)
- Family member	124 (45.3)
- Neighborhood	198 (72.3)
- Leaflet/Poster/ Multimedia	69 (25.2)
- Television	259 (94.5)
- Radio	101 (36.9)
- Internet source	31 (11.3)

Table 14 Accessing sources of health information of participants (n = 274)(cont.)

Source of health information	n (%)
Source of health information made unclear understanding	
- Health provider	8 (2.9)
- Family member	16 (5.8)
- Neighborhood	55 (20.1)
- Life-let/Poster/ Multimedia	61 (22.3)
- Television	83 (30.3)
- Radio	33 (12.0)
- Internet source	11 (4.0)
- Other (Event, Health volunteer, Seller/PR of health product	7 (2.3)

Almost 70.0 % of T2DM patients had ever read individual DM booklet with 63.5 % read before see doctor for treatment follow up and 60.2 % of T2DM patients read it when had complication or got sick in the other hand 54.7 % read it after met doctor for treatment follow up. According to the reasons for unread individual DM booklet, with 71.0 % of unread DM booklet were clearly understand explanation of DM management by doctor ,44.1 % raised small alphabet in DM booklet made them blur vision and

confused while 33.3 % did not want to read it. In addition, barriers of understanding health information were found close to half 49.6 % of total participants were unclear understanding when faced health information with technical term explanation, specifically medical explanation and 43.4 % received health information in a short time period were not clearly understand as in the table 15.

Table 15 Barriers of understanding health information of participants (n = 274)

Barriers of understanding health information	Yes n (%)	No n (%)
1. Reading diabetes booklet.	181 (66.1)	93 (33.9)
Reading DM booklet on the situation. (more than one)	n = 181	
- Before go to see doctor for treatment follow up.	115 (63.5)	66 (36.5)
- After met doctor for treatment follow up.	99 (54.7)	82 (45.3)
- You have had complication or got sick.	109 (60.2)	72 (39.8)
- You want to know your DM or health status.	69 (38.1)	112 (61.9)
2. The reasons for do not read DM booklet (more than one) (n = 93)		
-Already received clearly explanation from doctor.	66 (71.0)	27 (29.0)
- Reading book is not better than listen.	31 (33.3)	62 (66.7)
- The small alphabet made blur vision and confused.	41 (44.1)	52 (55.9)
- The content have many technical term of words.	89 (95.7)	4 (4.3)
- The booklet design is not attractive.	28 (30.1)	65 (69.9)
- Busy	13 (14.0)	80 (86.0)

Table 15 Barriers of understanding health information of participants (n=274) (cont.)

Barriers of understanding health information	Yes n (%)	No n (%)
3. The following barriers effect to your understanding about information of DM management. (more than one)		
- Small alphabet/blur vision	125 (45.6)	149 (54.5)
- Technical term explanation/specifically medical explanation	136 (49.6)	138 (50.4)
- Pattern of transferring/kind of communication	78 (28.5)	196 (71.5)
- The difference of content from previously received	103 (37.6)	171 (62.4)
- Short time period of accessing/receiving	119 (43.4)	155 (56.6)
- Other	12 (4.4)	262 (95.6)

4.1.1.2 Health Literacy

Most of the T2DM patients had moderate level in the overall of health literacy (74.1%) and by domain; functional skills (65.0%), interactive communication skills (76.6%) and critical skills (71.9%). However high levels of health literacy were seen in few of the patients across the three domains; with a particularly low percentage of patients (1.5%) having high health literacy in terms of interactive skills. In the same way, in 5 components of health literacy were seen moderate level despite the lowest skill were seen in getting media and health information literacy components of critical skill (65.3 %) as in the table 16.

Table 16 Health Literacy by domain (n = 274)

Health Literacy by domains	Range of Scoring		
	Low	Moderate	High
	n (%)	n (%)	n (%)
Health literacy overall	(0 – 49.9)	(50.0–80.0)	(80.1-100.0)
Mean(SD)= 57.8 (10.8) Min= 30.0 Max= 85.0	65 (23.7)	203 (74.1)	6 (2.2)
1 Functional skill	(0 – 14.9)	(15.0-23.9)	(24.0-30.0)
Mean(SD) = 21.6 (3.8) Min=11.5 Max=30.0	14 (5.1)	178 (65.0)	82 (29.9)
a Needed health knowledge and understanding	(0–4.9)	(5.0–8.0)	(8.1–10.0)
Mean(SD) = 7.0 (1.5) Min=3.0 Max=10.0	17 (6.2)	206 (75.2)	51 (18.6)
b Accessing with health information and service	(0–9.9)	(10.0–16.0)	(16.1–20.0)
Mean(SD) =14.6 (3.1) Min=7.5 Max=20.0	11 (4.0)	174 (63.5)	89 (32.5)
2.Interactive communication skill	(0–21.9)	(22.0-35.1)	(35.2-44.0)
Mean(SD) = 22.9 (6.4) Min=5.0 Max=40.0	109 (39.8)	158 (57.7)	7 (2.6)
a Communicating for added Professional	(0-11.9)	(12.0-19.2)	(19.3-24.0)
Mean(SD) =12.3 (3.7) Min=1.0 Max=23.0	105 (38.3)	164 (59.9)	5 (1.8)
b Managing health conditions	(0–9.9)	(10.0–16.0)	(16.1–20.0)
Mean(SD) = 10.4 (4.0) Min=0 Max=20.0	117 (42.7)	142 (51.8)	15 (5.5)

Table 16 Health Literacy by domain (n = 274) (cont.)

Health Literacy by domains	Range of Scoring		
	Low	Moderate	High
	n (%)	n (%)	n (%)
Critical skill	(0 – 19.9)	(20.0-31.9)	(32.0-40.0)
Mean (SD) = 21.3(5.6) Min=9.0 Max=38.0	115 (42.0)	146 (53.3)	13 (4.7)
5) getting media and health information literacy	(0–9.9)	(10.0–16.0)	(16.1–20.0)
Mean (SD) = 8.4 (4.6) Min= 0 Max=20.0	179 (65.3)	83 (30..3)	12 (4.4)
6) Making the appropriate health decision to good practice	(0–9.9)	(10.0–16.0)	(16.1–20.0)
Mean (SD) = 12.8 (2.7) Min= 7.0 Max=19.0	24 (8.8)	204 (74.5)	46 (16.8)

In term of needed health knowledge and understanding healthy behaviors which was the first component of functional skill were seen most of the T2DM patients corrected understanding kind of food for patients with DM 74.5% and hypertension (82.1%). In the same, almost of 82.0% T2DM diabetics were made the appropriate management to change guilty emotional to be happiness and were known what are the diseases from smoking and exposure Tar or Nicotine but 65.7% of T2DM diabetics unknown kind of high risk second hand smoking exposure as in the table 17.

Table 17 Needed health knowledge and understanding in items (n = 274)

Needed health knowledge and understanding 10 items	Corrected n (%)	Uncorrected n (%)
1) Known and understanding kind of food to reduce risk to hypertension beside DM	225 (82.1)	49 (17.9)
2) Known and understanding which chronic disease should be prevent by taking varieties of vegetable.	160 (58.4)	114 (41.6)
3) Known and understanding which chronic disease caused by taken food with high sugar.	238 (74.5)	36 (11.1)
4) Known and understanding how to perform step of exercise to reduce risk of cancer, Cardiovascular disease, Heart disease and hypertension.	204 (62.8)	70 (21.5)
5) Known and understanding the good exercise for older adult and elderly.	148 (54.0)	126 (46.0)
6) Known and understanding the best management emotional to change guilty emotional to be happiness.	224 (81.8)	50 (18.2)
7) Known and understanding the appropriate activities to reduce stress in older adult and elderly.	233 (71.7)	41 (15.0)
8) Known and understanding the disease that smoker and exposure secondhand smoking had low risk to get it.	221 (80.7)	53 (19.3)

Table 17 Needed health knowledge and understanding in items (n = 274)(cont.)

Needed health knowledge and understanding item	Corrected n (%)	Uncorrected n (%)
9) Known and understanding how exposed second hand smoking due to high risk affect their health.	94 (34.3)	180 (65.7)
10) Known and understanding what are diseases caused by alcohol consumption.	183 (66.8)	91 (33.2)

In table 18 was preferred how often of accessing health information and services among T2DM patients which was the second component of functional skill. Participants had accessed health information sometime with more than half (55.1%) were rechecked for believable health information from varieties sources, it was the same with 48.2% of T2DM patients checking to correct it. However, a few participants (9.5%) had got a trouble to access health information very often times.

Table 18 Accessing with health information and service in items (n = 274)

Accessing with health information and service 5 items	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
1) Accessing health information immediately, when they want to know about healthy behavior.	25 (9.1)	53 (19.3)	105 (38.3)	49 (17.9)	42 (15.3)
2) Accessing or check to corrected health information	13 (4.7)	57 (20.8)	132 (48.2)	41 (15.0)	31 (11.3)
3) Have a trouble to access health information when they want to acess.	26 (9.5)	97 (35.4)	113 (41.2)	26 (9.5)	12 (4.4)
4) Update health information or check it for clearly understanding.	14 I5.1)	39 (14.2)	101 (36.9)	97 (35.4)	23 (8.4)
5) Recheck the source of health information for confirmation believable.	11 (4.0)	16 (5.8)	151 (55.1)	79 28.8)	17 (6.2)

In table 19 was presented frequency of communication for added Professional which was the first component of interactive communicating skill. Sometimes, almost of T2DM were not understand explanation from someone (37.6%) , 33.2 % of them request helping to teach and read health information while 31.0% of T2DM patients were unclearly understand lift let and DM management manual. In

addition, 40.9% had almost never persuaded someone to accept health information and 38.4 % of T2DM had almost never present reading, speaking and written health information skill to someone more than that 29.9% of them had never made understanding about DM management and told this trouble to member of family or their friends.

Table 19 Communicating for added Professional in items (n = 274)

Communicating for added Professional 6 items	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
1) Received health information from someone but do not make understand.	7 (2.6)	33 (12.0)	103 (37.6)	87 (31.8)	44 (16.1)
2) Request someone helping to teach you reading health information.	19 (6.9)	59 (21.5)	91 (33.2)	56 (20.4)	49 (17.9)
3) Made understand and telling about your DM management for family member or your friends.	5 (1.8)	49 (17.9)	61 (22.3)	73 (28.1)	82 (29.9)
4) Can't make understand lift let or DM management booklet.	36 (13.1)	73 (26.6)	85 (31.0)	59 (21.5)	21 (7.7)

Table 19 Communicating for added Professional in items (n = 274) (cont.)

Communicating for added Professional 6 items (cont.)	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
5) Present your reading, speaking and written health information skill to someone especially diabetes management information.	10 (3.6)	22 (8.0)	46 (16.4)	104 (38.4)	93 (33.9)
6) Persuade someone to accept your presentation of health information	21 (7.7)	32 (11.7)	28 (10.2)	112 (40.9)	81 (29.6)

In table 20 was present frequency of health condition management which was the second component of interactive communicating skill. Patients with T2DM had concern about nutrition and sugar consumption sometime (33.6%) and very often (20.4%) in daily meal. In addition, most of T2DM patients were manage health condition sometime in term of renovation environment to convince healthy behaviors (44.2%) while 41.6% evaluation stress and reducing it with the appropriate way. However, 38.7% of T2DM patients had almost never remind to maintain healthy behaviors as same as 32.5% of T2DM patients had almost never plan to exercise and reach goal of exercise planning.

Table 20 Managing health condition in items (n = 274)

Managing health condition 5 items	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
1) Concern nutrition and sugar consumption in your daily meal.	56 (20.4)	64 (23.4)	92 (33.6)	43 (15.7)	19 (6.9)
2) Plan to exercise and following to reach planning goal.	38 (13.9)	29 (10.6)	55 (20.1)	89 (32.5)	63 (23.0)
3) Evaluation stress and getting achievement to reduce it with the appropriate way.	22 (8.0)	56 (20.4)	114 (41.6)	58 (21.2)	24 (8.8)
4) Remind healthy behavior to maintain healthy.	30 (10.9)	41 (15.0)	76 (27.7)	106 (38.7)	21 (7.7)
5) Renovation the environment to convince healthy behavior.	18 (6.6)	48 (17.5)	121 (44.2)	67 (24.5)	20 (7.5)

In table 21 was present frequency of getting media and health information literacy which was the first component of critical skill. In the first item, most of T2DM (40.5%) had never rechecked the reliability and truly on health products and health services and a few of T2DM patients (3.6%) were very often intend to do it. However, 35.4% of T2DM patients were sometime concerned about the meaningful

or believable of health information before accepted and practiced following while 38.0% of T2DM patients were sometime accepted health information from health education program as same as 40.5% of T2DM patients that accepted consensus of DM management from group discussion based on confirmation truly of health information.

Table 21 Getting media and health information literacy in items (n = 274)

Getting media and health information literacy 5 item	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
1) Recheck reliability and truly of advertisement of health product and health service from television.	3 (1.1)	18 (6.6)	63 (23.0)	79 (28.8)	111 (40.5)
2) Played attention to recheck reliability and truly of health product and health service advertisement from web site or multimedia.	10 (3.6)	16 (5.8)	81 (29.6)	93 (33.9)	74 (27.0)
3) Accepted health information based on meaningful and believable of its to make good practice.	7 (2.6)	14 (5.1)	97 (35.4)	71 (25.9)	85 (31.0)

Table 21 Getting media and health information literacy in items (n = 274)(cont.)

Getting media and health information literacy 5 items n = 274	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
4) Accepted and confirm reliability and truly of health information from health education program based on	13 (4.7)	35 (12.8)	104 (38.0)	69 (252)	53 (9.3)
5) Accepted consensus of DM management from group discussion based on reliability and its truth.	26 (9.5)	51 (18.6)	111 (40.5)	47 (17.2)	39 (14.2)

In table 22 was present the appropriate health decision to good practice healthy behavior including food consumption, exercise, emotional, smoking and alcohol drinking. The best practice for healthy were seen 80.3% of T2DM patients making the appropriate health decision to good practice in term of alcohol drinking, secondary were seen 54.0% of T2DM patients making a good practice to maintain healthy exercise without someone beside and the third was a making decision for controlling unhealthy food consumption (60.6% of T2DM patients).

Table 22 Making the appropriate health decision to good practice in items
(n = 274)

Making the appropriate health decision to good practice 5items	n (%)
1) The appropriate health decision when you join party with unhealthy food.	
a) Eating all tasty food"	19 (6.9)
b) Eating a little bit unhealthy food	166 (60.6)
c) Try to find the lowest sugar food in party	50 (18.2)
d) Avoid unhealthy food and telling everybody for illness with diabetes disease.	39 (14.2)
2) Decision making for exercise when your friend who beside you stop to exercise.	
a) Stop exercise.	67 (24.5)
b) Remain exercise without friend but will be stop if it bored.	49 (17.9)
c) Maintain healthy exercise.	148 (54.0)
d) Encouraged my friend maintain healthy exercise with me	10 (3.6)

Table 22 Making the appropriate health decision to good practice in items

(n = 274)(cont.)

Making the appropriate health decision to good practice 5items	n (%)
3) Technique to reduce stress.	
a) Relaxing with a favorite entertainment.	148 (54.0)
b) Chosen extreme exercise to reduce stress.	20 (7.3)
c) Go to temple, chant and meditation.	23 (8.4)
d) Recall to wonder moment and thinking in the positive way.	83 (30.3)
4) Decision making when your family member smoking inside home.	
a) Let them smoking	29 (10.6)
b) Go outside for unexposed second hand smoking.	147 (53.6)
c) Persuade them to stop smoking for other health.	50 (18.2)
d) Persuade them to stop smoking for healthy family.	48 (17.5)
5) Decision making for invitation to hang out and drinking with your friend at her/his home.	
a) Drink a lot with friend	8 (2.9)
b) Drink a bit	40 (14.6)
c) Drink a lot but no drive and let friend send back to home.	6 (2.2)
d) Drink only water and give the reason why can't drink alcohol.	220 (80.3)

4.1.1.3 Knowledge of diabetes of participants

The averaged of diabetes knowledge score among T2DM patients were 15.6 which in range of moderate level. On the other hand most of T2DM patients (55.1%) had found high level classified by averaged score 16.0-20.0 while 38.3 % of T2DM patients had moderate level (10.0-15.9). However, low level of diabetes knowledge was seen in few T2DM patients (6.6%).

Table 23 Diabetes knowledge level (n = 274)

Diabetes knowledge level (score)	n (%)	Mean(SD)
Low (0 – 9.9)	18 (6.6)	8.3 (1.3)
Moderate (10.0 – 15.9)	105 (38.3)	12.9 (3.1)
High (16.0 – 20.0)	151 (55.1)	17.6 (3.2)
Mean = 16.6 SD±3.1		

Diabetes knowledge were test knowledge and understanding of diabetes managements among T2DM patients including characteristic of diabetes, food consumption, physical activity or exercise, drug administration and feet care. In item characteristic of diabetes, 2 of 3 T2DM patients were mostly known hypoglycemia symptoms (90.5%) and diabetes symptom (87.2%) despite 52.2% of T2DM patients were misunderstand how to treat hypoglycemia symptoms. Moreover, largely of T2DM patients (63.5%) were incorrectly answer that genetic disorder was only one caused of diabetes disease. Diabetes knowledge: food consumption were found most of T2DM patients known limited high sodium or salty food reduced risk of hypertension in T2DM

(89.4%) and what kind of food were appropriate for people with T2DM. Next knowledge of the appropriate exercise for T2DM patients with 81.0% of T2DM patients were known how to exercise in correct way for improving controllable blood glucose level and 71.5% of T2DM patients were known exercise increasing metabolism and reducing blood glucose level. However, this part were seen a weak point of drug administration understanding that almost of T2DM patients (63.1%) think generic name, pharmacokinetic of diabetes medicine non-necessary for diabetes management and closely to half of them (48.9%) misunderstanding that in normal level of blood sugar could be stop taking drug. In addition, two of third T2DM patients well known healthy behavior for controlling blood glucose for example smoking and alcohol drinking as in table 24.
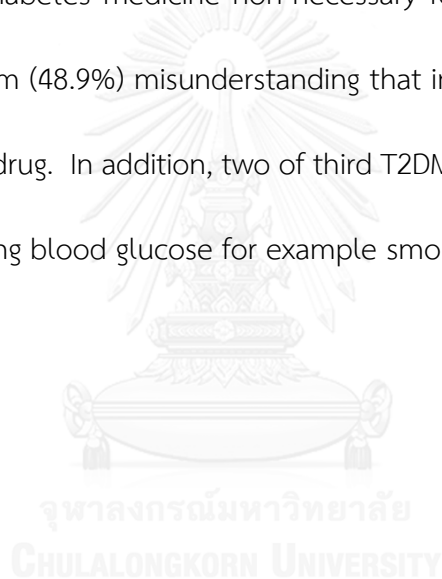
Table 24 Knowledge of diabetes in items of participants (n = 274)

No	Diabetes knowledge Test	False n (%)	True n (%)
1.	Characteristic of diabetes mellitus is high blood glucose level.	138 (50.4)	135 (49.3)
2.	Hypoglycemia or Hyperglycemia are the complication of diabetes mellitus.	90 (32.8)	184 (67.2)
3	Hypoglycemia symptom are present shakiness/Nervousness or anxiety, Sweating, chills and clamminess/ Lightheadedness or dizziness.	26 (9.5)	248 (90.5)
4	Diabetes mellitus symptom are Urinating often, Feeling very thirsty, and Feeling very hungry - even though you are eating. Extreme fatigue, Blurry vision, Cuts/bruises that are slow to heal, Weight loss - even though you are eating more (type 1) Tingling pain, or numbness in the hands/feet (type 2)	35 (12.8)	239 (87.2)

Table 24 Knowledge of diabetes in items of participants (n = 274)(cont.)

No	Diabetes knowledge Test	False n (%)	True n (%)
5	There is only one causation as genetic disorder related diabetes disease.*	98 (36.5)	174 (63.5)
6	Diabetes patients may require sweet candy or sweet soft-drink when get hypoglycemia symptom.	131 (47.8)	143 (52.2)
7	Diabetes mellitus patients can take unlimited of green vegetable.	31 (11.3)	243 (88.7)
8	Diabetes mellitus patients can take lean meat unlimited.*	133 (48.5)	141 (51.5)
9	Diabetes mellitus patients have to limit high sodium and salty food to reduce risky of DM complication as hypertension or kidney disease.	29 (10.6)	245 (89.4)

Table 24 Knowledge of diabetes in items of participants (n = 274)(cont.)

No	Diabetes knowledge Test	False n (%)	True n (%)
10	Drug adherence is treatment for cured from DM disease.	113 (41.2)	161 (58.8)
11	Unknown generic name and pharmacokinetics of DM medicines are not affect for DM management in DM patients.*	101 (36.9)	173 (63.1)
12	Patients with 2DM who had normal blood glucose level < 140 mg./dl might be stop drug administration. *	140 (51.1)	134 (48.9)
13	Exercise lead to increase metabolism and improve controlling blood glucose.	78 (28.5)	196 (71.5)
14	Exercise for 30 minute at least three times/week will improve controllable blood glucose.	52 (19.0)	222 (81.0)
15	Patients with DM have to stop exercise when get heart attack or weakness or dizziness.	10 (3.6)	264 (96.4)
16	The best period time for exercise is 10 minute/day.	121 (44.2)	153 (55.8)
17	DM patients have to choose shoe;care soft, fit size, without button foot for massage.	83(30.3)	191 (69.7)
18	Patients with DM have to stop smoking and drinking alcohol.	43 (15.7)	231 (84.3)
19	Patients with DM have to check up oral health twice a year	57 (20.8)	217 (79.2)
20	Patients with DM have to see doctor when get vomiting and blur vision.	32 (11.7)	242 (88.3)

4.1.1.4 Self-efficacy of diabetes management

In table 25, patient's self-efficacy were seen averaged score in high level (98.5% of T2DM patients) both of overall and each items. It was present high confidence of self-management with diabetes such as physical activity, current dietary habits, blood glucose monitoring, and the patients' current perception of diabetes. In the same, T2DM patients were found high confidence that they can go to see doctor all of follow up appointment and can maintain drug adherence. However, it was contrast confidence with suggestion exercise for healthy.

Table 25 Self-efficacy of diabetes management in items (n = 274)

Self-Efficacy items	Mean (SD)	Low (0 – 3.0) n (%)	Moderate (3.1-5.9) n (%)	High (6.0-10.0) n (%)
Self-efficacy all items	7.5(1.1)	1 (0.4)	3 (1.1)	270 (98.5)
1) Confidential of feeling with eating meals every 4 to 5 hours including breakfast every day.	7 (1.4)	5 (1.8)	4 (1.5)	265 (96.7)
2) Confidential of feeling with following diet plan when preparation or sharing food with non DM people.	7 (1.4)	5 (1.8)	5 (1.8)	264 (96.4)
3) Confidential of feeling with chosen appropriate foods for DM disease (for example, snacks).	7.1 (1.3)	4 (1.5)	1 (0.4)	269 (98.2)
4) Confidential of feeling with exercise 15 to 30 minutes for 4 to 5 times a week.	6.5 (2.0)	14 (5.1)	16 (5.8)	244 (89.1)

Table 25 Self-efficacy of diabetes management in items (n = 274) (cont.)

Self-Efficacy items	Mean (SD)	Low (0 – 3.0) n (%)	Moderate (3.1-5.9) n (%)	High (6.0-10.0) n (%)
5) Confidential of feeling with making an appropriate prevention dropping blood sugar during exercise period.	6.6 (1.8)	9 (3.3)	14 (5.1)	251 (91.6)
6) Confidential of feeling with treatment for blood glucose dropped.	6.9 (1.6)	6 (2.2)	3 (1.1)	265 (96.7)
7) Confidential of feeling with judgement progress of illness to visit the doctor.	7.9 (1.4)	2 (0.7)	-	272 (99.3)
8) Confidential of feeling with meeting doctor all of appointment follow up.	8.5 (1.4)	2 (0.7)	-	272 (99.3)
9) Confidential of feeling for drug adherence in order of prescription from doctor.	8.5 (1.4)	2 (0.7)	2 (0.7)	270 (83.1)
10) Confident of feeling to maintain healthy feet such as routine care.	7.8 (1.3)	1 (0.4)	-	273 (99.6)

Table 25 Self-efficacy of diabetes management in items (n = 274) (cont.)

Self-Efficacy items	Mean (SD)	Low (0 – 3.0) n (%)	Moderate (3.1-5.9) n (%)	High (6.0-10.0) n (%)
11) Confidential of feeling with blood glucose controlling without interfere with the things in daily life.	7.9 (1.2)	1 (0.4)	2 (0.7)	271 (98.9)
12) Feeling of acceptable performance of controlling and monitoring diabetes to make healthy life.	7.8 (1.2)	1 (0.4)	2 (0.7)	271 (98.9)

4.1.1.5 Self-Care Activity

This section were present self-care activity level classified by range of score overall and each components including eating behavior, exercise, smoking, alcohol drinking, drug administration and feet care. Of the patients 66.8 % were seen high level of self-care activity which was difference with particularly 6 patients having low level as in table 26.

Table 26 Self-care activity level of participants (n = 274)

Self-care activity (score)	n (%)	Mean (SD)
Low (0 – 29.9)	7 (2.6)	28.2 (1.6)
Moderate (30.0 – 41.9)	85 (31.0)	37.7 (2.7)
High (42.0 – 60.0)	182 (66.4)	47.2 (3.9
Mean= 43.8 SD 6.1 Min= 23.3 Max 58.7		

In the separate components had found self-care activities; exercised and feet care in the moderate level. However, eating behaviors, drug adherence, unhealthy behavior; smoking drinking were seen high level as detail in the table 27

Table 27 Self-care activity of participants by components

Self-care activities by components	Low (0-3.3)	Moderate (3.4-4.9)	High (5.0-10.0)
Eating behavior Mean (SD) =6.8 (1.5)	6 (2.2)	85 (31.0)	183 (66.8)
Exercise Mean (SD) =5.8 (2.6)	72 (26.3)	159 (58.6)	43 (15.7)
Smoking Mean (SD) =9.3 (1.7)	9 (3.3)	54 (19.7)	211 (77.0)
Drinking Mean (SD) =8.1 (2.4)	2 (0.7)	89 (32.5)	183 (77.0)
Drug administration Mean (SD) = 8.7 (1.3)	7 (2.5)	83 (30.3)	184 (67.2)
Feet care Mean (SD) = 7.9 (1.4)	3 (1.1)	202 (73.7)	69 (25.2)

4.1.1.6 Diabetes Quality of Life (DQOL)

Patients with 83.9 % of T2DM patients had moderate level of quality of life consist of satisfaction with treatment and impact of treatment. On the other hand, a few patients were present low level and high level with 5.8% and 10.3% of T2DM patients respectively.

Table 28 Quality of life among participants (n = 274)

Quality of life	n (%)	Mean (SD)
Low (0 – 49.9)	16 (5.8)	44.2 (4.9)
Moderate (50.0 – 79.9)	230 (83.9)	66.3 (1.2)
High (80.0 – 100.0)	28 (10.3)	83.9 (8.2)
Mean=66.7 SD±10.6		

In the table 29, T2DM patients were very satisfied with time spent for diabetes treatment including time period to test sugar level (51.1%) and time period to check up treatment of diabetes (44.9%). Next down on 62.0% of T2DM patients were moderately satisfied with their knowledge of diabetes as same as level of satisfaction current treatment of diabetes with 52.2 % of T2DM patients. Although, most of T2DM patients were very satisfied with taking time for diabetes treatment low percentage of patients (2.6%) feeling very dissatisfied with the amount of time for diabetes management in daily life.

Table 29 Quality of life of participants by satisfaction with diabetes treatment (n = 274)

Satisfaction with diabetes treatment (7 items)	Very satisfied n (%)	Moderately satisfied n (%)	Neither n (%)	Moderately dissatisfied n (%)	Very dissatisfied n (%)
1) Satisfaction with current DM treatment.	122 (40.9)	143 (52.2)	12 (4.4)	6 (2.2)	1 (0.4)
2) Satisfaction with time spent to manage DM.	54 (19.7)	131 (47.8)	58 (21.2)	24 (8.8)	7 (2.6)
3) Satisfaction with time spent to determine your sugar level.	140 (51.1)	102 (37.2)	27 (9.9)	4 (1.5)	1 (0.4)

Table 29 Quality of life of participants by satisfaction with diabetes treatment

(n = 274) (cont.)

Satisfaction with diabetes treatment (7 items)	Very satisfied n (%)	Moderately satisfied n (%)	Neither n (%)	Moderately dissatisfied n (%)	Very dissatisfied n (%)
4) Satisfaction with spent more time for exercising.	50 (18.2)	102 (37.2)	90 (32.8)	30 (10.9)	2 (0.7)
5) Satisfaction with time spent to follow up DM.	123 (44.9)	137 (50.0)	14 (5.1)	-	-
6) Satisfaction with knowledge DM in mind.	64 (23.4)	170 (62.0)	37 (13.5)	3 (1.1)	-
7) Sexual satisfaction.	5 (1.8)	30 (10.9)	237 (86.5)	2 (0.7)	-

In the table 30, 42.7% of T2DM patients were fairly often obscure having diabetes for someone when they join party or eat something with someone meaning that it effect to food consumption of them. In addition, sometime half of T2DM patients (51.5%) had had pain because of diabetes treatment as same as feeling physical ill and feeling worry about missing their work with 39.1% and 39.8% of T2DM patients, sometime.

Table 30 Quality of life of participants by impact of illness and treatment (n = 274)

Impact of illness and treatment (7 items)	Very often n (%)	Fairly often n (%)	Sometime n (%)	Almost never n (%)	Never n (%)
1) Eating something shouldn't rather than tell someone that have DM disease.	49 (17.9)	117 (42.7)	79 (28.8)	19 (6.9)	10 (3.6)
2) Worry about whether would be miss working.	12 (4.4)	58 (21.2)	109 (39.8)	95 (34.7)	-
3) Got pain because of the treatment for DM.	7 (2.6)	56 (20.4)	141 (51.5)	69 (25.2)	1 (0.4)
4) Got sick beside DM.	9 (3.3)	64 (23.4)	107 (39.1)	94 (34.3)	-
5) Bad night's sleep because of DM.	2 (0.7)	15 (5.5)	54 (19.7)	124 (45.3)	79 (28.8)
6) Feeling DM limited career.	2 (0.7)	13 (4.7)	40 (14.6)	133 (48.5)	86 (31.4)
7) Feeling with the burden of DM placing on family.	1 (0.4)	10 (3.6)	35 (12.8)	109 (39.8)	119 (43.4)

4.1.1.7 Determinants of HbA1c of participants

1) The association of characteristics of participants and HbA1c

This part was determining the characteristics associated with HbA1c in T2DM diabetics at the 61th Sungwan Thusanarom Health Center, Saimai

district. The table 31 lay out t-test analysis and ONE-WAY ANOVA to find the factors associated with HbA1c. Of the assessed characteristics were not found the associated with HbA1c level.

Table 31 The characteristic associated with HbA1c of patients with T2DM (n = 274)

Characteristics	HbA1c Mean (SD)	t/F	p-value
Sex		1.14	0.26
- male	7.7 (1.5)		
- female	7.5 (1.3)		
Age (year)		0.97	0.36
- 50 – 59	7.7 (1.5)		
- 60 – 69	7.4 (1.3)		
> 69	7.7 (1.2)		
Educational		0.93	0.39
- Uneducated	7.2 (0.8)		
- Lower than high school	7.7 (1.3)		
- High school and higher	7.5 (1.4)		
Marital status		0.02	0.99
- Single	7.6 (1.4)		
- Widow	7.6 (1.3)		
- Married	7.6 (1.3)		
- Divorce	7.5 (1.1)		

Table 31 The characteristic associated with HbA1c of patients with T2DM
(n = 274) (cont.)

Characteristics	HbA1c Mean (SD)	t/F	p-value
Stay with family		-0.69	0.49
- Yes	7.3 (1.4)		
- No (home alone)	7.6 (1.3)		
Monthly income (THB.)		2.05	0.11
≤ 5,000	7.6 (1.3)		
- 5,001 – 15,000	7.5 (1.3)		
> 15,000	8.1 (1.6)		
Having care taker		-0.45	0.65
- Yes	7.6 (1.3)		
- No	7.4 (1.5)		

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2) Determinants of HbA1c enrolled duration with diabetes, health literacy, knowledge of diabetes, self-efficacy and self-care activities.

In table 32 lays out the result of multiple linear regression analysis of HbA1c determinant with duration suffering with diabetes, health literacy by domain, knowledge of diabetes, self-efficacy, self-care activities to lay out bivariate and multiple linear regression analysis. In the bivariate analysis duration suffering with diabetes, two domain of health literacy: Functional skill, interactive communication skill, self-efficacy, self-care activity were significantly related with HbA1c of T2DM

patients (p<0.05).. However, in the multivariate analysis were a significant associated duration suffering with diabetes and self-care activity with HbA1c by p<0.01. The association of determinant factors and HbA1c was formulated as HbA1c level = Formulate of predictors was HbA1c level= 0.29 + 0.17(Duration with DM) – 0.2(self-care activity and power of predicted 9 %. Thus HbA1c might be increase it could be more power to predict level of HbA1c among T2DM patients. Based on this mean function, the expected HbA1c level for T2DM diabetics depend on duration with DM (year) and self-care activity. Interpretation of this function , increasing of 1 year for duration with DM while reduction of self-care activity 1 scoring should be decrease HbA1c level 0.7 % and shown probability 9 % of function predicted.
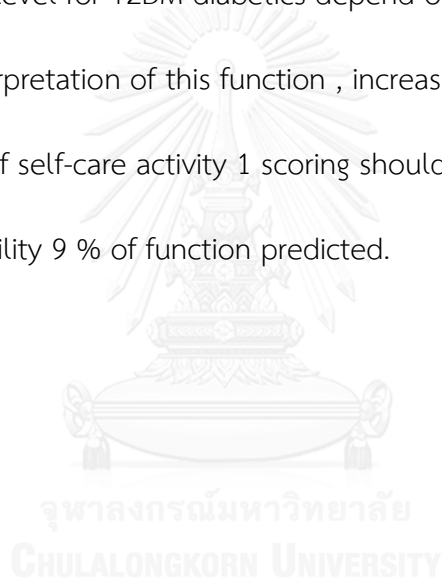
Table 32 Determinants of HbA1c including health literacy by domain, knowledge of diabetes, self-efficacy, self-care activities among patients with T2DM.

Variables	Mean	Unadjusted		Adjusted	
	(SD)	B	p-value	B	p-value
Duration suffering with diabetes	8.4 (5.9)	0.17	0.01	0.18	<0.01
Health literacy					
- Functional skill	21.6 (3.8)	-0.08	0.11	0.01	0.93
- Interactive communication skill	20.7 (6.9)	-0.11	0.03	0.001	0.96
- Critical skill	23.4 (4.9)	-0.18	0.01	0.03	0.18
Knowledge of diabetes	14.6 (3.2)	-0.12	0.02	0.02	0.95
Self-efficacy	7.5 (1.1)	-0.12	0.03	0.03	0.72
Self-care activities	43.8 (6.2)	-0.22	<0.01	-0.04	<0.01
R^2	0.09				
F	3.09				
p-value	<0.01				

4.1.1.8 Determinants of quality of life

1) The association of characteristics of participants and quality of life.

This part was determine the characteristics associated with quality of life among T2DM diabetics at the 61th Sungwan Thusanarom Health Center, Saimai district. The table 33 lay out t-test analysis and ONE-WAY ANOVA to find the factors associated with HbA1c. Of the assessed characteristics, BMI and duration of time suffering from diabetes were significantly associated with quality of life.

Table 33 The characteristic associated with quality of life in patients with T2DM (n=274)

Characteristics	QOL scoring Mean (SD)	t/F	p-value
Sex		-0.93	0.35
- male	68.5 (10.5)		
- female	67.1(10.6)		
Age (year)		1.10	0.34
- 50 – 59	66.1 (10.6)		
- 60 – 69	66.7 (10.9)		
> 69	67.3 (10.3)		
Educational		0.91	0.40
- Uneducated	70.3 (13.2)		
- Lower than high school	66.8 (10.3)		
- High school and higher	66.1 (10.8)		

Table 33 The characteristic associated with quality of life in patients with T2DM (n=274) (cont.)

Characteristics	QOL scoring Mean (SD)	t/F	p-value
Marital status		1.15	0.33
- Single	66.2 (11.2)		
- Widow	68.8 (10.5)		
- Married	66.1 (10.5)		
- Divorce	68.9 (10.4)		
Monthly income (THB.)		0.72	0.54
≤ 5,000	67.5 (11.0)		
- 5,001 – 15,000	65.8 (9.6)		
> 15,000	67.4 (10.9)		
Stay with family		1.14	0.25
- Yes	66.5 (11.9)		
- No (home alone)	69.8 (10.5)		
Having care taker		-0.69	0.49
- Yes	66.8 (11.9)		
- No	64.8 (10.4)		

Table 33 The characteristic associated with quality of life in patients with T2DM (n=274) (cont.)

Characteristics	HbA1c Mean (SD)	t/F	p-value
Duration with T2DM (year)			0.01*
≤ 5	7.5 (1.3)		
- 6 – 10	7.4 (1.2)		
> 10	7.9 (1.4)		
BMI (Normal 18.5-22.9)			0.04*
< 18.5	5.5 (1.3)		
- 18.5 – 22.9	7.6 (1.2)		
- 23.0 – 24.9	7.5 (1.5)		
- 25.0 – 29.9	7.5 (0.9)		
≥ 30.0	7.9 (1.4)		

2) Predictors of quality of life by health literacy, knowledge of diabetes, self-efficacy, self-care activities and HbA1c level

In table 34 were presented determinants of quality of life enrolled health literacy by domain, knowledge of diabetes, self-efficacy, self-care activities and HbA1c level to lay out bivariate and multiple linear regression analysis. In the bivariate analysis three domains of health literacy: Functional skill, interactive communication skill, critical skill, self-efficacy, self-care activity were significantly related with quality of life of T2DM patients (p<0.05). However, in the multivariate

analysis were significantly quality of life associated with knowledge of DM, self-efficacy

and self-care activity by p<0.05). Thus it could be more power to predict quality of life

in item treatment impact and satisfaction with DM treatment among T2DM patients.

Table 34 Determinants of quality of life enrolled health literacy by domain,
knowledge of diabetes, self-efficacy, self-care activities, duration with DM and HbA1c
among T2DM patients

Variables	Mean	Unadjusted		Adjusted	
	(SD)	B	p-value	B	p-value
Health literacy					
- Functional skill	21.6 (3.8)	0.34	<0.01	0.12	0.01
- Interactive communication skill	20.7 (6.9)	0.15	<0.01	0.09	0.42
- Critical skill	23.4 (4.9)	-0.28	<0.01	-0.15	0.15
Knowledge of diabetes	14.6 (3.2)	0.26	<0.01	0.08	0.02
Self-efficacy	7.5 (1.1)	1.33	<0.01	0.13	0.03
Self-care activities	43.8 (6.2)	0.68	<0.01	0.39	<0.01
HbA1c level	7.6 (1.3)	0.38		0.05	0.35

Summarized determinant of HbA1c and quality of life in bivariate were

seen similarly associated with knowledge of DM, self-efficacy and self-care-activity.   In

addition, multivariate analysis was a significant association only self-care activity with

HbA1c and quality of life.

4.1.2 Phase I Step 2: In-depth interview (Prioritized problem and needed)

4.1.2.1 General information of study setting

Saimai district Bangkok, it is surrounded (from north clockwise) by Amphoe Lam Lukka of Pathum Thani province, Kholong Sam Wa, Bang Khen and Don Mueng of Bangkok. Saimai district is semi-urban characteristics which can be recognized by its environment, traffic route, public utility system, community structure and transportation. For the area contacted with Lam Lukka, Phrathumthain province, people's lifestyle still has a rural nature. Some people work in agriculture which is different from housing estate community which is semi-urban area. Most of the people immigrated from other provinces due to economic and occupation reasons. Most informants are people who have lived here for a long time. The remarkably changed lifestyle includes limited food resources and space of their living places and having no place for planting vegetables and raising animals. Most people consumed ready meals and cooked to order food rather than cooking by themselves at home. Their limited options of food become more severe if they rely on their family members or care takers who go out to work from early morning to late evening. At times, the food is not suitable for patients with Diabetic Mellitus (DM). They also have limitations for physical activities. Besides, the stress management and relationship within the family and among their neighbors in housing estate community has more urban characteristics than rural nature.

4.1.2.2 Concepts used to explain DM, behaviors and self-care of DM patients

In-depth interview was used to examine beliefs and concepts used to explain DM, behaviors and self-care of DM patients. The inclusion criteria included those with DM, aged 50-79 years and the total number of the participants was 8.

The beliefs and concepts used to explain the cause of DM were various. Some believed that it is caused by their own behaviors, especially eating habit which was obtained from the parents or grandparents. Thus, some believed that their ancestors accounted for their illness. One interesting viewpoint is that they have been diagnosed with DM because of high sensitivity and specificity of the screening tests as their lifestyle was similar to their ancestors, but they did not have any diseases. Therefore, illness acceptance among these patients is still uncertain between self-care as a DM patients and regular lifestyle as an ordinary person. Some people had no abnormal symptoms, while those with DM symptoms identified from screening still considered them as normal symptoms for their own lifestyle. Another caused based on their beliefs was global changes including environment, eating and lifestyle and medications leading to development of the disease no matter how well they took care themselves. Particularly, diet factor which is different from the past time when people grew fruits and vegetables and cooked by themselves without using any chemical substances.

"The disease occurred because of me as I ate what I want for a long time"

"I ate like my grandparents did but the they didn't have the disease"

"In the past time, the number of patients with DM was as many as that nowadays no matter how much they ate"

"I ate 4 eggs boiled in syrup a day as my parents did and they were fine, but after the doctors performed physical exam and checked on me, they told me that I had DM."

"Nowadays, there is a lot of unhealthy food. Unlike the old time, when we could grow or find food like vegetables, eggs and fish around our neighborhood. Right now, they are full of ready cooked food which we will never know what they put in it, unavoidably destroying our health.

Although continuous education was provided to the patients to promote proper understanding about the disease according to the patients' information, they were still unsure about the real causes of the disease. Some patients claimed that many people always take a good care for themselves, but they still have DM. Thus, their beliefs and behaviors remain in doubt. They were curious why their ancestors didn't have the disease if genetic is the cause, so they did not follow the doctor's recommendations, but their own needs. This group of patients tended to have irregular self-care behaviors and could not control their blood sugar in the recommended range for DM patients.

For patients who could control their blood sugar well had similar beliefs about causes of the disease, but they accepted the doctor's diagnosis and tried to comply with recommendations of the doctor or nurse. After knowing that they had high blood sugar, they tried to control their diet before meeting the doctor. These patients were afraid of being blamed by healthcare personnel. Some extent of anxiety and stress could be felt by the researcher during the interview. Anxiety and stress indicate acceptance of the disease and intention to follow an advice of the doctor and nurse. Complements or blames from healthcare personnel were dependent on their blood sugar level. Although self-care of these patients was not worrisome, their wrong belief on diet control only a week before meeting the doctor caused unimproved cumulative blood sugar. The belief can lead to irregular behaviors to control their blood sugar, so they were at risk of more severe disease and complications. This misconception needs to be addressed and changed.

Understanding and thoughts related to effects and severity of DM

The participants perceived that even though they had diet restriction, it did not effect on their lifestyle. Moreover, the reflection of core caused of increasing blood glucose were seen a significant burden of taking medications, and being anxious of being blamed when saw doctor. Some patients are dependent on their family members to take them to the hospital, so their family member had to take leave from work. Financial impact was another concern because they needed to choose proper

food and pay for transportation to meet the doctor ever 1- 2 months, leading to increased expenses. Taking medicine is perceived as an important burden and worry as they need to take medications on time every day for their lifetime.

The effects mentioned by the participants were not related to severity of DM as the patients explained that there was nothing serious occurred and they only need to take medications and comply with recommendations of healthcare personnel.

"When getting sick, we need to see the doctor. Now I am fine and have no symptoms except for having numbness on my leg. It is normal as I am already old, so blood circulation is not so well"

"When coming to see the doctor, I am ok, but my son or daughter had to take leave from work. It would be great if you could tell the doctor to be quick so that he/she could go back to work"

"Living with the disease, I have to think carefully before eating, but I don't want to disturb my children to find proper food for me and waste their money"

"I am a merchant and start working early in the morning and have breakfast late. Sometimes, I forgot to take medications, but I tried to take twice a day as the doctor said"

Beliefs and expectations on treatment received

Some patients believed that the medications received could completely cure the disease. Thus, when they found that their bold sugar was normal, they could eat as general people do, reduce medication dosage or even stop taking medications.

"I could control diet well and my blood sugar has decreased. I am not taking the medication twice a day anymore. I adjusted it to take once a day in the morning by myself, because taking medications too much is not good for our health. The doctor didn't order to change the dosage, but I did it by myself and I am alright.

Another finding is the belief that the modern medicine that the doctor prescribed was not effective to cure the disease. Therefore, the patient decided not to take it and used alternative medicine which assessed television advertisement and talking with their neighbors of relatives instead. The patient perceived it was more effective to reduce blood sugar.

Most importantly, the patients strictly control diet only for a short time before the doctor's appointment.

"I am not taking the medications the doctor prescribed as the doctor told me about the adverse effects. He ordered taking 4 tablets a day, but anything was better so I bought bolus called "Mohsheang" to take. I heard its properties from TV ads. This time the doctor also gives me the same medications, but I'm not going to take them"

The patients' expectation for treatment was very similar which was being completely cured and not a long life treatment as the present by any means. They expected that the healthcare system will be able to discover ways to completely cure the disease. The patient mainly gave the hope of curing the disease to healthcare personnel. However, different perspectives indicate that they believe that the disease cannot be completely cured and they need to have good healthcare throughout their life. Thus, they are responsible for their and need to strictly comply with the recommendations of healthcare personnel.

4.1.2.3 Concepts used to explain DM and guideline for sustainable development of care for DM patients in healthcare personnel's perspectives.

The administrators of care system for patients with DM perceived DM as individuals' behavior problem resulted from changing society, economy, habitual activities, inappropriate eating habit and lack of heath awareness. They also thought that healthcare is not the duly of each individual only, but it is also a responsibility of healthcare sector to design health system for people. Besides, genetic factor only has little effect. Another explanation of the problem related to the disease is that operations of healthcare services in the past led people to rely their heath on healthcare personnel. Although there have been attempts to shift the strategies from health repair to health promotion for several years.

The outcomes of interventions are usually successful when they have been changed to the national policy with clear goals and successful indicators. The administrators believed that the focus of this problem should not only be on behavior changes, but also policy and health indicators development both by Health Department which controls health services for DM patients in public health centers under its jurisdiction and coordination with related healthcare networks. These indicators should be set as criteria for working performance evaluation and promotion of public heath personnel. The goal is to achieve an indicator of Heath Department by reducing accumulative blood sugar at least 30%. This strategy will be beneficial both for DM patients do control their blood sugar and for personal who achieve the goal.

In terms of system development strategy for sustainable care of DM patient in healthcare providers' perspectives, they realized that DM is more serious and had more negative impacts than other chronic diseases and requires self-care throughout the patients' life. The goal for sustainable care is self blood sugar control, proper understanding and behaviors for diet control, exercise, taking medications and overall healthcare to reduce complications of the disease. The percussion effects of DM could be on family members, increased burden among healthcare personnel, financial burden, social and economic problems and also psychological health problems. Recently, the goal is partly achieved in terms of blood sugar reduction at 42% of all patients registered which is higher than the set goal at 30%. However,

sustainability in regular blood control and self-care among the patients are still not achieved. Policy for sustainable health should be developed and the patients, their family and community should be in charge of this health problem.

Healthcare personnel should be a facilitator or a coach to support the patients rather than allowing the health indicator to determine position or promotion in their career. This is because the patients may perceive that healthcare personnel would like to achieve the set indicators and their career growth rather than providing health services by heath and ethics. Burden and pressure on indicators should be reduced to reinforce sustainable work.

Ways to reduce burden among healthcare personnel include capability building for the patients, care takers, families and volunteers in their community and promoting patient network development for sustainable self-help group, simple communication and continuing care. The barriers between the patients and healthcare providers should be eliminated and shifted to relatives like relationship. These strategies are believed to be successful factors not only for DM, but also other chronic diseases and may promote working happiness among the personnel.

4.1.2.4 Health communication and education model about desirable self-care of DM patients

The informants had different view points on their desirable communication model. Health communication with the doctor at follow-up

appointments is the simplest and most accessible method, because the information is directly given by healthcare personnel who are the most reliable and needed information source as perceived by the patients. However, desirable communication should be in a friendly and caring manner, use of discussion rather than blaming or shouting when having high blood sugar level. Manual was one of the communication approach given to the patients. Although there was complete information in the manual which is easy to understand, the informants thought that they had limitations to use it including time consuming, small letters and lack of interest in the manual which is full of letters and written explanations. Thus, they did not read or even open it, but remember verbal recommendations at the appointment desk instead of reading a manual. Some patients asked their children, relatives or neighbors to read for them. They preferred listening more than reading and pointed out that if the manual to be used, pictures with key contents and not too many letters in one page is recommended. It is explained that they usually forget the information in a short time and pictures help remind them about what have been previously educated. Communication through media with pictures and sound can also be used such as TV. However, they were unsure whether the information via advertisement can be trusted. However, their doubts did not lead to searching for additional information from other sources. When they fell unsure about the information from the media, they decided not to believe and follow it. Overall, they expected effective and continuing

communication from healthcare personnel more than relying on themselves, family or care takers.

4.1.2.5 Desirable communication model of healthcare information and education for self-care of the care takers.

The informants are patients with DM, aged 70 years and older who was diagnosed with DM for at least 1 year. According to their opinion, based on health communication method received and their expectation, healthcare personnel's communication is essential for improving patent behaviors. They trusted information received from the doctor and other healthcare providers more than their care takers. The desirable communication identified by care takers included explaining information, facts and ways to solve the patient's problems with simple language and no blaming and negative emotions or expressions. Verbal communication is perceived as the simplest communication method which is simultaneously accessible both for the patient and care taker. For the self-care manual and use of other methods, they think it was quite difficult to access due to time constraint and complicated language. Online media and television are more accessible than written media

4.1.2.6 Communication model of healthcare information and education for patients' self-care in healthcare personnel's perspectives

Most patients with DM are elderly people, so direct communication with the patients and care takers is important and the simplest. It may be unsuitable to provide manual for this age group, but if necessary, the manual must be simple and

interesting with pictures and big enough letters. Verbal communication should be informal, resulting in feeling comfortable and not being taught. The government had allocated a great deal of budget on health education using various forms such as brochures, Knowledge boxes both for staff and patients. However, evaluation on use of these methods has never been done, especially for those with vision and reading limitations. Thus, a study on effectiveness and evaluation of health education, media used in heath promotion work is required in order to identify appropriate health communication model and methods for patients and care takers for optimum effectiveness. In addition, TV is another accessible means of health communication because most elderly people do not have any occupation and usually stay at home and watch television.

4.1.3 Phase I Step 3: Group discussion (Develop intervention)

According to group discussion on the model of the patient manual based on education level and the problems identified from qualitative and quantitative study. It is recommended to divide information into smaller manuals and give to the patients during group education and large manuals with several topics should not be provided at the same time. For The manual format, it is vital to ensure use of simple language with pictures and do not overuse detailed explanations. The previous manuals given were considered not interesting. For health recording manual, barriers of reading and understanding should be reduced by using simple language, large letters which can be read without glasses.

Group education program is an informal activity under the concept of "Growing a health tree protecting DM patients" The difference in colors of the leaves

given to the patients helps indicate their blood sugar level: green leaves represent blood sugar < 140 mg./dl, orange ones represent blood sugar 140-169 mg./dl., and red leaves are for those with blood sugar ≥ 170 mg./dl. To initiate this activity, the participants will be given a leaf and its color is based on their last commutative blood sugar before participating in the program. They will be asked to stick their colored leaf on the health tree and then they will receive a small leave in each group education according to their capillary blood sugar (CBG) or Fasting Plasma Glucose (FPG) to monitor the growth and development of the health tree within 6 month period, using the leaves' colors. The group education consists of 6 education sessions continuously as their follow-up schedules.

Multifaceted Healthy Coaching Program

<table>
<tr>
<td>Session in 1st – 6th month

2.5 hours monthly</td>
<td>Group education: Case-based learning based on priority of patient's problem and needed may be following Suggestion 7 essential for DM management

1. Introduction Multifaceted Healthy Coaching Program

(Case-based learning, Diabetes knowledge (general), prioritized problem, solving & Goal setting

2 – 3 Healthy eating: Food consumption,</td>
</tr>
<tr>
<td>1st - 6th month

Monthly</td>
<td>- SMS stimulate and reminder self-care behavior including issue; compliant with medication, healthy eating, records DM diary, exercise

- Couseling: healthy coaching 10-15</td>
</tr>
<tr>
<td>Monthly, 3rd , 6th month</td>
<td>Laboratory test

- DTX test monthly

- FPG test at 3rd month

- HbA1c test at 6th month

Questionnaire data collection in the intervention evaluation</td>
</tr>
</table>

Figure 12 Structural of Multifaceted Healthy Coaching Program

4.2 Phase 2: Implement and evaluation of Multifaceted Health Coaching program

The results of second phase of this study was elaborated on the randomized control trial which studied the effect of the Multifaceted Healthy Coaching program in T2DM diabetes patients seeking care at the 61th public health center in terms of outlined outcomes .These outcomes were:

4.2.1 Characteristic of participants in the intervention and control groups

This part were enrolled 274 T2DM diabetics from situation survey who found inclusion criteria and exclude 100 patients who found HbA1c < 7.0% and high level of health literacy . This pragmatic RCT performed with a 1:1 allocation ratio. Participants with HbA1c > 7.0% and low to moderate level of health literacy were allocated by computer-randomized from registered ID directory of patients. Eligible participants were approached simple random sampling patients who are appointment meeting doctor on Wednesday in to the intervention arm and other day into the control to reach sample size 40 in each arm.

The intervention and the control groups consisted of 40 T2DM diabetes patients per group which were homogeneity when compared at the baseline statistically using characteristics variables presented in table 35. Among 80 T2DM patients both of the intervention and control groups were majority of females (70.0%, 67.5%) with equal of the respondents both groups being between 60-69 years old (45.0 %) and 50% of the intervention group were high school and higher educational

but the control group were higher percentage (52.5%). Marital status both group were married (77.5%, 60.0%) with 5,001-15,000 THB monthly income (52.5%, 47.5%). Most of the intervention group stay with family (95.0%) as same as the control group. In addition most of them having care taker (90.0% of the intervention and 95.0% of control groups).

Table 35 Characteristics of the intervention group and control group (n=40 per group)

Characteristics	Intervention group n (%)	Control group n (%)	Homogeneity p-value
Sex			0.81
- Male	12 (30.0)	13 (32.5)	
- Female	28 (70.0)	27 (67.5)	
Aged (year)			0.48
- 50 - 59	13 (32.5)	9 (22.5)	
- 60 – 69	18 (45.0)	18 (45.0)	
≥ 70	9 (22.5)	13 (32.5)	
Mean (SD)	62.9 (7.8)	65.8 (8.2)	
Min , Max	51 , 79	50, 79	
Educational			0.82
- Lower than high school	20 (50.0)	19 (47.5)	
- High school and higher	20 (50.0)	21 (52.5)	
Marital Status			0.91
- Single, widow, Divorce	9 (22.5)	16 (40.0)	
- Married	31 (77.5)	24 (60.0)	
Occupation			0.18
- Non-occupation	17 (42.5)	19 (47.5)	
- Occupation	23 (57.5)	21 (52.5)	

- Chi-square test: sex, aged, educational, marital status and occupational

Table 35 Characteristics of the intervention group and control group
(n=40 per group) (cont.)

Characteristics	Intervention group	Control group	Homogeneity p-value
Monthly income (THB)			0.90
≤ 5,000	12 (30.0)	13 (32.5)	
- 5,001 – 15,000	21 (52.5)	19 (47.5)	
≥ 15,000	7 (17.5)	8 (20.0)	
Mean (SD)	11,977 (10,921)	10,642 (8,780)	
Min , Max	1,000 , 50,000	3,000 / 35,000	
Stay with family			0.69*
- Yes	38 (95.0)	38 (95.0)	
- NO (Home alone)	2 (5.0)	2 (5.0)	
Having care taker			0.67*
- Yes	36 (90.0)	38 (95.0)	
- No	4 (10.0)	2 (5.0)	

* t-test: Monthly income, Fisher exact test: Stay with family, Having care taker,

In table 36, the participants in the intervention and control groups were non-significantly statistic comorbidity (p>0.05) with 90% of the intervention having other disease beside diabetes as same as 92.5% of the control group.

Table 36 Comorbidity diseases of the intervention group and control group

Characteristics	Intervention group n=40	Control group n=40	Homogeneity p-value
Comorbidity			0.99*
- Yes	36 (90.0)	37 (92.5)	
- No	4 (10.0)	3 (7.5)	

* Fisher exact test

The t-test analysis was determine the homogeneity between the intervention and the control groups carried out with medication being weight, BMI, duration with diabetes, FPG and HbA1c, as show in the table 37. All of medication variables in both of the intervention and control group were non-significantly that shown homogeneity in both groups.
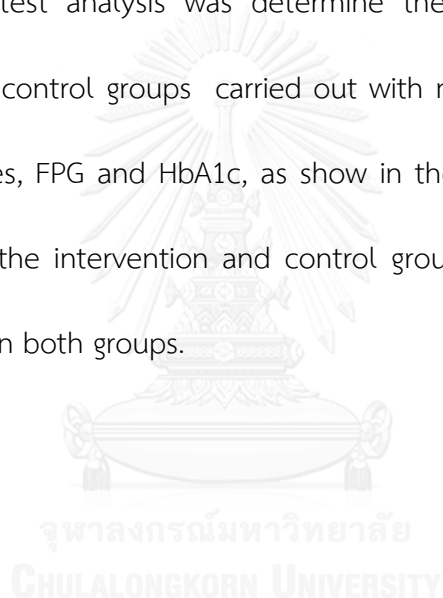
Table 37 Medication of the intervention group and control group

Medications	Intervention group Mean (SD)	Control group Mean (SD)	t	Homogeneity p-value
BMI	25.7 (4.1)	27.4 (4.2)	-1.59	0.12
- 18.5 – 22.9				
- 23.0 – 24.9				
- 25.0 – 29.9				
≥ 30.0				
Duration with diabetes(year)	9.3 (8.2)	9.1 (5.2)	0.13	0.89
≤ 5				
- 6 – 10				
> 10				
FPG (mg/dL)	152.1 (37.9)	188.0 (43.6)	-0.13	0.89
- 126.0-140.0				
- 140.1–169.9				
≥ 170.0				
HbA1c (%)	7.8 (1.4)	7.7 (1.3)	0.25	0.81
- 7.0 – 7.9	27 (67.5)	26 (65.0)		
- 8.0 – 8.9	5 (12.5)	7 (17.5)		
≥ 9.0	8 (20.0)	7 (17.5)		

- t-test: Weight, BMI, Duration with DM, FPG, HbA1c

Comparison health literacy which were the fundamental ability to learn among participants in the intervention and the control groups were non-significantly statistic as detail in table 38 (p>0.05). Interpretation statistic analytical, in the intervention and control groups were similarly of health literacy being Functional skill, Interactive communication skill critical skill and all of components.

Table 38 Health literacy by domain of the intervention group and control group by t-test (n = 40 per group)

Health Literacy by domains	Intervention group Mean (SD)	Control group Mean (SD)	t	Homogeneity p-value
Health Literacy overall	62.6 (8.3)	61.2 (8.3)	0.75	0.45
1) Functional HL skill	19.7 (2.9)	18.9 (3.4)	1.01	0.32
- Needed health knowledge and understanding	6.6 (1.2)	6.6 (1.5)	< 0.01	1.00
- Accessing with health information and service	13.1 (2.4)	12.4 (2.5)	1.32	0.19
2) Interactive communication HL skill	20.6 (4.8)	18.8 (4.9)	1.64	0.11
- Communicating for added professional	12.5 (3.3)	11.5 (3.2)	1.45	0.15
- Managing health condition	8.1 (3.0)	7.3 (3.3)	1.06	0.29

Table 38 Health literacy by domain of the intervention group and control group by t-test (n = 40 per group) (cont.)

Health Literacy by domains	Intervention group Mean (SD)	Control group Mean (SD)	t	Homogeneity p-value
3) Critical HL skill	22.3 (2.8)	23.4 (3.5)	-1.58	0.12
- Getting media and health information literacy	11.0 (1.7)	10.9 (2.6)	0.26	0.79
- Making the appropriate health decision to good practice	11.5 (1.8)	12.1 (2.1)	-1.37	0.18

Comparison mean score of knowledge of diabetes, self-efficacy and self-care activity including eating behavior, exercise, smoking, alcohol drinking, drug administration, feet care and quality of life among participations in both groups were not difference at base line. All of them were show the similarly of primary outcome before starting the Multifaceted Healthy Coaching program by non-significantly statistical p>0.05 as in table 39.

Table 39 Knowledge of diabetes, self-efficacy, self-care activity and quality of life in the intervention and control groups by t-test (n = 40 per group)

Variables	Intervention group Mean (SD)	Control group Mean (SD)	t	Homogeneity p-value
Knowledge of diabetes	13.2 (3.4)	14.2 (2.9)	-1.45	0.15
Self-efficacy	7.3 (1.6)	7.4 (1.0)	-0.41	0.68
Self-care activity (overall)	42.9 (5.8)	43.2 (6.6)	-0.21	0.83
- Eating behavior	6.3 (1.2)	6.8 (1.6)	-1.87	0.07
- Exercise	5.8 (1.8)	5.4 (1.4)	0.89	0.37
- Smoking	9.5 (1.3)	9.2 (1.9)	0.97	0.33
- Alcohol drinking	8.8 (2.1)	9.2 (1.9)	-0.93	0.36
- Drug administration	7.9 (1.6)	8.0 (1.5)	-0.29	0.77
- Feet care	5.1 (1.1)	4.8 (0.9)	1.22	0.23
Quality of life	58.9 (10.9)	60.3 (7.9)	-0.61	0.55

4.2.2 The effect of Multifaceted Healthy Coaching program at base line to 6 month within the intervention and control groups

4.2.2.1 Participation and responding the Multifaceted Healthy Coaching Program within the intervention group

According to table 40, described 100.0 % of participation attended the Multifaceted Healthy Coaching Program while in the component SMS reminder was seen lower than half reading SMS in the 1st week, however in the 2nd week found reader SMS 72.5 %. Telephone approached was provided counseling for 62.5% of T2DM patients which requested highest of supporting for eating and chosen healthy food for DM patients (22.5%) while less than 15.0% consulted drug administration, health problem, monitoring blood glucose , stress managing and other.

Table 40 Participation and responding the Multifaceted Healthy Coaching Program in the intervention group at base line to 6 months

Components of program	n (40)	Percent (%)
Attending group education ≥ 4 times	40	100.0
SMS responding		
Reading SMS in 1st week	17	42.5
Reading SMS in 2nd week	29	72.5
Diary records	23	57.5
Telephone counseling		
No trouble	15	37.5
Have trouble (more than one)	25	62.5
1) Eating and chosen healthy food for T2DM	9	22.5
2) Drug administration	5	12.5
3) Health problem	4	10.0
4) Monitoring blood glucose	3	7.5
5) Stress mode	1	2.5
6) Other	3	7.5

4.2.2.3 Descriptive of improvement of health literacy, knowledge of diabetes, self-efficacy, self-care activity at base line to 6 months in the intervention group

The percentage of improvement measurement outcome at base line to 6 months was presented in table 41. Most of T2DM patients were seen improvement of health literacy in the overall and diabetes knowledgement (97.5% and 90.0%) while 75.0% of them had improved self-care activity and half of them were seen improvement of self-efficacy. The core outcome measurement such as reducing of HbA1c and increasing quality of life were seen reduction of HbA1c level of 75.0 % patients with T2DM while 95.0 % had found increasing of quality of life scoring.
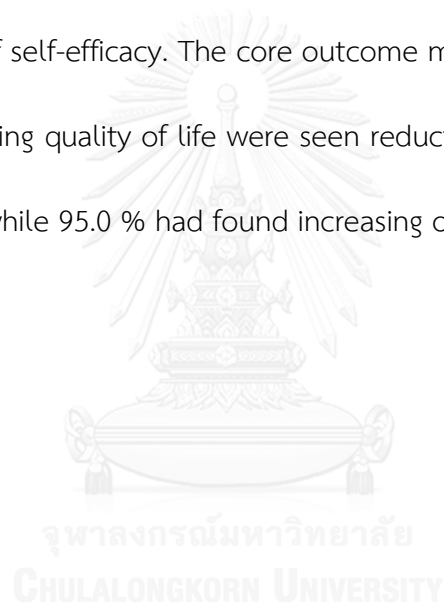
Table 41 Percentage of improvement of health literacy, knowledge of diabetes, self-efficacy, self-care activity in the intervention group (n=40)

Variables	Invention group N	Percentage (%)
Improvement of health literacy overall	39	97.5
- Functional skill	35	87.5
- Interactive communication skill	40	100.0
- Critical skill	31	77.5
Improvement of knowledge of diabetes	36	90.0
Improvement of self-efficacy	20	50.0
Improvement of self-care activity overall	30	75.0
- Eating behavior	30	75.0
- Exercise	24	60.0
- Smoking	4	10.0
- Alcohol assumption	9	22.5
- Drug administration	25	62.5
- Feet care	29	72.5
Reduction of HbA1c level	30	75.0
Improvement of quality of life	38	95.0

4.2.2.4 Improvement of health literacy, knowledge of diabetes, self-efficacy, self-care activity, HbA1c, and quality of life at base line to 6 month within the intervention and control groups

1) Health literacy

The evaluation of the Multifaceted Healthy Coaching program to improve Health literacy in the overall and by domains; Functional skill, Interactive communication and Critical skill were approached t-test analysis as in table 42. When compared from the baseline to the post-test at six months in the intervention group, there were shown significantly in the overall of health literacy (p<0.01). Moreover, there were a significant of health literacy by domain; Functional skill, Interactive communication skill and Critical skill (p<0.01). Best of all, six components of health literacy were significantly by p<0.05. In contrast, in the control group, there were not a significant of health literacy in the overall, three domains and six components at the baseline to six months. It should be explain that the Multifaceted Healthy Coaching program improve health literacy in the overall, by domain and each items of measurement.

Table 42 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group)

Health Literacy by domains	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	T	p-value
Health Literacy overall					
- Intervention group	62.6 (8.3)	78.8 (9.9)	16.25	11.63	<0.01
- Control group	61.2 (8.3)	61.7 (7.1)	0.53	0.78	0.44
Functional HL skill					
- Intervention group	19.7 (2.9)	22.9 (2.3)	3.30	8.08	<0.01
- Control group	18.9 (3.4)	18.6 (3.3)	-0.41	-1.49	0.14
1)Needed health knowledge and understanding					
- Intervention group	6.6 (1.2)	8.0 (0.8)	1.43	8.32	<0.01
- Control group	6.6 (1.6)	6.4 (1.6)	-0.23	-1.19	0.24
2)Accessing with health information and service					
- Intervention group	13.1 (2.4)	14.9 (1.9)	1.88	5.54	<0.01
- Control group	12.4 (2.5)	12.2 (2.7)	-0.21	-0.78	0.44

Table 42 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group) (cont.)

Health Literacy by domains	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean Difference	t	p-value
Interactive communication					
- Intervention group	20.6 (4.8)	29.5 (3.8)	8.95	11.78	<0.01
- Control group	18.8 (4.9)	19.5 (3.7)	0.65	1.48	0.15
1)Communicating for added professional					
- Intervention group	12.5 (3.3)	16.6 (2.4)	4.10	7.79	<0.01
- Control group	11.4 (3.2)	11.7 (2.8)	0.20	0.89	0.38
2)Managing health condition					
-Intervention group	8.1 (3.0)	12.9 (2.9)	4.85	9.08	< 0.01
- Control group	7.3 (3.3)	7.8 (2.3)	0.43	1.27	0.21

Table 42 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group) (cont.)

Health Literacy by domains	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	t	p-value
Critical health literacy					
- Intervention group	22.3 (2.8)	26.3 (6.6)	4.0	4.01	<0.01
- Control group	23.4 (3.5)	23.7 (3.8)	0.28	0.62	0.54
1)Getting media and health information literacy					
- Intervention group	11.0 (1.7)	12.5 (3.8)	1.45	2.42	0.02
- Control group	10.9 (2.6)	11.2 (3.1)	0.3	1.09	0.28
2)Making the appropriate health decision to good practice					
- Intervention group	11.5 (1.7)	14.9 (2.4)	2.55	5.04	<0.01
- Control group	12.1 (2.1)	12.5 (2.5)	0.40	1.52	0.14

2) Knowledge of diabetes

The comparison knowledge of diabetes at the base line to the end of the Multifaceted Healthy Coaching program, there was a significant improving knowledge of diabetes in the intervention group (p<0.01) but in the control group was not found a significant (p>0.05) as in the table 43.

Table 43 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group)

Variables	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	t	p-value
Knowledge of diabetes					
- Intervention group	13.2 (3.4)	16.7 (2.5)	3.50	8.48	<0.01
- Control group	14.2 (2.9)	15.1 (3.7)	0.93	1.90	0.07

        3) Self-efficacy

        In the table 44, presented comparison of self-efficacy at the base line to the end of the Multifaceted Healthy Coaching program, there was a significant increasing of self-efficacy for diabetes management in the intervention group (p<0.01). On the other hand, it was not found a significant improving of self-efficacy in the control group (p>0.05).

Table 44 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group)

Variables	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	T	p-value
Self-efficacy					
- Intervention group	7.3 (1.6)	7.9 (1.5)	0.63	2.90	0.006
- Control group	7.4 (1.0)	7.2 (1.1)	-0.20	-1.43	0.16

4) Self-care activity

In the table 45, presented comparison of self-care activity at the base line to the end of the Multifaceted Healthy Coaching program, there was a significant increasing in the overall of self-care activity score (p<0.01) in the intervention group while it was not seen a significant in the control group (p>0.05). When compared in each component in the intervention group, there were a significant improving of five components being eating behavior, exercise, alcohol drinking, drug administration and feet care (p<0.05) while in the control was not found a significant improving of them. In contrast, one out of six components as alcohol drinking at the base line to post-test in the control group was significantly (p<0.01) but interpretation of a significant leading to increasing frequency of alcohol assumption in this group.

Table 45 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group)

Self-care activity	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	t	p-value
Self-care activity overall					
- Intervention group	42.9 (5.8)	48.2 (5.3)	5.21	4.54	<0.01
- Control group	43.2 (6.6)	44.3 (6.0)	1.09	1.31	0.19
1)Eating behavior					
- Intervention group	6.3 (1.2)	7.8 (1.0)	1.63	8.63	<0.01
- Control group	6.8 (1.6)	6.9 (1.5)	0.50	0.92	0.36
2) Exercise					
- Intervention group	5.9 (2.6)	6.8 (2.1)	0.90	2.54	0.01
- Control group	5.4 (1.4)	5.8 (2.2)	0.35	1.12	0.27
3) Smoking					
- Intervention group	9.5 (1.3)	9.7 (0.9)	0.18	0.89	0.37
- Control group	9.2 (1.9)	9.4 (1.6)	0.20	1.31	0.19
4) Alcohol drinking					
- Intervention group	8.8 (2.1)	9.1 (1.8)	0.33	2.01	0.02
- Control group	9.2 (1.9)	8.9 (1.9)	-0.25	-3.24	0.003

Table 45 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group) (cont.)

Self-care activity	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	t	p-value
5) Drug administration					
- Intervention group	7.9 (1.6)	8.7 (1.7)	0.78	2.58	0.02
- Control group	8.0 (1.5)	7.7 (1.8)	-0.33	-1.09	0.28
6) Feet care					
- Intervention group	5.1 (1.1)	7.1 (1.8)	2.03	6.88	<0.01
- Control group	4.8 (0.9)	5.3 (1.6)	0.45	1.74	0.89

5) HbA1c and Quality of life

Achievement goal were measured improving of HbA1c and quality of life to support the effectiveness of the Multifaceted Healthy Coaching program. In table 46, presented the comparison of HbA1c and quality of life at the baseline to post-test at 6 month, there was a significant reduction of HbA1c level in the intervention group (p<0.01) while in the control group was not found. Secondary achievement evaluated changing of quality of life at the end of this program it only had a significant increasing of mean score in the intervention group (p<0.01) but it was not seen in the control group meaning that programmatic may be improve quality of life .

Table 46 Comparison of health literacy at base line to 6 month within the intervention and control groups by t-test (n = 40 per group)

Variables	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Mean diff	t	p-value
HbA1c mg/dl.					
- Intervention group	7.8 (1.4)	7.3 (1.1)	-0.49	-3.18	0.003
- Control group	7.7 (1.3)	8.2 (1.4)	0.46	1.97	0.06
Quality of life					
- Intervention group	58.9 (10.9)	73.6 (12.8)	14.59	8.59	<0.01
- Control group	60.3 (7.9)	60.6 (7.5)	0.29	1.48	0.15

4.2.3 The effect of Multifaceted Healthy Coaching Program at 6 month between the intervention and control groups

4.2.3.1 Improvement of Health literacy by domain at 6 month between intervention and control groups

The comparison of health literacy by domain and six components at baseline to post-test at 6 month between the intervention and control group were found significantly in the positive direction in term of the overall of health literacy, three domains and five components ($p<0.05$) as in the table 47. In addition, it had only one non- significant as getting media and health information literacy which was one out of two components of critical skill

Table 47 Comparison of the overall health literacy at 6 month between the
intervention and control groups by t-test (n = 40 per group)

Health Literacy by domains	Intervention group	Control group	t	95% CI		p-value
	Mean (SD)	Mean (SD)		Lower	upper	
Health Literacy overall	78.8 (9.9)	61.7 (7.1)	8.87	13.28	20.9	<0.01
Functional HL skill	22.9 (2.3)	18.6 (3.3)	7.01	3.17	5.68	<0.01
1)Needed health knowledge and understanding	8.0 (0.8)	6.4 (1.6)	5.83	1.09	2.21	<0.01
2)Accessing with health information and service	14.9 (1.9)	12.2 (2.7)	5.27	1.72	3.82	<0.01
Interactive communication	29.5 (3.8)	19.5 (3.7)	11.9	8.41	11.79	<0.01
1)Communicating for added Professional	16.6 (2.4)	11.7 (2.8)	8.45	3.76	6.08	<0.01
2)Managing health condition	12.9 (2.9)	7.8 (2.3)	8.74	3.99	6.35	<0.01

Table 47 Comparison of the overall health literacy at 6 month between the intervention and control groups by t-test (n = 40 per group) (cont.)

Health Literacy by domains	Intervention group Mean (SD)	Control group Mean (SD)	t	95% CI Lower	upper	p-value
Critical health literacy	26.3 (6.6)	23.7 (3.8)	2.16	0.20	4.99	0.04
1)Getting media and health information literacy	12.5 (3.8)	11.2 (3.1)	1.63	-0.28	2.8	0.11
2)Making the appropriate health decision to good practice	14.9 (2.4)	12.5 (2.5)	4.47	1.36	3.54	<0.01

4.2.3.2 Improvement of Knowledge of diabetes and self-efficacy at 6 month between intervention and control groups

In table 48 lay out t-test analysis to compare knowledge of diabetes and self-efficacy at the end of the Multifaceted Healthy Coaching program between the intervention and the control groups. Knowledge of diabetes and self-efficacy were difference between them because it was significantly statistical analysis by p<0.05. This result were interpreted that the Multifaceted Healthy Coaching

program had improving knowledge of diabetes and self-efficacy in T2DM diabetics

seeking care at the 61th health center.

Table 48 Comparison of the knowledge of diabetes and self-efficacy at 6 month

between the intervention and control groups by t-test (n = 40 per group)

Variables	Interventio n group	Control group	t	95% CI		p-value
	Mean (SD)	Mean (SD)		Lower	upper	
Knowledge of diabetes	16.7 (2.5)	15.1 (3.7)	2.18	0.14	2.96	0.03
Self-efficacy	7.9 (1.5)	7.2 (1.1)	2.37	0.11	1.29	0.02

4.2.3.3 Improvement of self-care activity at 6 month between

intervention and control groups

In the table 49 lay out the comparison of self-care activity in the

overall and six components that present statistic analytical to support the

effectiveness of Multifaceted Healthy Coaching program. There was found a significant

different of self-care activity between the intervention and the control groups while

all of components was not similarly. According to improving of them, there were

significant improving of five components being eating behavior, exercise, drug

administration and feet care (p<0.05) while unhealthy behavior including smoking and

alcohol drinking were not significant. The result was interpreted that the Multifaceted

Healthy Coaching program was effect to self-care activity especially eating behavior,

exercise, drug adherence and feet care among T2DM diabetics in the 61 health center,

Saimai district Bangkok Thailand.

Table 49 Comparison of self-care activity at 6 month between the intervention and control groups by t-test (n = 40 per group)

Variables	Intervention group	Control group	t	95% CI		p-value
	Mean (SD)	Mean (SD)		Lower	upper	
Self-care activity overall	48.2 (5.3)	44.3 (6.0)	3.02	1.30	6.36	<0.01
1)Eating behavior	7.8 (1.0)	6.9 (1.5)	3.15	0.33	1.46	<0.01
2) Exercise	6.8 (2.1)	5.8 (2.2)	3.31	0.58	2.32	<0.01
3) Smoking	9.7 (0.9)	9.4 (1.6)	1.12	-0.25	0.90	0.27
4) Alcohol drinking	9.1 (1.8)	8.9 (1.9)	0.36	-0.69	0.99	0.72
5) Drug administration	8.7 (1.7)	7.7 (1.8)	2.55	0.22	1.78	0.01
6) Feet care	7.1 (1.8)	5.3 (1.6)	4.85	1.09	2.61	<0.01

4.2.3.4 Improvement of HbA1c and quality of life at 6 month between intervention and control groups

The achievement of Multifaceted Healthy Coaching were highlight to decrease of HbA1c level and to improve quality of life among T2DM diabetics in the intervention group. In table 50, comparison reduction of HbA1c and changing quality of life between the intervention and the control groups, it was reached achievement goal that a reduction of HbA1c level and quality of life were significantly by $p<.0.01$.

Table 50 Comparison of HbA1c and quality of at 6 month life between the intervention and control groups by t-test (n = 40 per group)

Variables	Intervention group	Control group	t	95% CI		p-value
	Mean (SD)	Mean (SD)		Lower	upper	
HbA1c mg/dl.	7.3 (1.1)	8.2 (1.4)	-3.12	-1.43	-0.32	0.003
Quality of life	73.6 (12.8)	60.6 (7.5)	5.52	8.31	17.71	<0.01

4.2.3.5 Changing over time of FPG between the intervention and control groups at baseline, 3 month and 6 month

In table 51, it is not a significant changing over time of Fasting Plasma Glucose at base line, 3rd month and 6th month within the intervention group. Moreover, when compared changing of Fasting Plasma Glucose at base line,3rd month and 6th month between the intervention and control groups there were non-significantly different of its.

Table 51 Repeated measure ANOVA of FPG level at baseline, 3 month and 6 month in the intervention and control groups

Source of variation	SS	df	MS	F-test	p-value
Within subjects					
- Intervention	91.5	1	91.5	0.2	0.65
- Within group (error)	4.6	1	4.6	0.01	0.92
(between group error)	35351	78	453.2		
Between subjects					
- FPG level	107.3	2	53.6	0.135	0.87
- FPG levelx groups	353.1	2	176.5	0.44	0.64

SS = Sum of Squares, df = degree of freedom, MS = Mean Squares

CHAPTER V

DISCUSSION, CONCLUSION AND RECCOMENDATION

5.1 Discussion

The purpose of this part is to summarize the study that was conducted and review the results obtained. It will seek to assess how the aims of the research have been fulfilled and draw upon achievement of these findings. After a short discussion on the strengths and limitations of the study, the chapter will end by presenting some recommendations for future research.

5.1.1 Contextualizing of older adult and elderly with type 2 diabetes

1) Characteristic

The characteristic of T2DM patients in the first phase of this study, almost of them were majority female (70.1%) while the average of aged over 60 year and most of them received lower than high school (73.4%) with monthly income ≤ 15,000 THB (84.6%). When shading to occupational of them, there were closely 50.0% non-occupation and occupation similarly, most of occupation was merchant and employee. For social supporting, most of them hold on the Government USC welfare health care scheme (85.0%) , 94.5% lived with family but only 69.3% having care taker. For contextualizing of historical medication, 85.4% of them was over normal BMI while duration with diabetes reported > 5 year and 90.5% having at least one comorbidity.

Finally, highlight reported 63.5% of participants with higher HbA1c level than recommended levels (7.0%) and quality of life shown up low to moderate level.

According to worldwide report prevalence of diabetes is higher in male than female its was contrast with finding in the setting study area obtained high prevalence of type 2 diabetes in female more than male. When focus to incidence rate of obesity it was report high incidence in female it seem to be influencing high risky to get chronic disease more than male. It was support this reasons by describe high prevalence of obesity increasing rate of pre-diabetes and others chronic disease. (Wild, S.,et al.,(2000) [1] [37] [42]. Exploring of historical medication were seen difference with Nationwide as high percentage of comorbidity (90.5%) and living with DM lower than Nationwide [37]. When focus to BMI level it was interested observation 84.5% of them with over the optimum level , it might be influencing comorbidity diseases not only hypertension but also hyperlipidemia and other chronic disease included high risk to get complication of diabetes [1] [33]. Moreover, informal interviewing their life style was found limited of healthy life styles as exercise, healthy food consumption that sometime family find food for them with limited of healthy food for diabetes patients. Finally, 62.5% of type 2 diabetes patients had abnormal HbA1c level (higher than 7.0%). Those were reflect of diabetes management problems both of individual level and care takers. In the individual level, factors influencing were summarized such as over normal BMI with suffering with DM for a long time and also

comorbidity of diabetes its had been in line explained by burden of diabetes   barriers of blood glucose controlling [33] [37] Tang, Y. H., Pang, S., Chan, M. F., Yeung, G. S., & Yeung, V. T. ,2008).. However, barriers as mention did not enough clear vision of problem when Explanatory mode summarized its was clearly threaten of controlling blood glucose in which key words were complication and high level of HbA1c were not the first prioritized problem in real life. In contrast, health care providers were concerned in these points in outline of health policy achievement goal as reduction rate poorly controlling blood glucose in T2DM patient at least 30.0%. Even though, health care service was fulfilled this gap but it was not sustainable of healthy behavior influencing diabetes outcome.   In addition, health care system with application multicenter approached to improve diabetes outcomes was limited [21]. It was not only concerned in patients but also care taker and health care provider were included.

In the situation of individual ability of T2DM patients in this study summarized the overall of fundamental ability as health literacy in term of healthy behavior reduction risk of chronic disease and shouting diabetes outcome were seen in the moderate level. This finding had higher level more than health literacy survey in Thailand report in 60 year of aged and over showed in low level when compared with other groups (MOPH, 2011, Tang, Y. H., Pang, S., Chan, M. F., Yeung, G. S., & Yeung, V.T.,2008). Health literacy level in this study should be commonly view among elderly patients with type 2 diabetes such as only completed primary schooling or a few years

of school are highly having inadequate or marginal health literacy while needed more direct teaching and follow-up by healthcare professionals were present similarity in this study (MOPH, 2011, Tang, Y. H., Pang, S., Chan, M. F., Yeung, G. S., & Yeung, V. T.2008).

Diabetes knowledgement summarized in the situation survey showed more than half of T2DM patients had been high level. Self-efficacy and Self-care activity were also drown in high level. This finding was not related with trend of glycated controllable. What do we learned more, even present all of factor influencing to HbA1c in which Explanatory model was support this point that T2DM patients did not concerned high level of HbA1c and only know what are the complication of diabetes but they were not much understand leading cause of diabetes complication. Moreover, good point with self-efficacy in high level was strength to correctly understanding and motivation well-being diabetes management outcome. It was not only knowledge of diabetes, self-efficacy but also self-care activity was not parallel with trend of HbA1c.

5.1.2 The Multifaceted Healthy Coaching Program development

The summarized of situation analysis had been benefit to formulate the protocol of the Multifaceted Healthy Coaching Program data in the ground-level used to stipulate development of the Multifaceted Healthy Coaching Program following procedure of this study to ensured that the intervention was specifically for

contextualized in Saimai Public Health Center its also served needed and prioritized problem for participants of this study. Moreover, multi-component approached was rise up high impact to improve HbA1c controlling and quality of life. The components of Multifaceted Healthy Coaching Program compose of group education, DM booklet, Diary records, SMS reminder and telephone counseling. All of them purposed to improve HbA1C reduction and improvement of quality of life.

In this case proved the instrument using for transferring DM management information and protocol of the Multifaceted Healthy Coaching Program served prioritized of needed and fulfilled barrier of made understanding information. In addition, it was developed based on a fundamental ability of them. Evidence from various studies in several format of health education toolkits showed the complexity of the content, including the reading level of the text, often surpasses the skill of patients. This study was similarly with several diabetes materials have been developed for limited of health literacy and to be used interactively between patients and providers to promote patient understanding, empowerment and improved self-efficacy with self-care behaviors in group education. Moreover, multi-technique approached such as demonstration, case-based learning and teach back in group education session had high impact self-help group engagement. In addition, using of symbol in real life to make understanding laboratory test replace traffic light shading "ping pong 7 shading" for risk of DM complication level. This program were approached growth up

healthy tree by blood glucose level" campaign. Using leave color shade explanation level of blood glucose test low risk of complication explained by green leaves while yellow leaves for moderate level and red leaves for high risk of DM complication. Most of all self-help group engagement hold on together growth up healthy tree were increase social supporting and improved health literacy skill, especially interactive communication skill. As same as Thanarun T. study was found that the diabetes educational mixed media for elderly should be organized into groups study using attractive media decoration with large size for older people to be able to see pictures and clearly texts. The alphabets should be easy to read which might be learning activities for creating a motivation that contain colorful illustrations related to the content of diabetes management to be understood without difficulty [111] [112]. The impact of teach-back on comprehension of discharge instructions and satisfaction among emergency patients with limited health literacy: A randomized, controlled study. Journal of Communication in Healthcare 8:1, pages 10-21..Lequi 2013 Those were applied concept from several study fulfilled previously research gap [15] [17], [47] [86] [87]. In addition, for maintain health communication was performed short message sending (SMS) reminder healthy behavior, drug adherence and telephone counseling. It was fulfilled previous research gap and health care system for T2DM patients in the setting area. Reviewing health care system for T2DM patients was seen the gap such as non-communication during waiting appointment follow up. This study added up health communication channel such as telephone counseling to promote

scoping skill and health communication between health providers and T2DM patients. Previous studies had presented positive health outcome and disease management of SMS reminders.

Finally, development protocol of the Multifaceted Healthy Coaching was applied participatory communication between stake holders: health providers, care takers and T2DM patients. It was the best way to improve the appropriate design of DM booklet, protocol which convinced all of them to attend health care service as The Multifaceted Healthy Coaching. The interesting point of group discussion was found that developing of health care program had had to consider community calendar as "Tod Krathin", "Buddhist day" and lottery day. Moreover, it seem good sound high satisfaction of valuables themselves. It was proved research hypothesis that applied participatory communication should be increase effective of specifically program for contextual of community.

5.1.3 Effectiveness of Multifaceted Healthy Coaching Program improving health literacy, knowledge of diabetes, self-efficacy, self-care activity, HbA1c and quality of life

The Multifaceted Healthy Coaching Program had significantly effect to healthy literacy, knowledge of diabetes, self-efficacy, self-care activity, HbA1c and quality of life. Comparison between the intervention and control groups at the end of this program was present a significant all outcome than control. Moreover, when compare all of measurement outcomes at the base line to six month had been

significant improvement in the intervention group. Other hand was non-significant improving in the control.

1) Health Literacy improvement

The effective of the multicenter approached made a positive improvement in health literacy skill, it seem to serve WHO suggestion to apply health literacy concept in the part of health promotion (WHO, 2009). Most of all summarized above should be interpretation that the Multifaceted Healthy Coaching Program made high benefit to improve Health literacy. In this study was developed booklet of diabetes management using for health information communication toolkit in group education part based on level of health literacy. It was similarly positive improving of health literacy with previous studies which implement health delivery information toolkit based on limited of health literacy skill. There were present the situation variety resources with several formats to deliver information to patients with diabetes, the skill of patients and presents a barrier for information delivery to those with low health literacy while the result of health literacy improvement had also present significantly in several studies [15] [17] [86] [87]. Most of all, group education approached had been applied motivation, stimulating and case-based learning in which structure of this session to stimulate learning, understanding ,interactive communication between people with same situation that increased performance of health literacy [16] [17] [18].

2) Diabetes knowledgement

A significant improvement of diabetes knowledgement in this study should be reflection high-impact of Multifaceted Healthy Coaching Program. There were several studies report similarly result. Such as Improving of Type 2 Diabetic Patients' Knowledge, Attitude and Practice towards Diabetes Self-care by Implementing Community-Based Interactive Approach-Diabetes Mellitus Strategy. Increasing high effectiveness of this program had applied recommendation strategies for improving diabetes outcome from World Health Organization (WHO) was preferred regularly of diabetes care for people with T2DM including self-man that were approached self-help group engagement (control blood glucose, self-monitoring life style), education approach and psychological care such as group discussion help together improving high performance of blood glucose controlling.

3) Self-efficacy and self-care activity

The greatest of important role high-impact with in self-efficacy and self-management behaviors may also play an in the pathway linking low literacy to worse diabetes outcomes. This study was applied its concept. However, there was limited of specifically of self-efficacy in T2DM patients in Thai version. It should be develop standardization measurement tool.

The extensive study by Glasgow et al. (1989) showed that adults with T2DM were highly confident in medicine use (89%), self-monitoring blood glucose (SMBG) (80%), and diet (78%), but confidence in performing exercise was lower (59%)

[49]. People with higher self-efficacy were better able to perform their self-management behaviors [56]. In a study by Sarkar in T2DM patients with low health literacy, for every 10% increase in self-efficacy score, patients were more likely to report optimal diet (0.14 day more per week, 95% CI = 0.06-0.23), exercise (0.09 day more per week, 95% CI = 0.015-0.18), self-monitoring blood glucose (odds ratio 1.16, 95% CI = 1.03-1.31) and feet care (odds ratio 1.22, 95% CI = 1.10-1.41), but not medication adherence (odds ratio 1.10, 95% CI = 0.94-1.20) [58]. This association was similar for all races/ethnicity and health literacy levels [58]. As confidence of their practices increased, people with diabetes had better self management behaviors in a variety of people with different race/ethnicity, education and socioeconomic status [58].

Previous studies had measured the effective of an intervention on self-efficacy among patients with diabetes and limited of literacy. Three studies Wallace AS. and Cavanaugh had found increasing self-efficacy scores, while two studies were not seen improvement[16] [18] [93]. More personalized, intensive interventions were more likely to improve the self-efficacy of patients with diabetes than less personalized interventions. The study by Gerber et al. which evaluated a multimedia intervention for diabetes education through use of computer kiosks in clinic waiting rooms, was not found any improvement in self-efficacy scores at the 1-year follow-up [94]. It was different with this study in term of Seligman et al studied the effect of

notifying physicians about their patients' limited literacy before clinic visits. Patients in the intervention (physician notified of literacy) and control (physician not notified) groups had similar self-efficacy scores measured after their clinic visits [93]. In contrast, more personalized interventions did improve patients' self-efficacy. In the study by Wallace et al which assessed the impact of providing patients with a literacy appropriate diabetes education guide accompanied by an initial brief individual counseling session and two follow-up telephone counseling sessions at 2 and 4 weeks, self-efficacy scores improved after the intervention. This improvement was similar across literacy levels. Interestingly, however, self-efficacy levels improved for English-speaking patients but not for Spanish-speaking patients. Cavanaugh had evaluated the impact of providing literacy-sensitive diabetes care within an enhanced diabetes care program. Patients were randomized to an existing enhanced diabetes care program (control group) or to an enhanced diabetes care program that addressed literacy and numeracy (intervention group). Self-efficacy improved from baseline at 6 months for both control and intervention groups, but there was no significant difference between the groups. Schillinger et al. performed a three-arm, randomized, and controlled trial including an automated telephone self-management program, a group medical visit program, and usual care. Both intervention arms improved diabetes self-efficacy more than usual care.

4) HbA1c improvement

The greatest achieved of the Multifaceted Healthy Coaching was confirmed by reduction of HbA1c in uncontrollable T2DM patients with limited of health literacy. Package of the intervention such as DM booklet for limited of health literacy, diary records for healthy and drug adherence, group-education, short message (SMS) reminding and individual telephone counselling. The intervention package severed for recommendation from previous studies in which relationship, facility patient's performance of diabetes management and regularly of health care communicated between health providers and patients [104].. However a few study do not suggest for authorized of health providers most action should be desired behavior changes and may create a defensive attitude by the patient [10] [105]. Moving from interactive communication to focus of "advice giving" to developing skills for a counseling-based approach may be more clearly information for diabetes management lead to beautiful outcome in patients with T2DM who were present limited of health literacy. It is very important point concerning to set up model, intervention for encouraged them based on health literacy level especially older adult and elderly patients with T2DM. That are reasons why the Multifaceted Healthy Coaching Program constructed based on health literacy level added up with normally health care home-based such as SMS and telephone counselling supporting regularly communication with health care provider.

Moreover, using SMS, and telephone mobile phone communication were equity assessing. Lim performed a randomized controlled trial that used telemetric data from a glucometer used by the patient, along with other information from an EMR. They found improving of glycemic control in the patients who received coaching self-management message and reminder healthy behavior when compare with usual care [113]. There was study used a mobile phone as a platform to enter personal health data, and as a way to get automated interactive voice messages for reminders in response and the study sought to ascertain usability and satisfaction via survey, as well as a pre/posttest on diabetes knowledge [114]. Their healthcare provider could also review the data, and the subjects in the study reported a positive perception of value of diabetes management. Similar to Lim, Durso reported that subjects had improved glycemic control and diabetes knowledge increased diabetes knowledge test scores after using the system. Reducing the barriers to use of self-management tools, such as by increasing ease of use can also increase compliance with the tool. However, there was a limited facility as mobile phone using skill and health care providing without SMS service system. It should be defense for facility support as e-Health which is greatest effective for diabetes management and health care service in a less number of health care team.

5) Quality of life

The demand of diabetes self-care and diabetes treatment can have a significant impact on many aspects of quality of life. In addition, the frequency of diabetes symptoms, the number of comorbid chronic conditions and family income could predict quality of life in people with DM. Moreover, characteristics significantly related diabetes specific quality of life included gender, age, income, marital status, household size, and the number of study-focused comorbidities, peripheral vascular disease, renal disease, history of stroke/TIA, psychological problems and arthritis [23] [24].

5.2 Conclusion

This study was a single-blinded randomized control trail which conducted in Saimai district based on location in semi-urban, Bangkok Thailand. This study were approached 2 phase for developing and evaluation the intervention. Finding from the first phase were summarized diabetes situation, priority problem and needed for diabetes management. It was considered for developing the Multifaceted Healthy Coaching program. Then in the second phase were evaluated the effectiveness of Multifaceted Healthy Coaching Program to improve diabetes outcome and quality of life. Participants of this study, T2DM patients seeking care at Public Health Center 61th with inclusion criteria were involved. Then sample selection was computer randomly ID registered in T2DM data base records to reach sample sized as 274 T2DM patients. While in the implement part was eligible T2DM patients with HbA1c level > 7.0% and low to moderate health literacy level as found 174 of 274 then was computered

randomed directly to patient's ID registered totally 80 patients allocated in two arms (n=40 per group). The effectiveness of this program were HbA1c reduction and improvement of quality of life.

5.2.1 Situation analysis

Overall finding was third of four female T2DM patients while average of aged 63 year and two of third of them received education in primary school level despite a few patients unattended-school. Closely half of them earned money from their occupational while 51.8 % of them were supported by family. According to their income most of them had monthly income lower than 15,000 THB. For family supporting most of them stay with their family and having care taker for illness situation and daily life as well.. Almost care taker for T2DM patients are daughter or son or daughter-son in law and couples. For health status and medication records were seen most of the patients had a BMI level over than recommendation and third of fourth suffering with diabetes more than 5 years. Moreover, 90.0% had comorbidity especially hypertension and dyslipidemia beside diabetes. Patients were not up to recommended HbA1c levels; with 2 of 3 having HbA1c levels higher than the optimum recommended levels of below 7%. Even, finding health status high risky for complication of diabetes and unhealthy status in T2DM patients they were seen moderate level of quality of life. When looking on health literacy, T2DM patients had moderate level of the overall of health literacy by domain and five of six subdomains while one of two critical subdomain as getting media and health information literacy had low level. However,

factor influencing health outcome including knowledge of diabetes, self-efficacy and self-care activity were also present moderate level as same as health literacy. Investigation of Explanatory model in diabetes summarized, controllable patients explained a causation of diabetes first prioritized as unhealthy behaviors in the same with limited of exercise. Second highlight leading cause of illness were genetic disorders, urbanization life style and climate chance to variety kind of food. It became to industrial manufacturing source replaced natural food in the same way with uncontrollable T2Dm patients. In order that, controllable T2DM patients were followed regimen of diabetes treatment precisely but it was slightly in uncontrollable. In addition they were not first prioritized problem as diabetes complication and high level of HbA1c. Additional, they were strictly amount of carbohydrate and sweet food 1-3 days to get low level of testing blood sugar before meet doctor for treatment follow up. Most contrast with Explanatory model of diabetes disease, health provider had set the achievement of diabetes management by reduction of HbA1c level and risky of diabetes complication.

　　5.2.2 The Multifaceted Healthy Coaching Program development

　　　　In the first phase of this study, lunched quantitative and qualitative to conduct the situation in the real life to formulate the intervention. Then approached methodology of formative research to develop DM booklet, Diary records and protocol of the intervention. Moreover it had been integrated with routine service that it is not disturb health care service. The Multifaceted Healthy Coaching compose of booklet

based on limited of healthy literacy in term of functional skill, diary records healthy behavior, group education, Short messages (SMS) reminder drug adherence and healthy behaviors and telephone counselling.

This pragmatic randomized control trail performed with a 1:1 allocation ratio. From phase one, T2DM patients who found HbA1c level > 7.0% , low-moderate level of health literacy and seeking care at Public Health Center 61th criteria were recruited. Eligible was undertaken 174 participants from waitlist registered number in computer base allocated in two arms by simple random sampling patients who are appointment meeting doctor on Wednesday in to the intervention arm and other day into the control. Next step will simple random participant to reach the sample size such as 40 participant in each arm.

The implementation of this program was lunched to improve diabetes outcome for six months starting in the first month to distributed diary records, booklet in which separate content for each session in monthly group education. When finishes group education SMS reminder sent in the 2nd, 3rd week then in the 4th week approached 10-15 minutes for individual telephone counselling. The circle of this program was implemented till six months. After that were tested improvement of health literacy, knowledge of diabetes, self-efficacy, self-care activity, HbA1c and quality of life which used paired t-test and independent t-test at base line to six month within both groups and comparison between groups was evaluated. Changing over

time of FPG at base line, 3rd month and 6th month were used Repeated ANOVA measurement.

5.2.3 The effectiveness of Multifaceted Healthy Coaching Program to improve HbA1c and quality of life

The comparison between the intervention and control groups at six months, improvement in primary outcome as health literacy showed significant $p<0.01$ in the overall and by domains. While at the end of this program, knowledge of diabetes had been significantly improve when compared with the control group including the positive outcome of self-efficacy also significant $p< 0.05$. The important one of primary outcome as self-care activity showed significant in the overall scoring by $p<0.01$ while by components showed a significant improvements in 4 of 6 such as eating behaviors, exercise, drug adherence and feet care however it had been non-significantly in smoking and alcohol drinking when compared with the control group. The achievement goal of this study testing in level of HbA1c at the end of this program, compared with the control group was found a significant reduction of HbA1c. Finally, measurement the impact of Multifaceted Healthy Coaching Program was seen significantly increasing of quality of life in the intervention group more than the control. Focusing to the different improvement of primary outcomes before and after implementation within the intervention group had been a significant improving of health literacy in the overall and by domain, knowledge of diabetes, self-efficacy, self-

care activity, reduction of HbA1c and quality of life was increased. In the other hand, those were not found in the control group. Most of all summarized should be confirm meaningful of the Multifaceted Healthy Coaching Program that made high benefit to improve diabetes outcome and quality of life in older adult and elderly T2DM patients in semi-urban community.

5.3 Strengths and limitations of this study

One of greatest strengths of this study design as randomized control trail and application formative research methodology and multifaceted approach to fulfill the gap from previous studies. For the first phase, currently data in the ground-level used to stipulate development of the Multifaceted Healthy Coaching Program following procedure of this study ensured that the intervention was specifically shape up for the specific contextualized community in which it was implemented. While add up of investigation in term of Explanatory model, effective of communication pattern and consumer information processing in stake holder was greatest strengths of jump-starting developed the intervention. In addition a single-blind randomized control trail which evaluated the effectiveness of the Multifaceted Healthy Coaching Program was conducted without bias selection where is its effectiveness generalized was increased. This study were also approached multicenter such as whole supporting for diabetes management that its due to high-impact of improve diabetes outcome.

Despite the limitations of this study was present limited of time period to follow after implementation. Even the tested of effectiveness of this program shown improvement of primary outcome, HbA1C, quality of life. It should be maintain interactive communication to be sustainable healthy behavior and keep their inspiration. In addition, this program aim to promote constructional standardized for health promotion program while it was not policy approached if health provider do not apply or reject its benefit should be loss.

5.4 Recommendations

5.4.1 Programmatic recommendations

The Multifaceted Healthy Coaching Program approach a high-impact not only improvement of HbA1c and quality of life but also influencing positive outcome of health literacy, knowledge of diabetes self-care activity. Finally, it is a high-impact to improve quality of life. The Multicenter techniques as well as this program should be apply as part of health educational of diabetes in the setting which similarly contextualized. The first recommendation, for develop high-impact of health education program to the positive of diabetes outcome should be jump-starting reforms of health care service based on the concept of health literacy skill in T2DM patients ,barrier of diabetes management and their needed due to stake holder participation for health policy making. First domain of Healthy literacy as functional skill improvement should be approach multimedia or manual for limited of health literacy group that made easy understanding by picture as storytelling more than text

while big size of alphabets and color theory should be apply. In addition, instructional media providing in the part of health promotion should be note equity convince health information assessing for this group. Moreover, social supporting as group education, sharing and help together all of T2DM patients should be apply to improve diabetes outcome. Next, stimulating strategies for maintenance healthy behavior should be set the well-distributed communication with patients such as SMS reminder or individual telephone counselling on the waiting time period to the next follow up. It is efficiency techniques that should be apply in the closely health care providing as community level to supporting a less number of health provider in responsibility area. Most of all are fulfill the gap of health care service in the Public Health Center. However, application of SMS reminder or telephone counselling should be concern feasibility to assess SMS reminder plus health information service. Furthermore, individual consulting should be done as routine health care service not only diabetes monitoring but also added up for other chronic disease as long term care. Topping the effective of health education intervention should be train counselling skill for diabetes clinician team.

5.4.2 Policy recommendation

Most of all are benefit for policy maker directly application to initiate health promotion policy to promote health literacy influencing diabetes management to improve diabetes outcome and health outcome. However, on the day it is limited of specifically health literacy measurement tool for chronic disease in Thai version that

should be develop health literacy measurement tool specifically for chronic disease while health literacy should be promote in health provider

5.5 Expected benefit and application

This study will be made benefit of health promotion planner and policy maker in term of improving standardized of health care service topping up the routine of health care service for chronic disease. The application of health literacy conceptual in development of health education program should be guidance for body shape of booklet toolkit that appropriate for the limited of basically learning skill. Moreover, to construct body of knowledge have to apply multidisciplinary of art also plus communication skill for delivery health information by motivated and stimulated techniques of this study. In advance delivery health information as eHealth, the protocol and health communication toolkit in this study will be guideline to develop the appropriate transferring system by social network, multimedia and eHealth.

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APPENDICES

Appendix A: Questionnaire English

HN ☐☐-☐☐-☐☐-☐☐-☐☐

Date…………………………………

Questionnaires for interviewing Type 2 Diabetic Patients

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Questionnaire structural 6 parts

Part 1: General information Part 2: Health Literacy Part 3: Diabetes knowledge test

Part 4: Self-efficacy   Part 5: Self-care activity Part 6: Quality of Life

Pleas marking "✓" in the box "☐" which matching with patient's answer

Interviewer (Name-Surname) ………………………………………………………………………………………

Date of interviewing ………………………………………………………………………………………………

Patient (Name-Surname)…………………………………………………………………………………………

Part 1 General information

1.1 Characteristics

Gender	☐ 1) Male ☐ 2) Female
Age (year)	………………years
Education	☐ 1) Not-attending school ☐ 2) Primary school ☐ 3) High school ☐ 4) Higher than high school
Marital status	☐ 1) Single ☐ 2) Widow ☐ 3) Married ☐ 4) Divorce
Monthly income(THB)	…………………Baht per month

Part 1 General information (cont.)

1.1 Characteristics (cont.)

Welfare Health Care	❑ 1) Universal Coverage Scheme ❑ 2) Government ❑ 3) Payment ❑ 4) Other
Living with family	❑ 1) Yes ❑ 2) NO
Having care taker in daily life or illness	❑ 1) Yes ❑ 2) NO
Weight (kg.)	................................kg.
Height (cm.)	................................cm.
BMI (Body Mass Index)	....
Waistline	..........................cm.
Duration with diabetes Mellitus (year)	..........................years

Co-morbidity beside diabetes	❑ 1) NO
	
	❑ 2) Yes (more than one)
	
	   ❑ 2.1 Hypertension ❑ 2.2 Dyslipidemia
	   ❑ 2.3 Diabetic retinopathy
	   ❑ 2.4 Cardiovascular disease (CVD)
	   ❑ 2.5 Kidney disease ❑ 2.6 Other

Oral drug administration per day	❑ 1) The number of drug ....items ❑ 2) How many time for taking drug per day? ❑ 2.1 OD...items ❑ 2.2 bid pc. ....items ❑ 2.3 3 time pc....items ❑ 2.4 3 time pc + hs.

1.2 Medical records (1 year ago)

Month/date	1st	2nd	3rd	4th	5th	6th
HbA1c						
FPG						
DTX						
Bp.						
Month/date	7th	8th	9th	10th	11th	12th
HbA1c						
FPG						
DTX						
Bp.						

Part 2 Health Literacy domains
2.1 Functional skill
2.1.1 Needed health knowledge and understanding item
1. What kind of food high risk to hypertension?(Co-morbidity beside DM).   ❑ 1) Salty Food ❑ 2) Fried Food with repeat frying oil   ❑ 3) Sweet Food ❑ 4) Sour Food
2. What is chronic disease prevented by varieties of vegetable consumption?   ❑ 1) Hypertension ❑ 2) Cancer ❑ 3) Diabetes ❑ 4) Dyslipidemia
3. What is chronic disease caused by taken food with high sugar?   ❑ 1) Hypertension ❑ 2) Cancer ❑ 3) Diabetes ❑ 4) Dyslipidemia

2.1 Functional skill (cont.)
2.1.1 Needed health knowledge and understanding item (cont.)

4. How to perform step of exercise to reduce risk co-morbidity beside DM such as of cancer, Cardiovascular disease, and hypertension?

❑ 1) At least 3 days weekly with at least 30 minutes each time.

❑ 2) Extreme exercise at least 60 minutes daily.

❑ 3) Housework at least 30 minutes daily.

❑ 4) Extreme exercise and drink a lot of water.

5. What is the preparation exercise that you should follow?

❑ 1) Drink a lot of plenty water before exercise.

❑ 2) Warm up before exercise and relaxing muscle after exercise.

❑ 3) Eating food before and after exercise.

❑ 4) Maintain extreme exercise till the end of time period.

6. What is the best management emotional to change guilty emotional to be happiness?

❑ 1) Uncle Ma try to solve all the problem even so stress mode.

❑ 2) Aunty Me feel so scarcely anyone may be gossips her.

❑ 3) Grandmother Soy feel so happiness with her job.

❑ 4) Grandfather Son go to temple and listen to sermon even it is not favourite in his mind.

7. What is the appropriate activities to reduce stress in older adult and elderly?

❑ 1) Reading and Eating.   ❑ 2) Exercise , prayer and mediation

❑ 3) Watching drama series and napping   ❑ 4) Travelling

8. What is disease that smoker and exposure Tar, Nicotine had low risk?

❑ 1) Emphysema   ❑ 2) Cardiovascular disease (CVD)

❑ 3) Lung cancer   ❑ 4) Liver cancer

2.1 Functional skill (cont.)

2.1.1 Needed health knowledge and understanding item (cont.)

9. Who get high risk to expose second hand smoking?

❑ 1) Having meal together with smoker   ❑ 2) Talk together with other and smoking

❑ 3) New smoker   ❑ 4) Smoker purpose to reduce stress

10. What are diseases caused by alcohol consumption?

❑ 1) Cirrhosis   ❑ 2) Cancer, Cardiovascular disease (CVD), Diabetes

❑ 3) Overweight   ❑ 4) Kidney failure

2.1.2 Accessing with health information and service (past a month)

1 How often do you access health information immediately, when you want to

know about managing of healthy behaviour?

❑ 1) Very often   ❑ 2) Fairly often   ❑ 3) Sometime

❑ 4) Almost never   ❑ 5) Never

2. How often do you access or check to correct health information?

❑ 1) Very often   ❑ 2) Fairly often   ❑ 3) Sometime

❑ 4) Almost never   ❑ 5) Never

3. How often do you get trouble to access health information?

❑ 1) Very often   ❑ 2) Fairly often   ❑ 3) Sometime

❑ 4) Almost never   ❑ 5) Never

4. How often do you update health information or check it for clearly understanding?

❑ 1) Very often   ❑ 2) Fairly often   ❑ 3) Sometime

❑ 4) Almost never   ❑ 5) Never

5. How often do you recheck the source of health information for confirmation believable?

❑ 1) Very often   ❑ 2) Fairly often   ❑ 3) Sometime

❑ 4) Almost never   ❑ 5) Never

2.1.2 Accessing with health information and service (past a month)

6. What are source of health information that you properly assess? (Please ranking in order 1 to 3 by put the number in front of answer)

  ....Health providers   .... Family member/Nephew

  ....Neighbourhoods   ....Brochures/Poster

  ....Television   ....Radio

  ......Internet assess   ....Other (specify).....................

7. What are source of health information that made you confuse or unclear understanding? (Please ranking in order 1 to 3 by put the number in front of answer)

  ....Health providers   .... Family member/Nephew

  ....Neighborhood   ....Brochures/Poster

  ....Television   ....Radio

  ......Internet assess   ....Other (specify).....................

8. What are the barriers to make understand with health information from varieties sources?(More than one)

  ❑ 1) Small alphabet/blur vision

  ❑ 2) Technical term explanation/specifically medical explanation

  ❑ 3) Pattern of transferring/kind of communication

  ❑ 4) The difference of content from previously received

  ❑ 5) Short time period of accessing/receiving

  ❑ 6) Other (specify)..

2.2 Interactive communication skill
2.2.1 Communicating for added Professional
1. How often do you don't understand explanation of health information from someone? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never
2. How often do you request someone helping to teach you reading health information? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never
3. How often do you make understanding and telling about your DM management for family member or your friends? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never
4. How often do you don't understand when you read lift let or DM management manual? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never
5. How often do you present your reading, speaking and written health information skill to someone? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never
6. How often do you persuade someone to accept health information? ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime ❏ 4) Almost never ❏ 5) Never

2.2.2 Managing health condition
1. How often do you concern nutrition and sugar consumption in your daily meal? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never
2. How often do you plan to exercise and reach your planning goal? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never
3. How often do you evaluate stress and get achieve to reduce it with the appropriate way? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never
4. How often do you remind healthy behaviour to maintain healthy? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never
5. How often do you renovate the environment to convince healthy behaviour? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never

2.3 Critical skill
2.3.1 Getting media and health information literacy (past 6 months)
1. How often do you recheck the reliability and truly of health product and health service which advertise from television? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime ❏ 4) Almost never   ❏ 5) Never
2. How often do you intend to recheck reliability and truly of health product and health service advertisement via website or multimedia? ❏ 1) Very often   ❏ 2) Fairly often   ❏ 3) Sometime   ❏ 4) Almost never   ❏ 5) Never

2.3.1 Getting media and health information literacy (past 6 months)
3. How often do you concern about meaningful or believable of health information before accepted and practise? ❑ 1) Very often ❑ 2) Fairly often ❑ 3) Sometime ❑ 4) Almost never ❑ 5) Never
4. How often do you accept health information when you participate health education program based on reliability and truly confirmation? ❑ 1) Very often ❑ 2) Fairly often ❑ 3) Sometime ❑ 4) Almost never ❑ 5) Never
5. How often do you accept consensus of diabetes management from group discussion with confirmation reliability and truly? ❑ 1) Very often ❑ 2) Fairly often ❑ 3) Sometime ❑ 4) Almost never ❑ 5) Never
2.3.2 Making the appropriate health decision to good practice
1. What is appropriate health decision when you join party with unhealthy food for DM patients? ❑ 1) Say " OK I will eat all tasty food" ❑ 2) Say " OK" then take a little bit unhealthy food ❑ 3) Say " Thank you" and try to find the lowest sugar food in party ❑ 4)Say "Thank you , I had had diabetes mellitus, kind of food would be increasing my blood glucose"

2.3 Critical skill (cont.)
2.3.1 Getting media and health information literacy (cont.)
2. What do you do when your friend stop exercise with you? ❑ 1) You will stop exercise. ❑ 2) You remain exercise without friend but you will stop if you bored. ❑ 3) You maintain you healthy exercise. ❑ 4) You encourage your friend to maintain healthy exercise with you.

2.3 Critical skill (cont.)
2.3.1 Getting media and health information literacy (cont.)
3. What is your favourite technique to reduce stress? ❑ 1) You relax with your favourite entertainment. ❑ 2) You will choose extreme exercise to reduce stress. ❑ 3) You will go to temple, chant and meditation. ❑ 4) Recall to wonder moment and thinking in the positive way.
4. What do you do when your family member smoking inside home. ❑ 1) Let them smoking ❑ 2) You will go outside for unexposed second hand smoking. ❑ 3) You will persuade them to stop smoking for other health. ❑ 4) You will persuade them to stop smoking for healthy family.
5. What do you do when you are invited to hang out and drinking with your friend at her/his home? ❑ 1) Drink a lot with your friend ❑ 2) Drink a little ❑ 3) Drink a lot but let your friend driving to send you back home. ❑ 4) Drink only water and give the reason why can't drink alcohol.

Part 3 Diabetes knowledge Test

No	Diabetes knowledge Test	False	True
1.	Characteristic of diabetes mellitus is high blood glucose level.		
2.	Hypoglycemia or Hyperglycemia are the complication of diabetes mellitus.		
3	Hypoglycemia symptom are present shakiness/Nervousness or anxiety, Sweating, chills and clamminess/ Lightheadedness or dizziness.		
4	Diabetes mellitus symptom are Urinating often, Feeling very thirsty, and Feeling very hungry - even though you are eating. Extreme fatigue, Blurry vision, Cuts/bruises that are slow to heal, Weight loss - even though you are eating more (type 1) Tingling pain, or numbness in the hands/feet (type 2)		
5	There is only one causation as genetic disorder related diabetes disease.*		
6	Diabetes patients may require sweet candy or sweet soft-drink when get hypoglycemia symptom.		
7	Diabetes mellitus patients can take unlimited of green vegetable.		
8	Diabetes mellitus patients can take lean meat unlimited.*		
9	Diabetes mellitus patients have to limit high sodium and salty food to reduce risky of DM complication as hypertension or kidney disease.		
10	Drug adherence is treatment for cured from DM disease.		
11	Unknown generic name and pharmacokinetics of DM medicines are not affect for DM management in DM patients.*		
12	Patients with 2DM who had normal blood glucose level < 140 mg./dl might be stop drug administration. *		

Part 3 Diabetes knowledge Test (cont.)

No	Diabetes knowledge Test	False	True
13	Exercise lead to increase metabolism and improve controlling blood glucose.		
14	Exercise for 30 minute at least three times/week will improve controllable blood glucose.		
15	Patients with DM have to stop exercise when get heart attack or weakness or dizziness.		
16	The best period time for exercise is 10 minute/day.		
17	DM patients have to choose shoe;care soft, fit size, without button foot for massage.		
18	Patients with DM have to stop smoking and drinking alcohol.		
19	Patients with DM have to check up oral health twice a year		
20	Patients with DM have to see doctor when get vomiting and blur vision.		

Part 4 Self-efficacy of diabetes management scoring 1 – 10 (lowest-highest)

No	Self-efficacy of diabetes management
1	Confidential of feeling that you can eat meals every 4 to 5 hours including breakfast every day. ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
2	Confidential of feeling that able to follow diet plan when preparation or sharing food with non DM people. ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
3	Confidential of feeling that chosen appropriate foods for DM disease (for example, snacks) ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
4	Confidential of feeling that can exercise 15 to 30 minutes for 4 to 5 times a week. ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

Part 4 Self-efficacy of diabetes management scoring 1 – 10 (lowest-highest)

No	Self-efficacy of diabetes management (cont.)
5	Confidential of feeling to make an appropriate prevention dropping blood sugar during exercise period. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
6	Confidential of feeling how to treat when blood glucose dropped. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
7	Confidential of feeling that you can judge when the changes in your illness mean you should visit the doctor. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
8	Confidential of feeling to see doctor covered all of appointment follow up. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
9	Confidential of feeling for drug adherence in order of prescription from doctor. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
10	Confident of feeling to maintenance healthy feet such as routine care. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
11	Confidential of feeling to blood glucose controlling without interfere with the things in daily life. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10
12	Feeling of acceptable performance of controlling and monitoring diabetes to make healthy life. ❏1 ❏2 ❏3 ❏4 ❏5 ❏6 ❏7 ❏8 ❏9 ❏10

Part 5 Self-care activity

5.1 Eating behaviours : Sweet food
1. Do you plan to control sweet food or increasing fruit consumption replace sweet snack? ❑ Yes   ❑ No
2. Do you have maintain your controlling sweet food consumption, currently? ❑ Yes   ❑ No
3. How long do you controllable sweet food? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. Do you have still sweet food consumption? ❑ Yes   ❑ No
5. How do you confidential to maintain your controlling sweet food consumption to next month? ❑ 1) Very confidence   ❑ 2) Fairly confidence ❑ 3) Moderately satisfied   ❑ 4) Never
5.2 Eating behaviours : Fatty food
1. Do you plan to control fatty food? ❑ Yes   ❑ No
2. Do you have maintain your controlling fatty food consumption, currently? ❑ Yes   ❑ No
3. How long do you controllable fatty food? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. Do you have still fatty food consumption? ❑ Yes   ❑ No
5. How do you confidential to maintain your controlling fatty food consumption to next month? ❑ 1) Very confidence ❑ 2) Fairly confidence ❑ 3) Moderately satisfied   ❑ 4) Never

5.3 Eating behaviours : Salty food
1. Do you plan to control salty food?   ❑ Yes   ❑ No
2. Do you have maintain your controlling salty food consumption, currently?   ❑ Yes   ❑ No
3. How long do you controllable salty food?   ❑ 1) < 30 days   ❑ 2) 1-6 month   ❑ 3) 7-12 month   ❑ > 1 year
4. Do you have still salty food consumption?   ❑ Yes   ❑ No
5. How do you confidential to maintain your controlling salty food consumption to next month?   ❑ 1) Very confidence   ❑ 2) Fairly confidence   ❑ 3) Moderately satisfied   ❑ 4) Never

5.4 Smoking
1. Do you plan to stop smoking cigarette? ❑ Yes ❑ No
2. Do you have maintain your stop smoking cigarette? ❑ Yes ❑ No
3. How long do you stop smoking cigarette? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. Do you have still stop smoking cigarette? ❑ Yes ❑ No
5. How do you confidential to maintain stop smoking cigarette to next month? ❑ 1) Very confidence ❑ 2) Fairly confidence ❑ 3) Moderately satisfied ❑ 4) Never
5.5 Alcohol consumption
1. Do you plan to stop alcohol drinking? ❑ Yes ❑ No
2. Do you have maintain stop alcohol drinking? ❑ Yes ❑ No
3. How long do you stop alcohol drinking? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. Do you have still stop alcohol drinking? ❑ Yes ❑ No
5. How do you confidential to maintain stop alcohol drinking to next month? ❑ 1) Very confidence ❑ 2) Fairly confidence ❑ 3) Moderately satisfied ❑ 4) Never

5.6 Drug administration
1. Do you take diabetes drug following prescription? ❑ Yes   ❑ No
2. Do you follow all appointment follow up? ❑ Yes   ❑ No
3. Do you take another drug beside diabetes drug? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. Do you take? ❑ Yes   ❑ No (Stop interviewing)
5. How do you confidential to stop taking anti-depress or insomnia drug beside diabetes medicines to next month? ❑ 1) Very confidence   ❑ 2) Fairly confidence ❑ 3) Moderately satisfied   ❑ 4) Never
5.7 Feet care
1. Do you check-up your health feet as routine care everyday? ❑ Yes   ❑ No
5.7 Feet care (cont.)
2. Do you have maintain feet care as your daily life? ❑ Yes   ❑ No
3. When do you check-up your health feet at the last time? ❑ 1) < 30 days ❑ 2) 1-6 month ❑ 3) 7-12 month ❑ > 1 year
4. At a past of month, do you still check-up healthy feet? ❑ Yes   ❑ No (Stop interviewing)
5. How do you confidential to maintain feet care as routine care? ❑ 1) Very confidence   ❑ 2) Fairly confidence ❑ 3) Moderately satisfied   ❑ 4) Never

Part 6 Quality of life
1. How satisfied are you with your current DM treatment?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
2. How satisfied are you with the amount of time it takes to manage your DM?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
3. How satisfied are you with the time it takes to determine your sugar level?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
4. How satisfied are you with the time you spend exercising?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
5. How satisfied are you with time spent getting check-up for your DM?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
6. How satisfied are you with your knowledge about your DM?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
7. How satisfied are you with your sex life?   ❏ 1) Very satisfied ❏ 2) Moderately satisfied ❏ 3) Neither   ❏ 4) Moderately dissatisfied ❏ 5) Very dissatisfied
8. How often do you find that you eat something you shouldn't rather than tell someone that you have DM?   ❏ 1) Very often ❏ 2) Fairly often ❏ 3) Sometime   ❏ 4) Almost never ❏ 5) Never

Part 6 Quality of life (cont.)

9. How often do you worry about whether you will miss work?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

10. How often do you have pain because of the treatment for your DM?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

11. How often do you feel physical ill?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

12. How often do you have a bad night's sleep because of DM?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

13. How often do you feel DM limited your career?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

14. How often do you feel with the burden your DM is placing on your family?

☐ 1) Very often   ☐ 2) Fairly often   ☐ 3) Sometime

☐ 4) Almost never   ☐ 5) Never

Appendix B: Questionnaire (Thai)

รหัส ☐☐-☐☐-☐☐-☐☐-☐☐

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

แบบสัมภาษณ์ผู้ป่วยเบาหวาน

สำหรับงานวิจัย *"การบูรณาการ การดูแลรอบด้าน เพื่อควบคุมระดับน้ำตาลในเลือด และพัฒนา คุณภาพชีวิตของผู้ป่วยโรคเบาหวานชนิดที่ 2 ในกลุ่มวัยผู้ใหญ่ตอนปลายและผู้สูงอายุที่อาศัยใน เขตกึ่งเมืองกึ่งชนบท เขตสายไหม กรุงเทพมหานคร ประเทศไทย"*

ประกอบไปด้วย 6 ส่วน ดังนี้

ส่วนที่ 1: ข้อมูลการทั่วไปของผู้ป่วย   ส่วนที่ 2: ความรอบรู้ด้านสุขภาพ

ส่วนที่ 3: ความรู้เกี่ยวกับโรคเบาหวาน   ส่วนที่ 4: ความมั่นใจในประสิทธิภาพการดูแลตนเอง

ส่วนที่ 5: พฤติกรรมการดูแลตนเอง   ส่วนที่ 6: คุณภาพชีวิต

<u>คำชี้แจง</u>:โปรดทำเครื่องหมาย ✓ ลงในช่อง ☐ ตามข้อมูลที่ได้รับจากการสัมภาษณ์ผู้ป่วย

ผู้บันทึกข้อมูล (ชื่อ-สกุล)... .

วันที่บันทึกข้อมูล.. ....

<u>ส่วนที่ 1</u> ข้อมูลทั่วไปผู้ป่วยเบาหวาน	
1. เพศ	☐ 1) ชาย ☐ 2) หญิง
2. อายุ	วัน/เดือน/ปี เกิด.....................................อายุ..............ปี
3. ระดับการศึกษา	☐ 1) ประถมศึกษาตอนต้น ☐ 2) ประถมศึกษาตอนปลาย ☐ 3) มัธยมศึกษาตอนต้น ☐4) มัธยมศึกษาตอนปลาย ☐ 5) อนุปริญญา/เทียบเท่า ☐ 6) ปริญญาตรี ☐ 7) สูงกว่าปริญญาตรี

ส่วนที่ 1 ข้อมูลทั่วไปผู้ป่วยเบาหวาน (ต่อ)	
4. สถานะสมรส	❑ 1) โสด ❑ 2) หม้าย (คู่สมรสเสียชีวิต) ❑ 3) สมรส ❑4) หย่า / แยก
5. อาชีพ	❑ 1) เกษตรกร(ทำไร่/สวน/นา) ❑ 2) ค้าขาย ❑ 3) รับจ้างทั่วไป ❑4) ข้าราชการ ❑ 5) ข้าราชการบำนาญ ❑6) รัฐวิสาหกิจ ❑ 7) บริษัทเอกชน ❑ 8) ธุรกิจส่วนตัว ❑ 9) พ่อบ้าน/แม่บ้าน/ไม่ได้ประกอบอาชีพ ❑ 10) อื่นๆ(ระบุ)...............................
6. แหล่งรายได้ของท่าน (ตอบได้มากกว่า 1ข้อ)	❑ 1) เงินบำเหน็จ/บำนาญ ❑ 2) จากการประกอบอาชีพ ❑ 3) จากลูก/หลาน/ญาติ ❑4) เบี้ยยังชีพผู้สูงอายุ ❑ 5) อื่นๆ (ระบุ) ....
7. รายได้ต่อเดือนของท่าน	....บาท
8. สิทธิการรักษาพยาบาลที่ใช้อยู่ในปัจจุบัน	❑ 1) บัตรทอง 30 บาท/ผู้สูงอายุ/ผู้พิการ/ผู้นำชุมชน/อสม. ❑ 2) เบิกตรง สวัสดิการข้าราชการ ข้าราชการบำนาญ ❑ 3) ประกันสังคม ❑ 4) สวัสดิการของบริษัท องค์กร รัฐวิสาหกิจ ❑ 5) จ่ายเงินเอง ❑ 6) ประกันสุขภาพเอกชน ❑ 7) อื่นๆ (ระบุ) ....
8. จำนวนสมาชิกในบ้าน	❑ 1) อยู่คนเดียว ❑ 2) อยู่กับสมาชิกในบ้าน................คน
9. อาศัยอยู่กับ (ตอบได้มากกว่า 1 ข้อ)	❑ 1) คู่สมรส ❑ 2) ลูกชาย/ลูกสาว ❑ 3) ลูกเขย/ลูกสะใภ้ ❑4) พี่น้อง ❑ 5) บิดา/มารดา ❑ 6) หลาน ❑ 7) ญาติ ❑ 7) อยู่คนเดียว

ส่วนที่ 1 ข้อมูลทั่วไปผู้ป่วยเบาหวาน (ต่อ)	

10. ผู้ที่ให้การดูแลหลักแก่ท่านด้านเป็นอยู่และยามเจ็บป่วย	❑ 1) ไม่มีคนดูแล
	
	❑ 2) มีคนดูแลเกี่ยวข้องเป็น
	
	   ❑ 2.1) คู่สมรส ❑ 2.2) ลูกชาย/ลูกสาว
	
	   ❑ 2.3) ลูกเขย/ลูกสะใภ้ ❑ 2.4) พี่น้อง
	
	   ❑ 2.5) บิดา/มารดา ❑ 2.6) หลาน
	
	   ❑ 2.7) ญาติ ❑ 2.8) อื่นๆระบุ).....................

11.ระยะเวลาที่ป่วยเป็นโรคเบาหวาน	เริ่มป่วย (แพทย์วินิจฉัย) ....ปีที่ผ่านมา เริ่มรักษา ปี พ.ศ................................... ระยะเวลาที่ป่วย.....................................ปี(ตั้งแต่วินิจฉัย)
12. น้ำหนัก,ส่วนสูง ,ดัชนีมวลกาย และเส้นรอบเอว	1) น้ำหนัก...............กิโลกรัม 2) ส่วนสูง...............เซนติเมตร 3) ดัชนีมวลกาย (BMI)......4) เส้นรอบเอว...........เซนติเมตร
13.โรคร่วมกับโรคเบาหวาน (ตอบได้มากกว่า 1 ข้อ)	❑ 1) โรคความดันโลหิตสูง ❑2) โรคไขมันในเลือดสูง ❑ 3) โรคหัวใจและหลอดเลือด ❑4) โรคทางตา ❑ 5) โรคไต ❑6) โรคเกี่ยวกับหลอดเลือด ❑ 7) โรคเข่าเสื่อม ❑8) โรคตับ ❑ 9) อื่นๆ (ระบุ)............... ❑10) ไม่มีโรคร่วม
14. ยาที่รักษาโรคเบาหวานอยู่ในปัจจุบัน	❑ 1) ยากิน จำนวน..............................รายการ ❑ 2) จำนวนมื้อในการกินยาแต่ละรายการ ❑ 2.1) วันละ 1 มื้อ ตอนเช้า ....รายการ ❑ 2.2) วันละ 2 มื้อ เช้า เย็น ....รายการ ❑ 2.3) วันละ 3 มื้อ เช้า กลางวัน เย็น ....รายการ ❑ 2.4) วันละ 4 มื้อ เช้า กลางวัน เย็น และก่อนนอน........

ส่วนที่ 1 ข้อมูลทั่วไปผู้ป่วยเบาหวาน (ต่อ)				
1 การใช้เครื่องมือสื่อสาร	ท่านมีโทรศัพท์เป็นของท่านเองหรือไม่ (หากไม่มีข้ามไปตอบส่วนที่ 3) ❑ 1) ไม่มีเป็นของตนเอง ❑ 2) มีเป็นของตนเอง			

ข้อคำถามเกี่ยวกับการใช้โทรศัพท์		ใช่	ไม่ใช่	ไม่แน่ใจ
1	โทรศัพท์มือถือมีความจำเป็นในชีวิตประจำวันของท่าน			
2	โทรศัพท์มือถือของท่านสามารถรับส่งข้อความได้			
3	ท่านใช้โทรศัพท์มือถือในการสนทนาเป็นส่วนใหญ่			
4	ท่านใช้โทรศัพท์มือถือระบบเติมเงิน			
5	ท่านใช้โทรศัพท์มือถือระบบรายเดือน			
6	ท่านเคยใช้โทรศัพท์โดยการรับ-ส่งข้อความ			
7	ท่านเคยใช้โทรศัพท์เล่นไลน์			
8	ท่านเคยรับส่ง บริการข่าวสาร/บริการดาวโหลดวีดีโอ รูปภาพ หรือคลิปต่างๆด้านสุขภาพผ่านโทรศัพท์มือถือ			
9	หากมีข้อความเข้าท่านจะเปิดอ่านทุกครั้ง			
10	ท่านเคยได้รับบริการข้อความเกี่ยวกับการดูแลสุขภาพ และข้อมูลด้านสุขภาพผ่านทางโทรศัพท์ (การส่งข้อความ/การให้คำปรึกษา)			
11	การส่งข้อความเกี่ยวกับการดูแลตนเองของผู้ป่วยเบาหวานให้ท่านทางโทรศัพท์ จะรบกวนความเป็นส่วนตัวของท่าน			
12	หากมีบริการให้คำปรึกษาในการดูแลสุขภาพแก่ท่านทางโทรศัพท์โดยเจ้าหน้าที่สาธารณสุขท่านยินดีใช้บริการ			

ส่วนที่ 2 ประเมินความรอบรู้ หรือ ความแตกฉานด้านสุขภาพ
โปรดบันทึกคำตอบที่ผู้ได้รับการสัมภาษณ์คิดว่าถูกต้องที่สุด
2.1 ความรู้ความเข้าใจทางสุขภาพ

1	อาหารชนิดใดที่เสี่ยงต่อการเกิดโรคความดันโลหิตสูง<u>มากที่สุด</u>(การเกิดโรคร่วมกับเบาหวาน) ❏ 1 อาหารที่มีรสเค็มจัด,อาหารหมักดอง ❏ 2 อาหารที่ใช้น้ำมันทอดซ้ำบ่อยๆ ❏ 3 อาหารที่มีรสหวานจัด ❏ 4 อาหารที่มีรสเปรี้ยว
2	การกินผักหลายๆชนิดที่มีสีสันแตกต่างกัน จะช่วยลดความเสี่ยงต่อการเป็นโรคใด<u>มากที่สุด</u> ❏ 1 โรคความดันโลหิตสูง ❏ 2 โรคมะเร็ง ❏ 3 โรคเบาหวาน ❏ 4 ไขมันในเลือดสูง
3	ผู้ป่วยที่มีโรคประจำตัวอะไรที่ไม่ควรรับประทานอาหารรสหวานจัด หรือ ขนมหวาน เช่น ทองหยอด ฝอยทอง ❏ 1 โรคความดันโลหิตสูง ❏ 2 โรคมะเร็ง ❏ 3 โรคเบาหวาน ❏ 4 ไขมันในเลือดสูง
4	คนไข้เบาหวานควรออกกำลังกายอย่างไรถึงจะลดความเสี่ยงต่อการเกิดโรคร่วมอื่นๆได้ ❏ 1 การออกกำลังกายจนเหนื่อย*อย่างน้อยสัปดาห์ละ 3 วัน วันละ 30 นาที* ❏ 2 ออกกำลังกายอย่างหนักทุกวันต่อเนื่อง*อย่างน้อยวันละ 60 นาที* ❏ 3 ออกกำลังกายด้วยการทำงานบ้านทุกวัน อย่างน้อยวันละ 30 นาที ❏ 4 ออกกำลังกายอย่างหนักแล้วพักดื่มน้ำให้มากอย่างน้อยสัปดาห์ละ 3 วัน
5	การออกกำลังกายทุกครั้ง เราควรกระทำตามบุคคลในข้อใด ❏ 1 ลุงมาดื่มน้ำให้มากๆ ทั้งก่อนและหลังการออกกำลังกาย ❏ 2 ป้ามีอบอุ่นร่างกายก่อนและยืดเหยียดกล้ามเนื้อหลังออกกำลังกาย ❏ 3 คุณยายสวยทานอาหารให้อิ่มทั้งก่อนและหลังออกกำลังกาย ❏ 4 คุณตาสนออกกำลังกายอย่างหนักตลอดช่วงเวลาของการออกกำลังกาย

ส่วนที่ 2 ประเมินความรอบรู้ หรือ ความแตกฉานด้านสุขภาพ
โปรดบันทึกคำตอบที่ผู้ได้รับการสัมภาษณ์คิดว่าถูกต้องที่สุด
2.1 ความรู้ความเข้าใจทางสุขภาพ (ต่อ)

6	บุคคลในข้อใดที่มีการจัดการกับอารมณ์ตนเองได้ดี ❑ 1 ลุงมาคิดหาทางแก้ปัญหากับทุกเรื่องให้ได้ ❑ 2 ป้ามีคอยระวังคนนินทาว่าร้ายตนเอง ❑ 3 คุณยายสวยตั้งใจทำงานอย่างเป็นสุข ❑ 4 คุณตาสนเข้าวัดฟังธรรมแม้จะไม่อยากเข้าก็ตาม
7	เมื่อท่านต้องการคลายเครียด ท่านจะเลือกการกระทำตามข้อใดเป็นลำดับแรกที่จะทำให้ท่านคลายเครียดได้ดีที่สุด ❑ 1 กินอาหารให้เพลิน อ่านหนังสือ ❑ 2 ออกกำลังกาย สวดมนต์นั่งสมาธิ ❑ 3 ดูละครหลังข่าว นอนพักให้มาก ❑4 ไปท่องเที่ยวในสถานที่ ที่ชอบ
8	โรคในข้อใดที่ไม่ได้มีสาเหตุมาจากการสูบบุหรี่ ❑ 1 โรคถุงลมโป่งพอง ❑ 2 โรคหัวใจและหลอดเลือด ❑ 3 โรคมะเร็งปอด ❑4 โรคมะเร็งในตับ
9	บุคคลในข้อใดที่มีความเสี่ยงต่อการเกิดอันตรายจากการสูบบุหรี่สูงที่สุด ❑ 1 กินข้าวพร้อมกับคนที่สูบบุหรี่ตลอดเวลา ❑ 2 คนที่สูบบุหรี่ไปคุยไป ❑ 3 คนที่เพิ่งหัดสูบบุหรี่ ❑4 คนที่สูบบุหรี่ทุกครั้งที่เครียด
10	การดื่มเครื่องดื่มแอลกอฮอร์ มีความเสี่ยงต่อการเกิดโรคใดมากที่สุด ❑ 1 โรคตับแข็ง ❑ 2 ะเร็ง โรคหัวใจ โรคเบาหวาน ❑ 3 โรคอ้วน ❑ 4 โรคไตวาย
คะแนนรวมองค์ประกอบที่ 1 ข้อ 1 – 10 (คะแนนเต็ม = 10 คะแนน)	

2. 2 การเข้าถึงข้อมูลและบริการสุขภาพ	
1	เมื่อท่านต้องการข้อมูลสุขภาพเกี่ยวกับการดูแลตนเองของผู้ป่วยเบาหวาน ท่านสามารถเข้าถึง แหล่งข้อมูลสุขภาพได้บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑ 2 บ่อยครั้ง ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
2	เมื่อท่านต้องการข้อมูลสุขภาพ ท่านสามารถค้นหาข้อมูล หรือสอบถามผู้รู้ จนได้ข้อมูลที่ถูกต้องทันสมัย บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑ 2 บ่อยครั้ง ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
3	ท่านมีปัญหากับการค้นหาข้อมูลสุขภาพจากแหล่งต่างๆไม่ว่าจะเป็นขอคำปรึกษาจากผู้รู้ จากสื่อสิ่งพิมพ์ หรืออินเตอร์เน็ตบ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑ 2 บ่อยครั้ง ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
2. 2 การเข้าถึงข้อมูลและบริการสุขภาพ	
4	ท่านมีการตรวจสอบข้อมูลสุขภาพเกี่ยวกับการดูแลตนเองของผู้ป่วยเบาหวาน เพื่อยืนยันความเข้าใจของ ตนเอง โดยการสืบค้นจากหลากหลายแหล่งบ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑ 2 บ่อยครั้ง ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
5	แหล่งข้อมูลข่าวสารที่ท่านได้รับเกี่ยวกับสุขภาพบ่อยที่สุด (เรียงลำดับจากมากไปน้อย 3 ลำดับ) ....ก) เจ้าหน้าที่สาธารณสุข ....ข) สมาชิกในบ้าน/ญาติ ....ค) เพื่อนบ้าน ....ง) แผ่นพับ โปสเตอร์ แผ่นป้ายความรู้ที่ติดไว้ตามสถานที่ต่างๆ ....จ) โทรทัศน์ ....ฉ) วิทยุ ....ช) จากข้อมูลที่หาได้ทางโทรศัพท์ (ใช้อินเตอร์เนทในการสืบค้นจากโทรศัพท์) ....ซ) อื่นๆ (ระบุ)...
6	จากแหล่งข้อมูลด้านสุขภาพที่ท่านได้รับ แหล่งข้อมูลใดที่ทำให้ท่านสับสน หรือไม่เข้าใจข้อมูลด้าน สุขภาพมากที่สุด (ให้เรียงลำดับจากมากไปหาน้อย 3 อันดับ) ....ก) เจ้าหน้าที่สาธารณสุข ....ข) สมาชิกในบ้าน/ญาติ ....ค) เพื่อนบ้าน ....ง) แผ่นพับ โปสเตอร์ แผ่นป้ายความรู้ที่ติดไว้ตามสถานที่ต่างๆ ....จ) โทรทัศน์ ....ฉ) วิทยุ ....ช) จากข้อมูลที่หาได้ทางโทรศัพท์ (ใช้อินเตอร์เนทในการสืบค้นจากโทรศัพท์) ....ซ) อื่นๆ (ระบุ)...

	ส่วนที่ 2 ประเมินความรอบรู้ หรือ ความแตกฉานด้านสุขภาพ (ต่อ)
	โปรดบันทึกคำตอบที่ผู้ได้รับการสัมภาษณ์คิดว่าถูกต้องที่สุด

2. 2 การเข้าถึงข้อมูลและบริการสุขภาพ   (ต่อ)

7	สาเหตุที่ทำให้ท่านไม่เข้าใจเกี่ยวกับข้อมูลทางสุขภาพจากแหล่งข้อมูลต่างๆ (ตอบได้มากกว่า 1 ข้อ)
	❏1 ตัวหนังสือมีขนาดเล็ก มองเห็นไม่ชัด
	❏ 2 ใช้คำที่ยากแก่การเข้าใจ
	❏ 3 วิธีการสื่อสารไม่ชัดเจน เช่น การพูดอธิบายของบุคลากรสาธารณสุข เนื้อหาในสื่อต่างๆๆ
	❏ 4 มีเนื้อหาที่แตกต่างจากที่เคยได้รับมาก่อน
	❏ 5 ได้รับข้อมูลในระยะเวลาสั้นๆ
	❏ 6 อื่นๆ(ระบุ)..

2.3 การสื่อสารเพื่อเพิ่มความรู้ความเข้าใจทางสุขภาพ

1	บ่อยครั้งแค่ไหนที่ท่านไม่เข้าใจคำแนะนำการดูแลตนเองของผู้ป่วยเบาหวานจากเจ้าหน้าที่สาธารณสุข หรือบุคคลที่ท่านขอคำปรึกษา
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
2	ท่านขอความช่วยเหลือจากบุคคลต่างๆ เพื่อช่วยอธิบายให้ท่านอ่านข้อมูลด้านสุขภาพจากสื่อต่างๆได้
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
3	ท่านเล่าเรื่องการดูแลตนเองเพื่อสุขภาพที่ดีของผู้ป่วยเบาหวาน ให้สมาชิกครอบครัวฟังบ่อยแค่ไหน
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
4	บ่อยครั้งแค่ไหนที่ท่านอ่านคู่มือการดูแลตนเองของผู้ป่วยเบาหวานแล้วไม่เข้าใจ
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
5	ท่านมีการถ่ายทอดหรือแนะนำวิธีการดูแลตนเองเกี่ยวกับโรคเบาหวาน โดยการพูด เขียน อ่าน ให้ผู้อื่น บ่อยครั้งแค่ไหน
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
6	ท่านโน้มน้าวให้คนอื่นยอมรับข้อปฏิบัติในการดูแลตนเองของผู้ป่วยเบาหวานบ่อยแค่ไหน
	❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
	คะแนนรวม องค์ประกอบที่ 3 ข้อ 1-6 (คะแนนเต็ม = 24 คะแนน)

2.4 การจัดการเงื่อนไขทางสุขภาพของตนเองเพื่อเสริมสร้างสุขภาพ	
1	ท่านสังเกตปริมาณอาหารและคุณค่าของอาหารที่กินในแต่ละมื้อ ให้เหมาะสมกับภาวะโรคเบาหวานของท่านบ่อยแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
2	ท่านสามารถออกกำลังกายได้ตามที่ท่านวางแผนไว้บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
3	เมื่อท่านมีความเครียด ท่านสามารถจัดการกับความเครียดของท่านได้บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
4	ท่านมีการทบทวนปัญหา อุปสรรคที่ทำให้ไม่สามารถดูแลสุขภาพตามที่วางแผนไว้บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
5	ท่านปรับปรุงสภาพแวดล้อมที่บ้าน ให้เหมาะสมกับการดูแลสุขภาพของท่านได้บ่อยแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
คะแนนรวม องค์ประกอบที่ 4 ข้อ 1-5 (คะแนนเต็ม = 20 คะแนน)	
2.5 ความรู้เท่าทันสื่อและสารสนเทศเพื่อสร้างเสริมสุขภาพ	
1	ท่านตรวจสอบโฆษณาสินค้าเกี่ยวกับสุขภาพ ก่อนตัดสินใจซื้อหรือใช้บริการ บ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
2	เมื่อท่านเห็นโฆษณาสินค้าในที่สาธารณะหรือจากเวปไซด์และเกิดความสนใจในสินค้านั้น ท่านตั้งใจจะไปหาข้อมูลเพิ่มเติมจากแหล่งอื่นๆ เพื่อตรวจสอบความน่าเชื่อถือก่อนตัดสินใจซื้อบ่อยครั้งแค่ไหน ❑1 ทุกครั้ง ❑2 บ่อยครั้ง ❑3 บางครั้ง ❑4 นานๆครั้ง ❑5 ไม่เคยเลย
3	ท่านหาข้อมูลเพิ่มเติม หรือขอคำปรึกษาเพื่อตรวจสอบความถูกต้องน่าเชื่อถือของโฆษณาสินค้าหรือบริการสุขภาพที่ท่านสนใจจากแหล่งใดบ่อยครั้งที่สุด (เรียงลำดับจาก มากไปหาน้อย 3 ลำดับ) ....ก) เจ้าหน้าที่สาธารณสุข ....ข) สมาชิกในบ้าน/ญาติ ....ค) เพื่อนบ้าน ....ง) แผ่นพับ โปสเตอร์ แผ่นป้ายความรู้ที่ติดไว้ตามสถานที่ต่างๆ ....จ) โทรทัศน์ ....ฉ) วิทยุ ....ช) จากข้อมูลที่หาได้ทางโทรศัพท์ (ใช้อินเตอร์เนทในการสืบค้นจากโทรศัพท์) ....ซ) อื่นๆ (ระบุ)..

2.5 ความรู้เท่าทันสื่อและสารสนเทศเพื่อสร้างเสริมสุขภาพ (ต่อ)	
4	ท่านมีการใช้เหตุผลเปรียบเทียบข้อดี ข้อเสีย ความถูกต้อง ความน่าเชื่อถือเพื่อเลือกรับข้อมูลด้านสุขภาพก่อนปฏิบัติตามบ่อยแค่ไหน ❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
5	เมื่อท่านได้แลกเปลี่ยนพูดคุย วิพากษ์ วิจารณ์เกี่ยวกับแนวทางการดูแลตนเองของผู้ป่วยเบาหวาน กับผู้อื่นโดยที่ท่านมีการวิเคราะห์เปรียบเทียบข้อมูลที่ได้รับก่อนตัดสินใจเชื่อและปฏิบัติตามบ่อยครั้งแค่ไหน ❏1 ทุกครั้ง ❏ 2 บ่อยครั้ง ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
คะแนนรวม องค์ประกอบที่ 4 ข้อ 1-3 (คะแนนเต็ม = 20 คะแนน)	
2.6 การตัดสินใจเลือกปฏิบัติที่ถูกต้องด้านสุขภาพ (ต่อ)	
1	เมื่อท่านไปร่วมงานเลี้ยง งานบุญ แล้วมีคนชวนให้กินอาหารที่ไม่เหมาะกับผู้ป่วยเบาหวาน เช่น ของหวาน อาหารมัน จนเกินไป ท่านจะทำอย่างไร ❏1 กินตามคำเชิญชวน ❏ 2 กินตามคำเชิญชวน แต่กินน้อย ❏ 3 ขอบคุณ แต่เลี่ยงไปกินอาหารที่ดีต่อสุขภาพของผู้ป่วยเบาหวานแทน ❏ 4 ขอบคุณ และบอกว่ามีปัญหาเรื่องเบาหวานกินอาหารนั้นๆไม่ได้
2	หากเพื่อนที่เคยออกกำลังกายกับท่านเป็นประจำ บอกว่าจะเลิกออกกำลังกายแล้ว ท่านจะทำอย่างไร ❏1 หยุดออกกำลังกายไปกับเพื่อน ❏ 2 ออกกำลังกายต่อเบื่อแล้วจะหยุดตามเพื่อน ❏ 3 ไปออกกำลังกายตามลำพัง ไม่ว่าจะมีหรือไม่มีเพื่อนออกกำลังกายด้วยหรือไม่ ❏ 4 พยามยามชักจูงให้เพื่อนออกกำลังกายต่อ โดยชี้ถึงประโยชน์ที่จะได้รับ
3	หากท่านมีความเครียดจากสถานการณ์ที่รุมเร้าตัวท่าน ท่านจะเลือกปฏิบัติตนในข้อใด (ให้ใส่ลำดับของกิจกรรมที่ต้องการปฏิบัติเรียงจากมากไปหาน้อย 3 อันดับ) ....1) หากิจกรรมที่ตนเองชอบทำ ....2) ออกกำลังกาย ....3) สวดมนต์ ภาวนา ไปทำบุญ .... 4) ทำใจเป็นกลาง มองโลกในแง่ดี ....5) อื่นๆ(ระบุ)...

2.6 การตัดสินใจเลือกปฏิบัติที่ถูกต้องด้านสุขภาพ (ต่อ)	
4	หากมีสมาชิกในบ้านสูบบุหรี่ภายในบ้านเสมอๆ ท่านจะทำอย่างไร ❏1 ไม่ว่าอะไรปล่อยตามสบาย ❏ 2 เลี่ยงออกไปห่างๆจากควันบุหรี่ ❏3 ขอร้องให้เลิกสูบ เพื่อสุขภาพของสมาชิกในบ้าน ❏4 ขอร้องให้เลิกสูบ เพื่อสุขภาพของท่าน, สมาชิกในบ้านที่สูบและคนอื่นๆในบ้าน
5	หากมีคนมาชวนท่านดื่มสุรา เบียร์ หรือเครื่องดื่มแอลกอฮอล์ ท่านจะทำอย่างไร ❏1 ตอบตกลงทันที ❏ 2 ดื่มนิดหน่อย เพื่อไม่ให้เสียมารยาท ❏3 ดื่มตามคำชวน และให้เพื่อนขับรถไปส่งกรณีขับรถกลับบ้านไม่ได้ ❏4 ปฏิเสธ และบอกว่าผู้ป่วยเบาหวานไม่ควรดื่มเครื่องดื่มแอลกอฮอร์

คะแนนรวมองค์ประกอบที่ 6 ข้อ 1-5 (คะแนนเต็ม = 20 คะแนน)

ส่วนที่ 3 ความรู้เกี่ยวกับโรคเบาหวาน อาการแทรกซ้อน และการดูแลตนเองเพื่อควบคุมโรคเบาหวาน	ใช่	ไม่ใช่
1	โรคเบาหวานคือโรคที่ระดับน้ำตาลในเลือดสูงกว่าปกติ		
2	อาการหน้ามืด หรือเป็นลมที่เกิดจากน้ำตาลในเลือดสูงหรือต่ำกว่าปกติเป็นภาวะแทรกซ้อนของโรคเบาหวาน*		
3	ผู้ป่วยเบาหวานที่มีน้ำตาลในเลือดต่ำ จะมีอาการเหงื่อออกมาก ใจสั่น หน้ามืดคล้ายจะเป็นลม		
4	อาการของโรคเบาหวานที่พบบ่อยได้แก่ ดื่มน้ำมาก ปัสสาวะบ่อย หิวบ่อย กินจุ ผอมลง		
5	สาเหตุของโรคเบาหวานเกิดจากกรรมพันธุ์เพียงอย่างเดียว*		
6	ผู้ป่วยโรคเบาหวานที่มีอาการหิว ไม่มีแรง หน้ามืด ใจสั่นคล้ายจะเป็นลมควรดื่มน้ำหวานหรืออมลูกอมที่มีรสหวาน		
7	ผู้ป่วยโรคเบาหวานสามารถรับประทานผักใบเขียว เช่นผักตำลึง ผักบุ้ง ผักกาด ได้โดยไม่จำกัดจำนวน		
8	ผู้ป่วยเบาหวานสามารถรับประทานเนื้อสัตว์ติดมัน ไข่ ได้โดยไม่จำกัดจำนวน*		
9	ผู้ป่วยเบาหวานควรหลีกเลี่ยงอาหารรสเค็มเพราะทำให้มีความเสี่ยงสูงกับภาวะแทรกซ้อนทางไต หรือโรคความดันโลหิตสูงได้		

ส่วนที่ 3 ความรู้เกี่ยวกับโรคเบาหวาน อาการแทรกซ้อน และการดูแลตนเองเพื่อควบคุม โรคเบาหวาน		ใช่	ไม่ใช่
10	การกินยาอย่างสม่ำเสมอสามารถรักษาโรคเบาหวานให้หายขาดได้*		
11	การกินยารักษาเบาหวานไม่จำเป็นต้องทราบชื่อยา การออกฤทธิ์ อาการข้างเคียง ของยา*		
12	ผู้ป่วยเบาหวานสามารถหยุดยาเองเมื่อมีอาการดีขึ้น หรือระดับน้ำตาลในเลือดปกติ (100-125 มก./ดล.)*		
13	การออกกำลังกายทำให้ร่างกายใช้น้ำตาลในเลือดได้มากขึ้น จึงช่วยทำให้การควบคุม ระดับน้ำตาลในเลือดดีขึ้น		
14	การออกกำลังกายอย่างน้อยครั้งละ 30 นาที สัปดาห์ละ 3 วัน จะช่วยควบคุมระดับ น้ำตาลในเลือดให้ดีขึ้น		
15	ผู้ป่วยเบาหวานที่ออกกำลังกายแล้วรู้สึกเหนื่อยหอบ เจ็บหน้าอก เวียนศีรษะ ควร หยุดออกกำลังกายทันที		
16	การออกกำลังกายของผู้ป่วยเบาหวานควรต่อเนื่องอย่างน้อย ครั้งละ 10 นาที ต่อวัน*		
17	ผู้ป่วยเบาหวานควรใส่รองเท้าที่นิ่ม พอดีเท้า พื้นเรียบและไม่มีปุ่ม นวดเท้า		
18	ผู้ป่วยเบาหวานควรงดสูบบุหรี่ และงดดื่มเครื่องดื่มที่มีส่วนผสมของแอลกอฮอล์		
19	ผู้ป่วยเบาหวานควรตรวจสุขภาพช่องปากและฟันทุก 6 เดือน		
20	ผู้ป่วยเบาหวานควรรีบไปพบแพทย์หากมีอาการคลื่นไส้ อาเจียน ตามัว		

ส่วนที่ 4 แบบประเมินความมั่นใจในประสิทธิภาพการดูแลโรคเบาหวานด้วยตนเอง

โปรดให้คะแนนในแต่ละข้อคำถามที่ตรงกับระดับความมั่นใจของผู้ป่วยเบาหวาน

มั่นใจน้อยที่สุด = 1 คะแนน -   มั่นใจมากที่สุด = 10 คะแนน

1	ท่านมั่นใจในระดับไหนว่าท่านสามารถรับประทานอาหารมื้อเช้า มื้อกลางวัน และมื้อต่อไป ทุก 4-5 ชม.
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
2	ท่านมั่นใจขนาดไหนว่า ท่านสามารถควบคุมการรับประทานอาหารของท่านได้เมื่อต้องร่วมรับประทานอาหารกับบุคคลอื่นที่ไม่ป่วยเป็นโรคเบาหวาน
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
3	ท่านมั่นใจในระดับไหนว่าท่านสามารถเลือกรับประทานอาหารว่างได้อย่างเหมาะสม เมื่อท่านหิว
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
4	ท่านมั่นใจในระดับไหนว่าท่านสามารถออกกำลังกายได้อย่างน้อยวันละ 30 นาที เป็นเวลา 3 วัน/สัปดาห์ อย่างสม่ำเสมอ
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
5	ท่านมีความมั่นใจในระดับไหนว่าท่านสามารถป้องกันระดับน้ำตาลในเลือดต่ำได้ ในขณะออกกำลังกาย
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
6	ท่านมั่นใจในระดับไหนว่าท่านสามารถดูแลตนเองได้เมื่อระดับน้ำตาลในเลือดต่ำ/สูง
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
7	ท่านมั่นใจในระดับไหนว่าท่านสามารถตัดสินใจได้ว่าป่วยระดับใดจึงควรจะไปพบแพทย์
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
8	ท่านมีความมั่นใจในระดับไหนว่าท่านสามารถไปพบแพทย์ได้อย่างสม่ำเสมอ
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
9	ท่านมั่นใจในระดับไหนว่าท่านสามารถใช้ยาได้ตามที่แพทย์สั่งอย่างสม่ำเสมอ
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
10.	ท่านมีความมั่นใจในระดับไหนว่าท่านสามารถดูแลสุขภาพเท้าได้อย่างสม่ำเสมอ
	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

11	ท่านมีความมั่นใจในระดับไหนว่าท่านสามารถควบคุมอาการของโรคเบาหวานได้โดยไม่รบกวนการทำกิจวัตรประจำวัน หรือกิจกรรมต่างๆในชีวิตประจำวัน ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10
12	ในภาพรวม ท่านมีความมั่นใจในประสิทธิภาพการดูแลเบาหวานด้วยตนเอง ในระดับใด ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

ส่วนที่ 5 แบบประเมินพฤติกรรมการดูแลตนเองของผู้ป่วยเบาหวาน ใน 1 เดือนที่ผ่านมา

5.1 การควบคุมการรับประทานอาหารหวาน

1	ท่านเคยลดการรับประทานอาหารรสหวาน เช่น ไม่เติมน้ำตาลในอาหาร ,หลีกเลี่ยงขนมหวานหรือเครื่องดื่มที่มีรสหวาน หรือผลไม้ที่มีรสหวาน ใช่ หรือไม่ ☐1.1 ใช่ ☐1.2 ไม่ใช่ (ถ้าไม่ใช่ข้ามไปตอบข้อ 4)
2	จากคำถามข้อ 1 ถ้าใช่ ปัจจุบันท่านยังคงลดการกินอาหารรสหวาน ใช่ หรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
3	จากคำถามข้อ 2 ถ้าใช่ จนถึงทุกวันนี้ท่านยังคงลดการกินอาหารรสหวาน ได้นานเท่าไหร่ ☐3.1 น้อยกว่า 30 วัน ☐ 3.2 1-6 เดือน ☐ 3.3 7-12 เดือน ☐ 3.4 มากกว่า 1 ปี
4	ใน 1 เดือน ที่ผ่านมา ท่านเคยคิดจะลดการกินอาหารรสหวาน ใช่หรือไม่ ☐4.1 ใช่ (ถามต่อในข้อ 5) ☐4.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)
5	ท่านมั่นใจในระดับไหนที่จะลดการกินอาหารรสหวาน ในเดือนถัดไป ☐5.1 ไม่มั่นใจ ☐ 5.2 มั่นใจปานกลาง ☐ 5.3 ค่อนข้างมั่นใจ ☐ 5.4 มั่นใจมาก

5.2 การควบคุมการรับประทานอาหารที่มีไขมันสูง

1	ท่านเคยกินอาหารมัน(เช่น อาหารที่ปรุงด้วย เนื้อหมูติดมัน เนื้อวัว อาหารที่มีกะทิเป็นส่วนประกอบ ,อาหารที่ปรุงด้วยการทอด) ใช่หรือไม่ ☐1.1 ใช่ ☐1.2 ไม่ใช่ (ถ้าไม่ใช่ข้ามไปตอบข้อ 4)
2	จากคำถามข้อ 1 ถ้าใช่ จนถึงทุกวันนี้ท่านยังคงกินอาหารมันอยู่ ใช่ หรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
3	จากคำถามข้อ 2 ถ้าใช่ ครั้งล่าสุดที่ท่านคิดจะลดการกินอาหาร ☐3.1 น้อยกว่า 30 วัน ☐ 3.2 1-6 เดือน ☐ 3.3 7-12 เดือน ☐ 3.4 มากกว่า 1 ปี

4	ใน 1 เดือน ที่ผ่านมา ท่านเคยลดการกินอาหารมัน ใช่หรือไม่ ☐2.1 ใช่ (ถามต่อในข้อ 5) ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)
5	ท่านมั่นใจในระดับไหนที่จะลดการกินอาหารมันได้หนึ่งเดือนนับจากนี้ไป ☐5.1 ไม่มั่นใจ ☐ 5.2 มั่นใจปานกลาง ☐ 5.3 ค่อนข้างมั่นใจ ☐ 5.4 มั่นใจมาก

5.3 การควบคุมการรับประทานอาหารรสเค็ม	
1	ท่านเคยลดอาหารรสเค็ม(หมักดอง,ตากแห้ง)หรือลดการปรุงรสเพิ่มด้วยเกลือ น้ำปลา ซีอิ้ว ใช่หรือไม่ ☐1.1 ใช่ ☐1.2 ไม่ใช่ (ถ้าไม่ใช่ข้ามไปตอบข้อ 4)

5.3 การควบคุมการรับประทานอาหารรสเค็ม (ต่อ)	
2	จากคำถามข้อ 1 ถ้าใช่ จนถึงทุกวันนี้ท่านยังคงกินอาหารรสเค็มอยู่ ใช่ หรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
3	จากคำถามข้อ 2 ถ้าใช่ ครั้งล่าสุดที่ท่านคิดจะลดการกินอาหารรสเค็ม ☐3.1 น้อยกว่า 30 วัน ☐ 3.2 1-6 เดือน ☐ 3.3 7-12 เดือน ☐ 3.4 มากกว่า 1 ปี
4	ใน 1 เดือน ที่ผ่านมา ท่านเคยลดการอาหารรสเค็ม ใช่หรือไม่ ☐2.1 ใช่ (ถามต่อในข้อ 5) ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)
5	ท่านมั่นใจในระดับไหนที่จะลดการกินอาหารรสเค็มในหนึ่งเดือนนับจากนี้ไป ☐5.1 ไม่มั่นใจ ☐ 5.2 มั่นใจปานกลาง ☐ 5.3 ค่อนข้างมั่นใจ ☐ 5.4 มั่นใจมาก

5.3 การสูบบุหรี่และดื่มเครื่องดื่มที่มีแอลกอฮอล์	
1	ท่านเคยสูบบุหรี่/ดื่มเครื่องดื่มมาแอลกอฮอล์หรือไม่ ☐1.1 เคย ☐1.2 ไม่เคย *(ถ้าไม่เคยข้ามไปตอบ การดูแลสุขภาพเท้า)*
2	ท่านเคยเลิกสูบบุหรี่หรือไม่ ☐1.1 ใช่ ☐1.2 ไม่ใช่ (ถ้ากไม่ใช่ข้ามไปตอบข้อ 4)
3	จากคำถามข้อ 1 ถ้าใช่ จนถึงทุกวันนี้ท่านยังคงหยุดสูบบุหรี่ ใช่หรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
4	จากคำถามข้อ 2 ถ้าใช่ ครั้งล่าสุดที่ท่านคิดจะเลิกสูบบุหรี่ ☐3.1 น้อยกว่า 30 วัน ☐ 3.2 1-6 เดือน ☐ 3.3 7-12 เดือน ☐ 3.4 มากกว่า 1 ปี

5	ใน 1 เดือน ที่ผ่านมา ท่านเคยคิดจะเลิกสูบบุหรี่ใช่หรือไม่ ☐2.1 ใช่ (ถามต่อในข้อ 5) ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)
6	ท่านมั่นใจในระดับไหน ในการที่จะเลิกสูบบุหรี่ได้ในเดือนถัดไป ☐5.1 ไม่มั่นใจ ☐ 5.2 มั่นใจปานกลาง ☐ 5.3 ค่อนข้างมั่นใจ ☐ 5.4 มั่นใจมาก
5.5 ประเมินการเลิกการดูแลสุขภาพเท้า	
1	ท่านเคยทำความสะอาด และตรวจสุขภาพของเท้า เพื่อดูความผิดปกติของเท้าทุกวัน ใช่หรือไม่ ☐1.1 ใช่ ☐1.2 ไม่ใช่ (ถ้าไม่ใช่ข้ามไปตอบข้อ 4)
2	จากคำถามข้อ 1 ถ้าใช่ จนกระทั่งทุกวันนี้ท่านยังทำความสะอาด ตรวจสุขภาพเท้า เพื่อดูความผิดปกติ ทุกวัน ใช่หรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
3	จากคำถามข้อ 2 ถ้าใช่ ครั้งล่าสุดที่ท่านทำความสะอาด ตรวจสุขภาพเท้าดูความผิดปกติอย่างต่อเนื่อง ☐3.1 น้อยกว่า 30 วัน ☐ 3.2 1-3 เดือน ☐ 3.3 4-6 เดือน ☐ 3.4 ต่อเนื่อง มากกว่า 6 เดือน
4	1 เดือน ที่ผ่านมา ท่านเคยคิดจะทำความสะอาด ตรวจสุขภาพเท้า เพื่อดูความผิดปกติของเท้าใช่หรือไม่ ☐2.1 ใช่ (ถามต่อในข้อ 5) ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)
5	ท่านมั่นใจในระดับไหน ในการที่จะทำความสะอาด ตรวจสุขภาพเท้า เพื่อดูความผิดปกติของเท้าทุกวัน ☐5.1 ไม่มั่นใจ ☐ 5.2 มั่นใจปานกลาง ☐ 5.3 ค่อนข้างมั่นใจ ☐ 5.4 มั่นใจมาก
5.6 การรับประทานยา	
1	ท่านใช้ยาได้ครบตามแพทย์สั่งหรือไม่ ☐1.1 ครบตามที่แพทย์สั่ง ☐1.2 ไม่ครบตามแพทย์สั่ง
2	ท่านมาพบแพทย์ตามที่แพทย์นัดทุกครั้งหรือไม่ ☐2.1 ใช่ ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ข้ามไปตอบข้อ 4)
3	ท่านได้รับประทานยาอื่นใด นอกเหนือจากที่แพทย์สั่งหรือไม่ (วิตามิน,อาหารเสริม,ฮอร์โมน ยาแก้ปวด) ☐3.1 มี (ระบุ)...☐ 3.2 ไม่มี
4	ท่านใช้ยาคลายเครียดหรือ ยาช่วยให้นอนหลับหรือไม่ ☐2.1 ใช่ (ถามต่อในข้อ 5) ☐2.2 ไม่ใช่ (ถ้าไม่ใช่ ให้หยุดถาม)

5	ปัจจุบันท่านยังใช้ยาคลายเครียดหรือ ยาช่วยให้นอนหลับ
	❏2.1 ใช้ ❏2.2 ไม่ใช้

ส่วนที่ 6 แบบประเมินคุณภาพชีวิตของผู้ป่วยเบาหวาน	
1	ท่านพอใจแค่ไหนกับผลการรักษาโรคเบาหวานของท่านในปัจจุบัน ❏1 ไม่พอใจมาก ❏ 2 ไม่พอใจ ❏ 3 เฉยๆ ❏ 4 พอใจปานกลาง ❏ 5 พอใจมาก
2	ท่านพอใจแค่ไหนกับเวลาที่เสียไปกับการจัดการโรคเบาหวานของท่าน ❏1 ไม่พอใจมาก ❏ 2 ไม่พอใจ ❏ 3 เฉยๆ ❏ 4 พอใจปานกลาง ❏ 5 พอใจมาก
3	บ่อยครั้งแค่ไหน ที่ท่านรับประทานอาหารโดยไม่บอกคนอื่นว่าเป็นโรคเบาหวาน ❏1 ตลอดเวลา ❏ 2 บ่อยๆ ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
4	บ่อยครั้งแค่ไหนที่ท่านกังวลว่าจะต้องขาดงาน หรือไปทำงานไม่ได้ตามปกติ ❏1 ตลอดเวลา ❏ 2 บ่อยๆ ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
5	ท่านพอใจแค่ไหนกับเวลาที่เสียไปในการเข้ารับการตรวจวัดระดับน้ำตาลในเลือดในโรงพยาบาล/ศูนย์สุขภาพชุมชน/ศูนย์บริการสาธารณสุข ❏1 ไม่พอใจมาก ❏ 2 ไม่พอใจ ❏ 3 เฉยๆ ❏ 4 พอใจปานกลาง ❏ 5 พอใจมาก
6	ท่านพอใจแค่ไหนกับเวลาที่ได้ใช้ไปเพื่อการออกกำลังกาย ❏1 ไม่พอใจมาก ❏ 2 ไม่พอใจ ❏ 3 เฉยๆ ❏ 4 พอใจปานกลาง ❏ 5 พอใจมาก
7	บ่อยครั้งแค่ไหนที่ท่านมีอาการเจ็บปวดจากการรักษาโรคเบาหวาน ❏1 ตลอดเวลา ❏ 2 บ่อยๆ ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
8	บ่อยครั้งแค่ไหนที่ท่านกังวลว่าจะเกิดอาการหน้ามืด หรือหมดสติ จากโรคเบาหวาน ❏1 ตลอดเวลา ❏ 2 บ่อยๆ ❏ 3 บางครั้ง ❏ 4 นานๆครั้ง ❏ 5 ไม่เคยเลย
9	ท่านพอใจแค่ไหนกับเวลาที่ใช้ไปในการเข้าตรวจรักษาโรคเบาหวานของท่าน ❏1 ไม่พอใจมาก ❏ 2 ไม่พอใจ ❏ 3 เฉยๆ ❏ 4 พอใจปานกลาง ❏ 5 พอใจมาก

	ส่วนที่ 6 แบบประเมินคุณภาพชีวิตของผู้ป่วยเบาหวาน
10	ท่านพอใจแค่ไหนกับความรู้ของท่านเกี่ยวกับการดูแลสุขภาพในเรื่องโรคเบาหวาน ❑1 ไม่พอใจมาก ❑ 2 ไม่พอใจ ❑ 3 เฉยๆ ❑ 4 พอใจปานกลาง ❑ 5 พอใจมาก
11	บ่อยครั้งแค่ไหนที่ท่านประสบปัญหาการนอนหลับอันเนื่องมาจากโรคเบาหวาน ❑1 ตลอดเวลา ❑ 2 บ่อยๆ ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
12	ท่านพอใจแค่ไหนเกี่ยวกับกิจกรรมทางเพศของท่านในปัจจุบัน *(หากโสดไม่ต้องตอบ)* ❑1 ไม่พอใจมาก ❑ 2 ไม่พอใจ ❑ 3 เฉยๆ ❑ 4 พอใจปานกลาง ❑ 5 พอใจมาก
13	บ่อยครั้งแค่ไหนที่ท่านรู้สึกว่าโรคเบาหวานที่เป็น มีผลทำให้ทำงานได้ไม่เต็มที่ ❑1 ตลอดเวลา ❑ 2 บ่อยๆ ❑ 3 บางครั้ง ❑ 4 นานๆครั้ง ❑ 5 ไม่เคยเลย
14	ท่านพอใจแค่ไหนกับภาวะของโรคเบาหวานของท่าน ที่ส่งผลต่อครอบครัว ❑1 ไม่พอใจมาก ❑ 2 ไม่พอใจ ❑ 3 เฉยๆ ❑ 4 พอใจปานกลาง ❑ 5 พอใจมาก

Appendix C : Guideline In-depth Interviews (Thai)

แนวทางการสัมภาษณ์เชิงลึกผู้ป่วยเบาหวาน

ตามแนวคิดการอธิบายโรค การปฏิบัติตนและการดูแลรักษาโรคเบาหวาน

ท่านคิดและเข้าใจอย่างไรเกี่ยวกับ "โรคเบาหวาน" ที่ท่านเป็นอยู่?

ท่านคิดว่าอะไรเป็นสาเหตุของการป่วยเป็นโรคเบาหวาน เพราะอะไร?

ท่านคิดว่าใครที่สามารถเป็นโรคเบาหวานได้บ้าง เพราะอะไร?

โรคเบาหวานมีผลกระทบต่อชีวิตของท่านอย่างไรบ้าง?

ท่านคิดว่า ณ เวลานี้การเจ็บป่วยด้วยโรคเบาหวานของท่านรุนแรงหรือไม่เพราะเหตุใด?

ท่านมีวิธีการในการดำเนินชีวิตเพื่อควบคุมโรคเบาหวานอย่างไรบ้าง?

ท่านรู้สึกกลัวหรือกังวลกับโรคเบาหวานที่ท่านเป็นอยู่หรือไม่ เพราะเหตุใด?

มีวิธีใดที่จะลดความกลัว หรือกังวลที่ท่านมีต่อการเป็นโรคเบาหวานของท่าน?

ท่านคิดว่าการรักษาที่ได้รับอยู่ในปัจจุบันดี เหมาะสมหรือไม่ เพราะเหตุใด?

ท่านคิดว่ามีวิธีการรักษาที่สามารถทำให้ท่านหายขาดจากการเป็นโรคเบาหวานได

    หรือไม่ เพราะเหตุใด?

การรักษาโรคเบาหวานแบบใดที่ท่านปรารถนา เพราะอะไร?

การรักษาโรคเบาหวานที่ท่านได้รับอยู่ในปัจจุบันทำให้ท่านหวาดกลัว หรือวิตกกังวลหรือไม่ เพราะ
เหตุใด

<u>แนวทางการสัมภาษณ์เชิงลึกบุคลากรสาธารณสุข</u>

<u>คลินิกโรคเรื้อรัง ศูนย์บริการสาธารณสุข ที่ 61 สังวาลย์ ทัศนารมย์ เขตสายไหม กทม.</u>

อะไรที่ท่านคิดว่าเป็นเป้าหมายในการดูแลรักษาคนไข้เบาหวานในสถานบริการของท่าน?

ท่านมีวิธีการ หรือ กลวิธี การดูแลรักษาคนไข้เบาหวานอย่างไร เพื่อให้บรรลุเป้าหมายที่ท่านตั้งไว้ตาม
ข้อ (1)

ท่านประเมินผลการดูแลรักษาคนไข้อย่างไร เพื่อบ่งชี้ว่าท่านบรรลุเป้าหมายที่ท่านตั้งไว้?

หลังจากประเมินผลการดูแลรักษาคนไข้เบาหวานของท่าน พบว่า บรรลุ/ไม่บรรลุเป้าหมายที่ตั้งไว้ ท่านว่าเพราะอะไร และจะแก้ไข/พัฒนาอย่างไร?

แนวทางสัมภาษณ์เชิงลึกผู้ป่วยเบาหวาน/ผู้ดูแลผู้ป่วยเบาหวาน

เพื่อหารูปแบบการสื่อสารข่าวสาร/ข้อมูล/การให้ความรู้เกี่ยวกับการดูแลตนเอง

ของผู้ป่วยเบาหวานชนิดที่ 2

ท่านคิดว่ารูปแบบการสื่อสารใดที่จะทำให้ท่านมีความรู้ ความเข้าใจ ข้อมูลข่าวสารที่เกี่ยวกับ โรคเบาหวาน และการดูตนเองของผู้ป่วยเบาหวานได้ง่าย และชัดเจนที่สุด เพราะอะไร?

รูปแบบการสื่อสารที่ท่านได้รับข้อมูล/คำแนะนำ/ข่าวสาร/การบอกเล่า เกี่ยวกับโรคเบาหวาน และ การดูแลตนเองของผู้ป่วยเบาหวานในปัจจุบัน เป็นรูปแบบใด มากที่สุด รองลงมาคือรูปแบบใด?

หากท่านสามารถกำหนดได้ว่าจะรับข้อมูลข่าวสาร/คำแนะนำ เกี่ยวกับการดูแลตนเองของผู้ป่วย เบาหวาน ท่านจะเลือกวิธีการ/รูปแบบใด เพราะเหตุใด?

แนวทางสัมภาษณ์เชิงลึกบุคลากรสาธารณสุข

คลินิกโรคเรื้อรัง ศูนย์บริการสาธารณสุข ที่ 61 สังวาลย์ ทัศนารมย์ เขตสายไหม กทม.

ท่านคิดว่าวิธีการสื่อสารข้อมูล ข่าวสาร ความรู้ความเข้าใจเกี่ยวกับโรคเบาหวาน และการดูแลตนเอง ของผู้ป่วยเบาหวาน วิธีการใดที่เหมาะสมกับกลุ่มวัยผู้ใหญ่ตอนปลาย และผู้สูงอายุมากที่สุด? เพราะ เหตุใด

ท่านคิดว่าวิธีการที่ท่านให้ความรู้ ข้อมูล ข่าวสารเกี่ยวกับโรคเบาหวานและการดูแลตนเองของผู้ป่วย ในปัจจุบัน มีประสิทธิภาพมากน้อยแค่ไหน เพราะอะไร?

หากท่านต้องการพัฒนารูปแบบการสื่อสารเกี่ยวกับโรคเบาหวาน และการดูแลตนเองของผู้ป่วย ท่าน จะพัฒนาเป็นรูปแบบใด เพราะเหตุใด?

<u>แนวทางสัมภาษณ์เชิงลึกผู้ป่วยเบาหวาน/ผู้ดูแลผู้ป่วยเบาหวาน</u>

<u>เพื่อหารูปแบบการทำความเข้าใจ ข้อมูล ข่าวสารเกี่ยวกับการดูแลตนเอง</u>

<u>ของผู้ป่วยเบาหวานชนิดที่ 2</u>

ปัจจุบันท่านได้รับข้อมูล ข่าวสาร ความรู้เกี่ยวกับโรคเบาหวาน หรือการดูแลตนเองของผู้ป่วย
เบาหวานจาก แหล่งใดบ้าง?

ท่านเคยแสวงหาข้อมูล ข่าวสาร ความรู้เกี่ยวกับโรคเบาหวาน หรือการดูแลตนเองของผู้ป่วยเบาหวาน
จากแหล่งใดบ้าง และเพราะเหตุใดจึงเลือกแหล่งข้อมูลนั้น?

ท่านมีแรงจูงใจใดในการแสวงหาข้อมูลเพิ่มเติมความรู้เกี่ยวกับโรคเบาหวาน หรือการดูแลตนเองของ
ผู้ป่วยเบาหวาน?

ท่านเข้าใจข้อมูล ข่าวสาร และความรู้เกี่ยวกับโรคเบาหวาน/การดูแลตนเองของผู้ป่วยเบาหวาน/
เกี่ยวกับการดูแลสุขภาพจากแหล่งที่ท่านได้รับหรือไม่? หากไม่เข้าใจท่านมีวิธีการใดที่ทำให้มีความ
เข้าใจเพิ่มมากขึ้น?

เมื่อท่านมีความเข้าใจในข้อมูลเกี่ยวกับสุขภาพ/การดูแลตนเองของผู้ป่วยเบาหวานที่ท่านได้รับ ท่าน
ต้องการจะปฏิบัติตนตามความเข้าใจนั้นหรือไม่ เพราะเหตุใด?

จากความรู้ความเข้าในเกี่ยวกับสุขภาพ/การดูแลตนเองของผู้ป่วยเบาหวานของท่าน และการปฏิบัติ
ตนตามความเข้าใจนั้น ท่านต้องการถ่ายทอดให้บุคคลอื่นหรือไม่ เพราะเหตุใด?

Appendix D: Records form

ที่	ชื่อ/ทะเบียน	อายุ	HbA1c (ว/ด/ป)	ครั้งที่ (ว/ด/ป)	1	2	3	4	5	6	7	8	9	10	11	12
1			1.	DTX....												
				Bp. ...												
	HN		2.	P. ...												
	โทร.			weight. (kg.)												
	ที่อยู่			BMI......												
				Height (cm)												
				Waste-												
				Circumstance												
				SMS reading												

ทะเบียนบันทึกข้อมูล ผู้เข้าร่วมโปรแกรมการสนับสนุนและดูแลรอบด้าน "ปลูกต้นรักษ์ พิทักษ์สุขภาพ ผู้ป่วยเบาหวาน"

เพื่อพัฒนาการควบคุมระดับน้ำตาล และคุณภาพชีวิตผู้ป่วยเบาหวาน เขตสายไหม

ว/ด/ป	ต้น/ปัญหา/สิ่งที่พบ	การให้สุขศึกษา/คำแนะนำ	ผลการเข้าร่วมกิจกรรม/ให้สุขศึกษา/คำปรึกษา	หมายเหตุ

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Appendix E: Healthy Diary Records

HN...................

สมุดออมสุขภาพผู้ป่วยเบาหวาน

ชื่อ..

นามสกุล..

โทรศัพท์...

ที่อยู่...

บันทึกสุขภาพผู้เข้าร่วมกิจกรรม ในรอบ 1 ปี

ข้อมูล ว/ด/ป	น้ำตาล ปลายนิ้ว	ความ ดัน	ชีพจร	น้ำหนัก	ดัชนี มวลกาย	เส้นรอบ เอว
ระดับน้ำตาลสะสม(HbA1c) (ว/ด/ป)....................=						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
ระดับน้ำตาลสะสม (HbA1c) .... = ...						

= ควบคุมได้ดี   = ต้องเฝ้าระวัง   = ระดับวิกฤต

บันทึกการดูแลสุขภาพตนเอง สัปดาห์ที่ ....

การกินอาหาร		ความถี่ของการปฏิบัติ		
		ประจำ	ครั้งคราว	ไม่เคย
1	กินอาหารครบ 5 หมู่ ข้าว ผัก ผลไม้ เนื้อสัตว์ น้ำ			
2	กินผักมากกว่าวันละ 3 ทัพพี			
3	กินผลไม้วันละ 6-8 คำ			
4	กินขนมหวาน/ขนมที่มีกระทิ			
5	กินปลาอย่างน้อยวันละ 1 มื้อ			
6	กินเนื้อสัตว์ติดมัน/อาหารมี ไขมัน/ทอด/ผัด			
7	กินอาหารต้ม/ตุ๋น/นึ่ง/ลวกอบ			
8	กินอาหารอ่อนเค็ม/ไม่ปรุงเพิ่ม			
9	ดื่มน้ำอย่างน้อยวันละ 8 แก้ว			
10	ออกกำลังกายวันละ15-30นาที			
11	ช่วงเวลาการหลับ 5-7 ชม./คืน			
12	กินยาตรงเวลา ครบทุกเม็ด			
13	สูบบุหรี่/ดื่มเหล้า			

ประจำ หมายถึง 5-7 วัน /สัปดาห์ , เป็นครั้งคราว = 1-4 วัน/สัปดาห์

ไม่เคย = ในช่วง 7 วันที่ผ่านมาไม่เคยปฏิบัติเลย

😊 = ดูแลตนเองได้ดี 😐 = พยายามอีกนิด ☹️ = ปรับปรุง

สรุปประเมินผลการดูแลสุขภาพตนเอง

สัปดาห์ที่	🙂	😐	☹️
สัปดาห์ที่ 1			
สัปดาห์ที่ 2			
สัปดาห์ที่ 3			
สัปดาห์ที่ 4			
สัปดาห์ที่ 5			
สัปดาห์ที่ 6			
สัปดาห์ที่ 7			
สัปดาห์ที่ 8			
สัปดาห์ที่ 9			
สัปดาห์ที่ 10			
สัปดาห์ที่ 11			
สัปดาห์ที่ 12			
สัปดาห์ที่ 13			
สัปดาห์ที่ 14			
สัปดาห์ที่ 15			
สัปดาห์ที่ 16			

Appendix F: Poster and Brochure
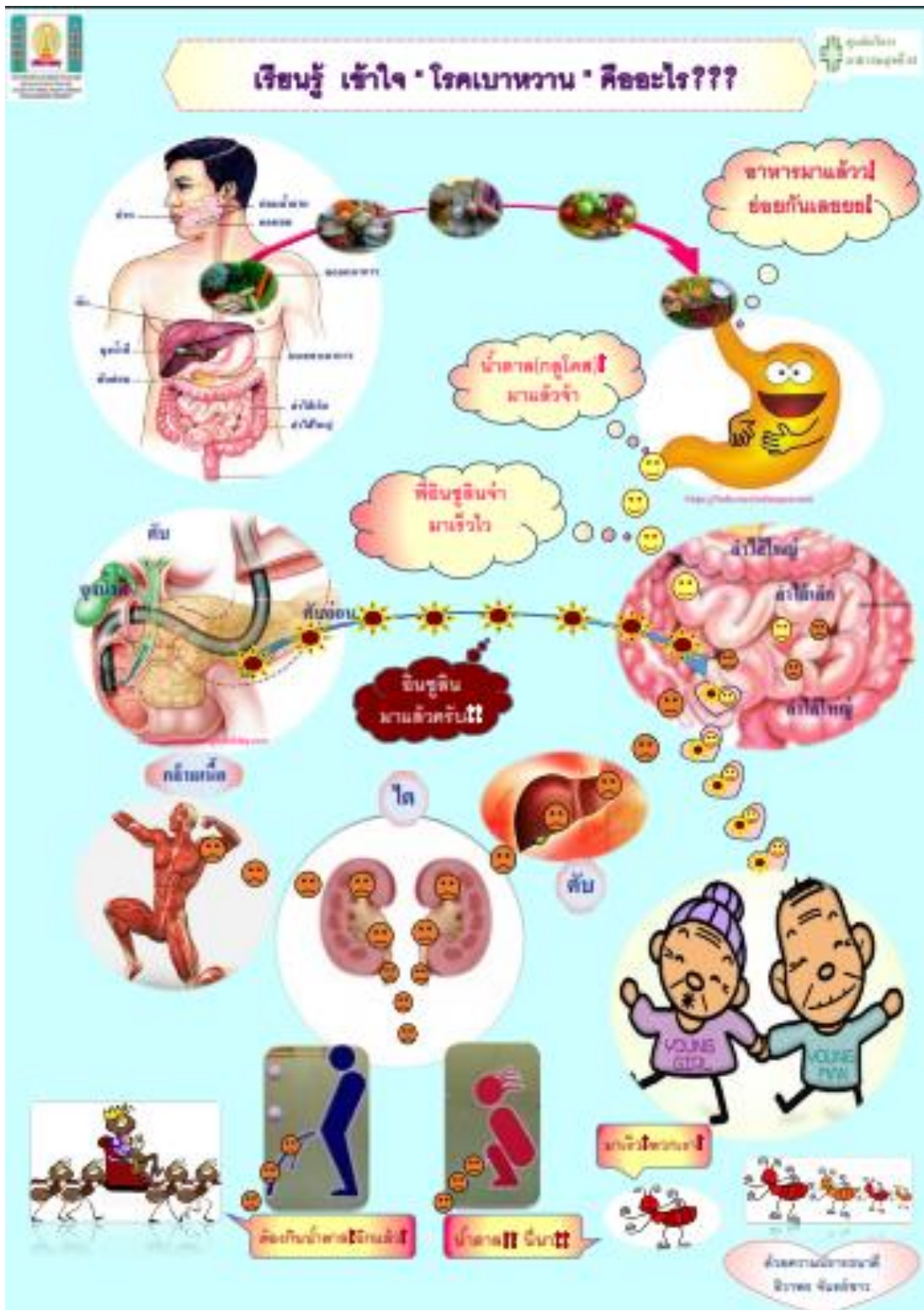
เรียนรู้ เข้าใจ " โรคเบาหวาน " คืออะไร???

"เบาหวาน" คือ อะไร คนสงสัย ถามใฝ่มา
"เบาหวาน" หรือ "ฉี่หวาน" ยิ่งนานวันยิ่งสงสัย
ในเลือดมี "หนึ่งสาว" สวยสกาวสุขสดใส
เรียกมาแต่ก่ำก่อน มีคำสอนในตำรา
ปัญหา อยู่ตรงนี้ "กลูโคส" ที่ไร้คู่ครอง
"อินซูลิน" ระเริงรื่น สุขสดชื่น ดื่นสาวงาม
เมื่อเลือกได้คู่รัก "กลูโคส" จักสุขสบาย
เป็นอันว่าราบรื่น คู่รู้รื่น คู่กายา
จะอยู่ ณ ที่ใด ยากอยู่ได้ไม่สุขสม
เข้าเซลล์ก็ไม่ได้ ไหลวนไป ให้ขื่นขม
ตา ตีน ถิ่นทำนัก อาภัพรัก หักห้ามฉใน
ไหลวน ปนกับ "ฉี่" ผลักไสหนีพ้นกายา
"กลูโคส" มีรสหวาน เป็นน้ำตาลในร่างกาย
"เบาหวาน" เมื่อใครเป็น สิ่งที่เห็นย้อนกลับไป
พ่อ แม่ หรือ ปู่ย่า ป้าน้าอา มีมั้ยหนอ
หรือ "กิน" แต่ของหวาน ชอบน้ำตาลหวานดีจัง
ออกกำลังกายบ้างหรือเปล่า?ถามเบาๆ เพราะสงสัย
โอ้!คำตอบช่างน่ารัก! ขอบคุณนักที่เปิดเผย
ออกบ้างนิดๆหน่อยๆ ออกค่อยๆ ไม่เหนื่อยแรง
ของหวาน "ให้ร่ำลา" หักใจลาให้ห่างไกล
กินน้อย ค่อยทำไป ปฏิบัติได้ เป็นสิ่งดี
ใครชอบ "อย่ารอรี" "รีบเดินหนีให้ห่างไกล"
ทุกเม็ด เบ็ดเสร็จใน หมอสั่งไว้ โปรดอคอ่ำ
ตรงตามที่นัดไว้ "รับรองได้ไม่ขาดยา"
พรึ่งพรู "อักษรา" "เบาหวานดำ" ข้านั้นใจ
คำกลอน มาวอนไหว้ ให้คนไข้ ได้สุขภาพดี

ขอแจ้งด้วยอักษรา หลังพูดจาอธิบาย
"ฉี่หวาน" ได้อย่างไร โปรดตั้งใจอ่านให้ดี
"กลูโคส" เรียกขานไป ชื่อนี้ใช่ใครให้มา
"อินซูลิน" คู่กันมา สิเน่หา เคียงคู่ครอง
อยู่เดี่ยวเปลี่ยว เศร้าหมอง เพราะคู่ครองไม่มองมา
เลือกได้ "มิคริ่นคราม" เพราะนงรามมีมากมาย
"อินซูลิน" จะพาไปครองคู่กาย อยู่ใน "เซลล์"
"กลูโคส" เจ้าปัญหา ไร้คู่มาร่วมเคียงชม
เวียนวาย กระแสชล เชื่อดไหลวนในร่างกาย
สุดทางกระแสชล เจ้าฝังตน ณ ตับ ไต
แต่แล้ว "เจ้าพ่อไต" กลับขับไล่ เจ้าออกมา
และนี่คือที่มา "ฉี่" นั้นหนาเค้าเรียก "เบา"
"เบา" มาพร้อม "หวาน" ฉัย เรียกง่ายๆให้ได้จำ
ประวัติการเจ็บไข้สืบย้อนไปในครอบครัว
เคยเป็น "จะเกิดต่อ" สืบสานต่อทางพันธุกรรม
กินง่าย "สุขใจจัง" "สุขภาพพัง" จึงรู้ตัว
กินแล้วกันนอนนัย ออกทำมัย ให้เหนื่อยแรง
มามะ! เริ่มกันเลย พร้อมรึยังเอ่ย!? มาๆฟัง
แต่ผลจะสำแดง "กาย" แข็งแรงจะกลับมา
หากยากจะหักห้าม พยายาม "ลดลง" ได้
"บุหรี่" ให้หลีกเลี่ยง ผลข้างเคียงนั้นมากมี
สำคัญคือ "กินยา" ทุกเวลา กำหนดไว้
หมอนัด ตรวจติดตาม พยายามมาให้ได้
อาการที่แทรกซ้อน รอร้าก่อนไม่ต้องมา
ต่อเนื่องไปเรื่องอื่น "จะหยิบยื่น" ให้ต่อไป
ของบทกลอนนี้ รอกวีบทต่อไป

ธิวาพร จันทร์ขาว
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

การดูแลตนเองของผู้ป่วยเบาหวาน

กวี แต่บทก่อน บอกคำสอน ให้เข้าใจ
สัญญาจะสานต่อ กวีก่อความเข้าใจ
มาต่อที่บทสอง ตามครรลองแห่งวิถี
"ธง" "โภชนาการ" บอก สัดส่วนอาหารให้
หมวด หนึ่ง หมวดข้าวแป้ง นั้นแสดงกำหนดไว้
หมวด สอง หมวดพืชผัก บำรุงรักษ์สุขภาพดี
หมวด สาม ผลไม้ สามส่วน ใช้รีให้เหมาะสม
หมวด สี่ คือ เนื้อสัตว์ ควรจำกัด แต่พอดี
หมวด ห้า คือ น้ำนม ต้องเหมาะสมพร่องไขมัน
หมวด หก ให้ "น้อย" "นิด" ไขมันติดให้ห่างไกล

เรื่องกินก็ผ่านพ้นไม่ยากดอน เกินเข้าใจ
เรื่องสองที่ต้องเน้น ไม่ยากเข็ญ เกินทำได้
"ออกกำลัง" ให้เหมาะสม อีกอารมณ์ให้สุขขี
"บุหรี่" นั้นมีพิษ ต้องไม่คิดมาสูบไว้
"สุรา" ก็ คือ เหล้า อย่ามัวเมา "หลง"ดื่มมัน
อีก "ตับ" ก็จะพัง ร่างกายยากจะยั้งได้
"ตา" เราต้องถนอมอย่าได้ยอมให้ "เบาหวาน"
"ตีน" เรา ไว้ใช้เดิน ใช้ดำเนินชีวิตได้
เล็บเท้าต้อง "ตัดตรง" อย่าให้โค้งไปปมากมาย

มาถึงเรื่องกินยา ถูกเวลาต้องจำไว้
อีกหนึ่งสมุนไพร เสนอให้ควบคู่ยา
อีกหนึ่งคือ "ชะพลู" ทั้งต้นดูให้งามตา
กินครั้งละ ครึ่ง แก้ว ก่อนอาหารให้ดื่มพลัน
"ตำลึง" คลานตามรั้ว ผักสวนครัว รั้วกินได้
"ใบ" "ราก"ที่ "เถาแก่" ต้มดื่มแค่ สองแก้วต่อวัน
ทุกคำ ในกลอนกล่าว ล้วนบอกเล่า ด้วยห่วงใย

เบาหวานคืออะไร กลอนบอกไว้ ให้ถ่องแท้
"เบาหวาน" อยู่อย่างไร ให้กายใจนั้นแข็งแรง
ปฏิบัติ เพื่อชีวี สุขภาพดี อย่างยั่งยืน
ต่อวันกินอย่างไร สมดุลได้อย่างง่ายดาย
แปด ถึง สิบสอง ได้ "ทัพพี" ให้ใช้วัดตวง
สี่ ถึง หกทัพพี แบ่งกินได้ใน หนึ่งวัน
สี่ส่วนก็ชื่นชม ยังเหมาะสมให้จัดไป
หก ถึง สิบสอง นี้ ช้อนกินข้าวมีก็ตวงไป
สองแก้ว ไม่เกินนั้น ให้ต่อวัน หลับสบาย
ไขมันจากสิ่งใดจำกัดได้ สบายชีวี
หวังเพียงให้คนไข้ "ปฏิบัติ" ได้กายแข็งแรง
ขยับกาย ให้ชื่นใจ เพื่อจักได้สุขภาพดี
กายใจ สมบูรณ์ดี สองสิ่งนี้ มีแต่คุณ
น้ำตาลไม่ตาไกล หากคีบไว้แล้วสูบมัน
พิษภัยนั้น "มหันต์!!" น้ำตาลนั้นจะมากมาย
"ใด" ก็ถนอมไว้ คิดห่างไกลออาหารกิน
"รังแก" และ "รังควาญ" เพราะน้ำตาลนั้นแกว่งไกว
ดูแลพวกเค้าให้ สะอาดเอี่ยม และน่าชม
เพราะจะเกิดแผลง่าย "นะ!!" ไม่หายเลยสักที
ถูกเม็ด "ครบหรือไม่" ตรวจตราไว้ทุกเพลา
ได้รับวิจัยว่า "มะระขี้นก" หนา "ช่วยบรรเทา"
ล้างสะอาดแล้วนำมาต้มเป็นชาไว้ดื่มกัน
กำหนดต่อหนึ่งวัน เช้า กลางวัน เย็น นั้น "ช่วยควบคุม"
สรรพคุณ นั้นบอกไว้ "ควบคุม" ได้ระดับน้ำตาล
ผลนั้นเอามาต้ม กินเหมือนกัน "ช่วยควบคุม"
"โปรดคิด" ท่านทั้งหลาย ปฏิบัติได้เกิด "ผลดี"

ของบบทกลอนนี้ ด้วยความปรารถนา ฉากใจ

ธิวพร จันทร์ขาว
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

ปริมาณ "น้ำตาล" ในอาหาร คิดก่อนกิน!!!

1 ช้อนชา = { 4 กรัม / 15 แคลอรี่ }   ปริมาณ 1 วัน = { 6 ช้อนชา / 24 กรัม }

"น้ำตาล" ใน เครื่องดื่ม

= 2.5 – 4 ช้อนชา   = 1 – 2 ช้อนชา

= 2.5 – 8 ช้อนชา   = 4 – 5 ช้อนชา

14 ช้อนชา   = 6 – 14 ช้อนชา

"น้ำตาล" ใน ผลไม้

ชนิดผลไม้	ปริมาณ	น้ำหนัก (กรัม)	ปริมาณน้ำตาล (ช้อนชา)
กล้วยไข่	1 ผล	40	2.18
กล้วยน้ำว้า	1 ผล	50	2.96
กล้วยหอม	1 ผล	108	5.56
แก้วมังกร (เนื้อขาว)	1/4 ผล	64	1.57
แก้วมังกร (เนื้อชมพู)	1/4 ผล	56	1.14
ข้าวโพดเหลือง	1 ฝัก	105	1.59
แคนตาลูป (เนื้อเหลือง)	5 ชิ้นคำ	110	1.67
ชมพู่แดงเหนียว	1 ผล	128	1.87
แตงโม	10 ชิ้นคำ	140	2.17
ทุเรียนก้านยาว	1 เม็ดเล็ก	22	0.71
ทุเรียนชะนีไข่	1 เม็ดเล็ก	32	0.61
น้อยหน่า	1 ผล	86	3.34
เงาะ	1 ผล	225	3.12
พุทราจีนแห้ง	10 ลูก	15	1.93
มะพร้าวอ่อน (เนื้อ)	1 ผล	93	0.64
มะพร้าวอ่อน (น้ำ)	1 ผล	-	5.15
มะละกอสารวย	6 ชิ้นคำ	72	1.78
ลิ้นจี่กะโหลก	4 ผล	48	2.24
ส้มโอขาวใหญ่	1 กลีบเล็ก	26	0.64
ส้มโชกุน	1 ผล	118	2.7
สาลี่หอม	1 ผล	123	2.39
องุ่นเขียวไร้เมล็ด	8 ผล	64	2.24
อินทผลัม	1 ผล	7.5	1.04
แอปเปิลเขียว	1 ผล	114	2.17
แอปเปิลแดง	1 ผล	130	3.4

รู้ทัน เข้าใจ เลือกซื้อปลอดภัย ใส่ใจสุขภาพ

สินค้าละลานตา เลือกซื้อหาได้อย่างไร

ฉลาก สินค้าโชว์ ตัดสินใจได้ง่ายดาย

หนึ่ง คือ ชื่ออาหาร ทุกรายการ มีภาษาไทย

สอง นั้นประจักษ์ได้ ความปลอดภัย เครื่องหมาย อย.

1 2 3 4 5 6

XX-X-XXXXX-Y-YYYY

สาม คือ วันหมดอายุ มัดปั่นคู่กับวันผลิต

สองเกลอ ล้วนเป็นมิตร ควรพินิจ พิจารณา

วันหมดอายุ / EXPIRY DATE
18-03-14
03-45-25 10

สี่ คือ ส่วนประกอบ ตามระบอบกรอบกฎหมาย

"%" แสดงไว้ ผู้ซื้อได้คิดไตร่ตรอง

ห้า คือ ผู้ผลิต ใครช่างคิดผลิตมา

ที่อยู่ เพื่อความหา หากสินค้านั้นถูกใจ

หรือหากมีปัญหา จักตรวจตราตรวจสอบได้

กฎหมาย กำหนดไว้คุ้มครองภัยปวงประชา

หก คือ ปริมาณ ที่บรรจุ ต้องระบุในทุกครา

ผู้ซื้อพิจารณา "ความคุ้มค่า" ที่จ่ายไป

มิใช่เพียง หก ข้อ อย่าเพิ่งท้อ อ่านต่อไป ไปต่อที่ หน้าสอง อีกมุมมอง พิจารณา

"โภชนาการ" สำคัญไฉน เรียนรู้ไป ไม่รีรอ อาหารที่ซื้อมา ให้คุณค่า เราอย่างไร??

"ฉลากโภชนาการ" เลือกซื้ออย่างไรให้คุ้มค่า!

ฉลากอาหาร หวาน มัน เค็ม (GDA)

รู้ทัน เข้าใจ เลือกซื้อปลอดภัย ใส่ใจสุขภาพ

สินค้าในทีบห่อ "โอ้ละหนอ" ช่างหลากหลาย
"ทำอย่างไร?" ละทีนี้ ถามใครดี "ซื้ออย่างไร"
"คุ้มค่า"และ"คุ้มทุน"มีเบ็ดเสร็จ ให้พร้อมมูล
รายละเอียด มี 6 ข้อ พร้อมแล้วหนอ เริ่มบอกกัน
ข้อ หนึ่ง ชื่ออาหาร ทุกรายการมีภาษาไทย
แม้มีภาษาอังกฤษ ก็ไม่ผิดหากสำแดง
ข้อ สอง ต้องตามติด ต้องเพ่งพิจ คลายสงสัย
เครื่องหมาย "เลขสารบบ-อาหาร"ครบและถ้วนดี
ข้อ สาม "วันผลิต" ตรวจซักนิดมีหรือไม่
ข้อ สี่ ส่วนประกอบ ตามระบบกรอบกฎหมาย
ข้อ ห้า ชื่อ ที่อยู่ ผู้ผลิต โปรดอ่านพลิกและค้นหา
ข้อ หก ปริมาณ/ปริมาตร เปิดโอกาสตัดสินใจ
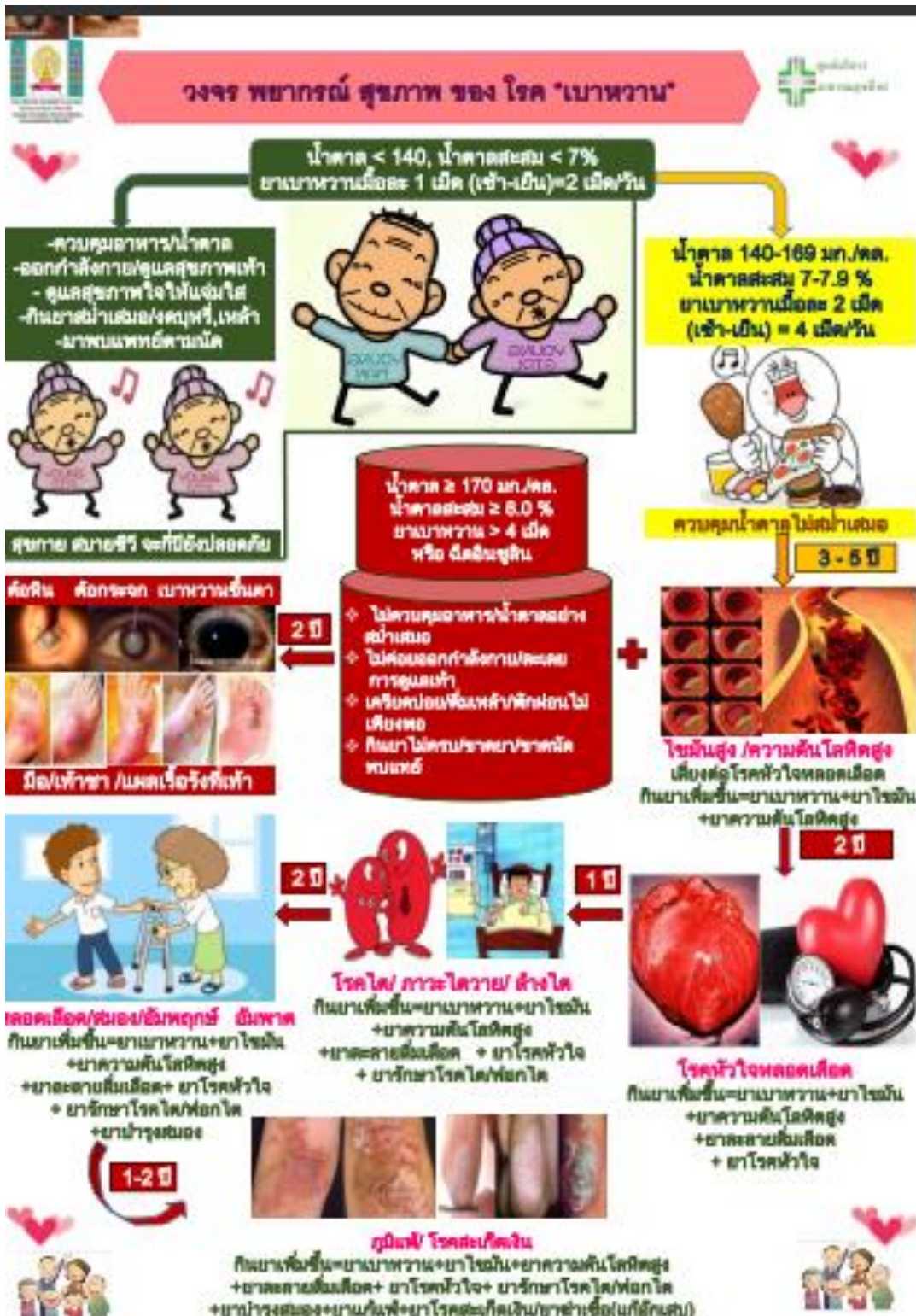นอกจากนี้"เรื่องอาหาร" "โฆษณาการต้องเหมาะสม
ในฉลากมีรายละเอียด ได้โปรดเจียดเวลาชม
โปรดอ่าน "ฉลาก"ก่อนซื้อโปรดเชื่อถือ โปรดทำตาม
กลอนกล่าวที่เล่าเรื่อง อยากปลดเปลื้องข้อสงสัย
จนกลอนในเรื่องนี้ พบอีกทีเรื่องต่อไป

ยากยิ่งตัดสินใจ "เลือกซื้อ" ได้ดังต้องการ
รีบยกมือเร็วไว "อาสา" ให้ยิ่งข้อมูล
เลือกได้ อย่างคุ้มทุน อุ่นใจได้ไม่ร้อนรน
"ฉลาก" นั้น สำคัญ เลือกซื้อกันอย่างมั่นใจ
เลือกซื้อได้ง่ายดาย ภาษาไทย ให้ชัดเจน
แล่ขนาด"นั้นห้ามแซง"ใหญ่เกินกว่าภาษาไทย
กินได้อย่างปลอดภัย "อย." ให้การรันตี
ซื้อได้สบายชีวีอาหาร "ดี"และ"ปลอดภัย"
สองสิ่ง คู่กันไป "หมดอายุ" แสดงไว้ให้ได้ยล
"ๆ" แสดงไว้ เลือกซื้อให้ถูกวิธี
แสดงไว้เมื่อเวลา เกิดปัญหา ได้ติดตาม
ทุกอย่างแสดงไว้ ซื้ออย่างไร ให้ "คุ้มทุน"
แสดงไว้ให้ได้ชม "คุณค่าโภชนาการ"
เลือกซื้อ ให้เหมาะสม สร้างค่านิยมที่ดีงาม
สุขภาพที่ดีงาม จะยืนยาว และยืนยง
เลือกซื้อกันอย่างไร สบายใจ สบายกาย
ด้วยรัก และห่วงใย ขอบพระคุณในความร่วมมือ

ธิวาพร จันทร์ขาว
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย

Appendix G: Diabetes booklet

วงจร พยากรณ์ สุขภาพ ของ โรค "เบาหวาน"

ไขมันสะสมในเส้นเลือด/ไขมันสูง   ความดันโลหิตสูง   เสี่ยงต่อโรคหัวใจและหลอดเลือด!!

พยากรณ์
สุขภาพ
ภายใน
3-5 ปี

กินยาเพิ่มขึ้น!!!
ยาเบาหวาน+ยาไขมัน+ยาความดันโลหิตสูง

จะเกิดอะไร
ขึ้น!!! ถ้ายัง
ควบคุมน้ำตาล
ไม่ได้!!

หาคำตอบ!! หน้า 3 !!

วงจร พยากรณ์ สุขภาพ ของ โรค "เบาหวาน"

ไม่ควบคุมอาหาร/น้ำตาล/น้ำหนัก   ไม่ค่อยออกกำลังกาย

เพิ่มความเสี่ยง!!
ระดับน้ำตาล
ในเลือดที่สูงขึ้น!!

น้ำตาล ≥ 170 มก./ดล.
น้ำตาลสะสม ≥ 8.0 %
ยาเบาหวาน > 4 เม็ด
หรือ ฉีดอินซูลิน

อ้วน
เท่าค่าความสูงและขนาดของ

มีภาวะเครียดบ่อยๆ

เครียด
ๆ

สุขภาพอีก 2 ปี
ต่อมา!!!

ต้อหิน   ต้อกระจก   เบาหวานขึ้นตา

โรคเบาหวานขึ้นตา

สูบบุหรี่/ดื่มเหล้า

แผลเรื้อรังที่เท้า

กินยาเพิ่ม
ยาไขมัน   ยาเบาหวาน
ยาความดัน   ยาละลายลิ่มเลือด
ยาโรคหัวใจ

แล้วต่อไป
สุขภาพจะเป็น
อย่างไร!?หน้า 4
มีคำตอบ!

สุขภาพช่องปาก   โรคหัวใจและหลอดเลือดมาเยือน!!

วงจร พยากรณ์ สุขภาพ ของ โรค "เบาหวาน"

ศูนย์บริการ สาธารณสุข 61 — 4
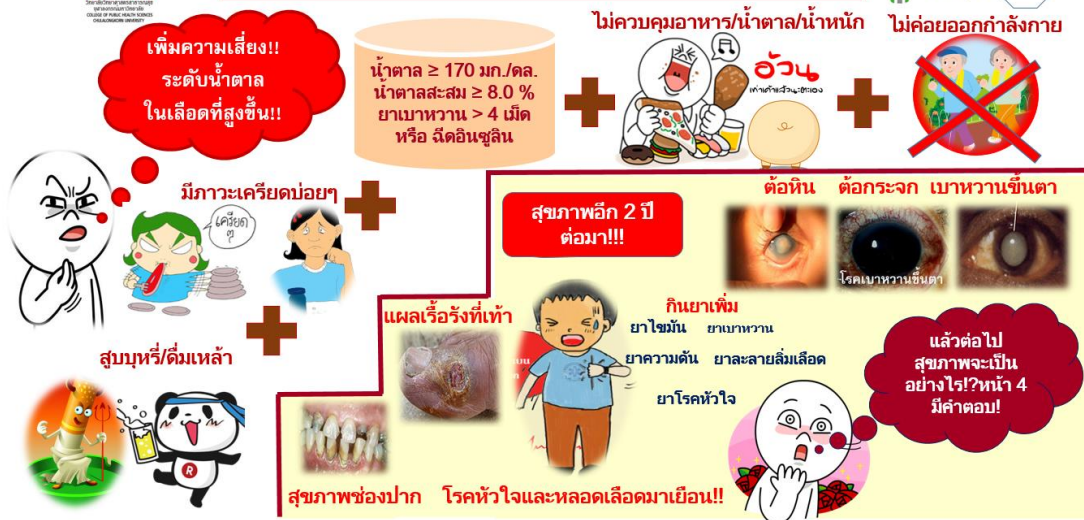
โรคไต/ ภาวะไตวาย/ ล้างไต

ภูมิแพ้/โรคสะเก็ดเงิน

หึะ!!ภายใน 1 ปีอาจเป็น โรคไต, อาจ ฟอกไต!!ด้วย

กินยาเพิ่มขึ้น

ยาโรคไต/ฟอกไต

โอ้!!หรือภายใน 2 ปี อาจเป็น อัมพฤกษ์ อัมพาตได้!!

อีก 2 ปี!!

ยาที่ต้องกินทั้งหมด
- ยาเบาหวาน
- ยาไขมัน
- ยาความดันโลหิตสูง
- ยาละลายลิ่มเลือด
- ยาโรคหัวใจ
- ยารักษาโรคไต/ ฟอกไต
- ยาบำรุงสมอง
- ยาแก้แพ้
- ยาโรคสะเก็ดเงิน/ยา ฆ่าเชื้อ(แก้อักเสบ)

กินยาเพิ่มขึ้น

ยาบำรุงสมอง

ฉันต้องทำ อย่างไร!!?

หลอดเลือด/สมอง/อัมพฤกษ์ อัมพาต

หน้าต่อไป! คำตอบครับ!

ควบคุม "อาหาร" "การกิน" ตามธงโภชนาการ

ศูนย์บริการ สาธารณสุข 61 — 5

เริ่มกันเลย!!ดูแล! สุขภาพอย่างจริงจัง ก่อนสายเกินไป

ข้าว วันละ 8-12 ทัพพี

ผลไม้ วันละ 3-5 ส่วน

ผัก วันละ 4-6 ทัพพี

เนื้อสัตว์ วันละ 6-12 ช้อนกินข้าว

นม วันละ 1-2 แก้ว

น้ำมัน น้ำตาล เกลือ วันละน้อยๆ

"ธง" "โภชนาการ" บอก สัดส่วนอาหารให้
ต่อวันกินอย่างไร สมดุลได้อย่างง่ายดาย
หมวด หนึ่ง หมวดข้าวแป้ง มีแสดงกำหนดไว้
แปดถึงสิบสอง ได้ "ทัพพี" ให้ใช้วัดตวง
หมวด สอง หมวดพืชผัก บำรุงรักษ์สุขภาพดี
สี่ ถึง หกทัพพี แบ่งกินได้ใน หนึ่งวัน
หมวด สาม ผลไม้ สามส่วน ไซร้ให้เหมาะสม
สี่-ห้าส่วนก็ชื่นชม ยังเหมาะสมให้จัดไป
หมวด สี่ คือ เนื้อสัตว์ ควรจำกัด แต่พอดี
หก ถึง สิบสอง นี้ ช้อนกินข้าวมีก็ตวงไป
หมวด ห้า คือน้ำนม ต้องเหมาะสมพร่องไขมัน
สองแก้ว ไม่เกินนั้น ให้ต่อวัน หลับสบาย
หมวด หก ให้ "น้อย""นิด"ไขมันติดให้ห่างไกล
ไขมันจากสิ่งใดจำกัดได้ สบายชีวี

อาหารแลกเปลี่ยน เลือกกินได้! หน้า 6

"อาหาร" "แลกเปลี่ยน" ตามธงโภชนาการ 6

- คาร์โบไฮเดรท 12 กรัม
- โปรตีน 8 กรัม , ไขมัน 8 กรัม
- พลังงาน 90-170 กิโลแคลอรี่

- คาร์โบไฮเดรท 18 กรัม
- โปรตีน 2 กรัม
- ไขมัน 0 กรัม
- พลังงาน 80 กิโลแคลอรี่

- คาร์โบไฮเดรท 5 กรัม
- โปรตีน 25 กรัม
- เส้นใยอาหาร 1-4 กรัม
- พลังงาน 25 กิโลแคลอรี่

หมวด นม 1 ส่วน

หมวด ข้าวแป้ง 1 ส่วน

หมวด พืช ผัก 1 ส่วน

แลกเปลี่ยนได้ หลากหลาย

หมวด เนื้อสัตว์ 1 ส่วน

หมวด ผลไม้ 1 ส่วน

หมวด ไขมัน 1 ส่วน

- โปรตีน 7 กรัม
- ไขมัน 0 - 8 กรัม
- พลังงาน 35-100 กิโลแคลอรี่

- คาร์โบไฮเดรท 15 กรัม
- พลังงาน 60 กิโลแคลอรี่

- ไขมัน 5 กรัม
- พลังงาน 45 กิโลแคลอรี่

ตัวอย่างอาหารแต่ละหมวด หน้า 7-12

"ตัวอย่าง" อาหาร หมวด หนึ่ง "ข้าวแป้ง" 7

ตัวอย่างผลิตภัณฑ์ข้าว แป้ง 1 ส่วน = คาร์โบไฮเดรท 18 กรัม, โปรตีน 2 กรัม พลังงาน 80 กิโลแคลอรี่

ข้าวสวย 1 ทัพพี | ขนมปังจืด 1 แผ่น | บะหมี่สุก 1 ก้อน | เส้นใหญ่ลวก 1 ทัพพี | เส้นหมี่ลวก 1 ทัพพี | ขนมจีน 1 จับ ขนาดกลาง

ข้าวเหนียว 1 ช้อนโต๊ะ | เส้นสปาเก็ตตี้ 1 ทัพพี | มักกะโรนี 1 ทัพพี | สาคูลวก 1 ทัพพี | เส้นเซี่ยงไฮ้ 1 ทัพพี | วุ้นเส้น 1 ทัพพี

ข้าวโพด ½ ฝัก | เผือกสุก 1 ทัพพี | มันสุก 1 ทัพพี | ขนมปังแครกเกอร์ 5 แผ่นเล็ก | แป้งดิบ 1 ช้อนโต๊ะ

"ตัวอย่าง" อาหาร หมวด สอง "พืชผัก"

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ตัวอย่างพืชผักต่างๆ 1 ส่วน= ผักสด 1 ทัพพี /ผักต้ม 2 ทัพพี กิน 4-6 ทัพพี ต่อวัน

ผักให้พลังงานน้อยไม่ต้องคิดสัดส่วน

ผักสมุนไพร
แต่งกลิ่น/ รส
อาหาร

"ตัวอย่าง" อาหาร หมวด สาม "ผลไม้"

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ผลไม้ 1 ส่วน ให้คาร์โบไฮเดรท 15 กรัม พลังงาน 60 กิโลแคลอรี่

ผลไม้ที่ควรเลี่ยง

แตงโม 2 ชิ้น | องุ่น 8-10 ผล | ชมพู่ 3 ผล | แคนตาลูป | ส้มโอ 2 ชิ้น | สับปะรด 8 ชิ้น

มะละกอสุก 3-4 ชิ้น | ผลกีวี 1 ผล | แก้วมังกร ¼ ผล | กล้วยไข่ 1 ผลกลาง | กล้วยหอม ½ ผลกลาง | มังคุด 4 ผล

ฝรั่งสาลี่ ½ ผล | เงาะ 4 ผล | ส้มเช้ง 1 ผลกลาง | ลองกอง 6 ผล | มะม่วงดิบ ½ ผลกลาง | แอ๊ปเปิ้ลเล็ก 1 ผล

มะม่วงสุก ½ ผลเล็ก | ส้มเขียวหวาน 1 ผล | ลำไย 6 ผล | ทุเรียน ½ เม็ดเล็ก | ลิ้นจี่ 5 ผลกลาง | ขนุนสุก 2 ชิ้น

"ตัวอย่าง" อาหาร หมวด สี่ "เนื้อสัตว์"

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เนื้อสัตว์สุก 1 ส่วน = 0.3 ขีด หรือ 2 ช้อนโต๊ะ โปรตีน 7 กรัม ไขมัน 0-8 กรัม พลังงาน 35-100 กิโลแคลอรี่

| ไขมันต่ำมาก | ไขมันต่ำ | ไขมันปานกลาง | ไขมันสูง |

กุ้งสุก 4 ตัว
ลูกชิ้นปลา 2 ช้อนโต๊ะ
เนื้ออกไก่ ลอกหนัง 2 ช้อนโต๊ะ
ปลาทูขนาดกลาง 1 ตัว
อ่องปลา 2 ช้อนโต๊ะ
ลาหมึก 2 ช้อนโต๊ะ

อกไก่นึ่ง อกไก่-เลาะหนัง
สะโพกไก่นึ่ง ปลากระป๋อง

เนื้อหมูสับ เนื้อหมู
ไข่ไก่ 1 ฟอง เต้าหู้หลอด 180 กรัม
กระดูกหมู 4 ชิ้น เต้าหู้แข็ง 60 กรัม

หมูยอ 2 ชิ้น ไส้กรอกกลาง 1 ชิ้น
แฮม 2 ชิ้น

- ไขมัน 0-1 กรัม
- พลังงาน 35 กิโลแคลอรี่

- ไขมัน 3 กรัม
- พลังงาน 55 กิโลแคลอรี่

- ไขมัน 5 กรัม
- พลังงาน 55 กิโลแคลอรี่

- ไขมัน 8 กรัม
- พลังงาน 100 กิโลแคลอรี่

"ตัวอย่าง" อาหาร หมวด ห้า "นม"

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ตัวอย่างผลิตภัณฑ์นม 1 ส่วน กิน 1-2 แก้ว ต่อวัน

| นมปกติ รสจืด 240 มล. | นมพร่องมันเนย 240 มล. | นมไม่มีไขมัน 240 มล. | นมถั่วเหลืองไม่ปรุงแต่ง 240 มล. |

- คาร์โบไฮเดรท 12 กรัม
- โปรตีน 8 กรัม
- ไขมัน 8 กรัม
- พลังงาน 150 กิโลแคลอรี่

- คาร์โบไฮเดรท 12 กรัม
- โปรตีน 8 กรัม
- ไขมัน 5 กรัม
- พลังงาน 120 กิโลแคลอรี่

- คาร์โบไฮเดรท 12 กรัม
- โปรตีน 8 กรัม
- ไขมัน 0 กรัม
- พลังงาน 80 กิโลแคลอรี่

- คาร์โบไฮเดรท 12 กรัม
- โปรตีน 8 กรัม
- ไขมัน 3 กรัม
- พลังงาน 95 กิโลแคลอรี่

"ตัวอย่าง" อาหาร หมวด หก "ไขมัน"

ไขมัน 1 ส่วน = ไขมัน 5 กรัม พลังงาน 45 กิโลแคลอรี่

อาหารที่มีไขมันอิ่มตัว

ชนิดของไขมัน	ปริมาณ
ไขมันสัตว์ (น้ำมันหมู , น้ำมันไก่	1 ช้
เนยสด	1 ช้อนชา
เบคอน	1 ชิ้น
กะทิ	1 ช้อนกินข้าว
มะพ	2 ช้อนกินข้าว
น้ำมันปาล์ม	2 ช้อนกินข้าว

ควรหลีกเลี่ยง เพิ่มระดับโคเลสเตอรอลในเลือด

อาหารไขมันไม่อิ่ม ตำแหน่งเดียว

ชนิดของไขมัน	ปริมาณ
น้ำมันมะกอก/น้ำมันถั่วลิสง	1 ช้อนชา
น้ำมันรำข้าว	1 ช้อนชา
เมล็ดมะม่วงหิมพานต์/เมล็ดอัลมอนต์	6 เมล็ด
ถั่วลิสง	10 เมล็ด
งา	1 ช้อนกินข้าว
มะกอกเขียว (ทำน้ำมัน)	10 ผล

ควรเลือกรับประทาน ช่วยลดระดับโคเลสเตอรอลในเลือด

อาหารไขมันไม่อิ่มตัว หลายตำแหน่ง

ชนิดของไขมัน	ปริมาณ
น้ำมันถั่วเหลือง	1 ช้อนชา
น้ำมันดอกคำฝอย	1 ช้อนชา
เนยเทียม	1 ช้อนชา
น้ำมันสลัดใส	1 ช้อนกินข้าว
น้ำมันข้าวโพด	1 ช้อนชา
น้ำมันดอกทานตะวัน	1 ช้อนชา
มายองเนส	1 ช้อนชา
เมล็ดทานตะวัน	1 ช้อนกินข้าว

ควรทานเพียงเล็กน้อย ช่วยลดระดับโคเลสเตอรอลในเลือด

ออกกำลังกาย ใส่ใจดูแลสุขภาพ

ออกกำลังกาย

แกว่งแขน วันละ 200 ครั้ง
1. ยืนแยกเท้าห่าง 1 ช่วงไหล่
2. แกว่งแขนไปด้านหลังแล้ว ปล่อยให้เหวี่ยงกลับมา

ยืดเหยียด

เรื่องกินก็ผ่านพ้นไม่ยากจน เกินเข้าใจ เรื่องสองที่ต้องเน้น ไม่ยากเข็ญ เกินทำได้ "ออกกำลัง" ให้เหมาะสม อีกอารมณ์ให้สุขขี "บุหรี่" นั้นมีพิษ ต้องไม่คีบมาสูบไว้ "สุรา" ก็ คือ เหล้า อย่ามัวเมา "หลง"ดื่มมัน อีก "ตับ" ก็จะพัง ร่างกายยากจะยั้งได้ "ตา"เราต้องถนอมอย่าได้ยอมให้ "เบาหวาน" "ตีน" เรา ไว้ใช้เดิน ใช้ดำเนินชีวิตได้ เล็บเท้าต้อง "ตัดตรง" อย่าให้โค้งไปมากมาย

หวังเพียงให้คนไข้ "ปฏิบัติ" ได้กายแข็งแรง ขยับกาย ให้ชื่นใจ เพื่อจักได้สุขภาพดี กายใจ สมบูรณ์ดี สองสิ่งนี้ มีแต่คุณ น้ำตาลไม่ลาไกล หากคีบไว้แล้วสูบมัน พิษภัยนั้น "มหันต์!!" น้ำตาลนั้นจะมากมาย "ไต" ก็ถนอมไว้ คิดห่างไกลอาหารเค็ม รังแกและรังควาญเพราะน้ำตาลนั้นแกว่งไกว เช็ดล้างทุกวันให้ สะอาดเอี่ยม และน่าชม เพราะจะเกิดแผลง่าย "แต่!!" ไม่หายเลยสักที

เดิน 15-30 นาที

ดูแลสุขภาพเท้า

บริหารเท้า 10 ท่า

1.ล้างเท้าให้สะอาดทุกวัน
2.เช็ดเท้าให้แห้ง
3.ตัดเล็บเป็นเส้นตรง
4.ทานวดโลชั่น
5.สวมถุงเท้าสะอาด
6.สวมรองเท้าพอดี
7.ไม่เดินเท้าเปล่า
8.ตรวจดูเท้าทุกวัน
9.ตรวจรองเท้าก่อนสวมใส่

ยา และ สมุนไพร โรคเบาหวาน กินอย่างไร ให้ถูกวิธี

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อาหารและยา มื้อเช้า

ไม่ควรเกิน
9.00-10.00 น.

อาหารและยา มื้อเย็น

ไม่ควรเกิน
19.00-20.00 น.

มาถึงเรื่องกินยา ถูกเวลาต้องจำไว้ อีกหนึ่งสมุนไพร เสนอให้ควบคู่ยา อีกหนึ่งคือ "ชะพลู" ทั้งต้นดูให้งามตา กินครั้งละ ครึ่ง แก้ว ก่อนอาหารให้ดื่มพลัน "ตำลึง" คลานตามรั้ว ผักสวนครัว รั้วกินได้ "ใบ" "ราก" ที่ "เถาแก่" ต้มดื่มแค่ สองแก้วต่อวัน ทุกคำ ในกลอนกล่าว ล้วนบอกเล่า ด้วยห่วงใย

ถูกเม็ด "ครบหรือไม่" รับประทานให้ตรงเวลา ได้รับวิจัยว่า "มะระขึ้นก" หนา "ช่วยบรรเทา ล้างสะอาดแล้วนำมาต้มเป็นชาไว้ดื่มกัน กำหนดต่อหนึ่งวัน เช้า กลางวัน เย็น นั้น "ช่วยควบคุม" สรรพคุณ นั้นบอกไว้ "ควบคุม" ได้ระดับน้ำตาล ผลนั้นเอามาคั้น กินเหมือนกัน "ช่วยควบคุม" "โปรดเถิด" ท่านทั้งหลาย ปฏิบัติได้เกิด "ผลดี"

ขอจบบทกลอนนี้ ด้วยความปรารถดี ที่จริงใจ

ตำลึง

ตำลึง ใบ ราก เถาแก่ ต้ม กิน ครั้งละ ครึ่งแก้ว ก่อนอาหาร เช้า กลางวัน เย็น

ชะพลู

ชะพลู ทั้งต้น ต้มกับน้ำ 3 ส่วน จนเหลือ 1 ส่วน ดื่มครั้งละ ครึ่ง แก้ว ก่อนอาหาร เช้า กลางวัน เย็น

มะระขึ้นก

มะระขึ้นก ผลตากแห้ง ชงเป็นชา1-2 ชิ้น ต่อ1 แก้ว ดื่มครั้งละ 1 แก้ว ก่อนอาหาร เช้า กลางวัน เย็น

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การดูแลสุขภาพเท้าของผู้ป่วยเบาหวาน

อยู่กับ "เบาหวาน" อย่างเป็นมิตร
ดูแล ใส่ใจ ห่วงใยสุขภาพ

ด้วย รัก
ห่วงใย

"ปลูกต้นรักษ์ พิทักษ์สุขภาพ ผู้ป่วยเบาหวาน"
โปรแกรมการดูแลและสนับสนุนรอบด้าน
เพื่อพัฒนาการควบคุมระดับน้ำตาล และคุณภาพชีวิต
กลุ่มวัยผู้ใหญ่ตอนปลาย และผู้สูงอายุ

วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย   ศูนย์บริการสาธารณสุข 61 สังวาลย์ ทัศนารมย์

การตรวจสุขภาพเท้าเบื้องต้นในผู้ป่วยเบาหวาน

1 สีผิว

ดำคล้ำ = เลือดไปเลี้ยงไม่พอ

แดง = อาจมีการอักเสบ,แผล ฝี หนอง

2 อุณหภูมิ

เย็นกว่าเท้าอีกข้าง=เลือดไปเลี้ยงไม่พอ

ร้อนกว่าส่วนอื่น=การอักเสบ,แผล ฝี หนอง

การตรวจสุขภาพเท้าเบื้องต้นในผู้ป่วยเบาหวาน

3 ขนนิ้วเท้า

4 การติดเชื้อ, เชื้อรา

ขนร่วง = เลือดไปเลี้ยงไม่พอ

มีฝ้าขาว เป็นขุย มีอาการคัน

5 การตรวจเล็บ

สุขบัญญัติ 10 ประการ การดูแลเท้าผู้ป่วยเบาหวาน

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ห้าม! แช่น้ำอุ่น ถึงร้อน

ห้าม! แช่น้ำเย็น

7

8

9

10

ตัดเล็บตรง ตะไบ มุมเล็บป้องกันเล็บขบ

หลีกเลี่ยงเหล้า บุหรี่ ลดหลอดเลือดตีบ

บริหารเท้า สม่ำเสมอ

พบแพทย์เมื่อมีอาการ ผิดปกติที่เท้า

การบริหารเท้าผู้ป่วยเบาหวาน 10 ท่า

5

1	2	3	4	5
บริหารปลายนิ้ว	นวดฝ่าเท้า	หมุนฝ่าเท้า	หมุนส้นเท้า	ยึดเหยียดปลายเท้า
กระดกปลายนิ้วขึ้นลง 10 ครั้ง/1 ชุด	นวดฝ่าเท้า 10 ครั้ง/ 1 ชุด	วางส้นเท้า ยกปลายเท้าขึ้นหมุน 10 ครั้ง/ 1 ชุด	วางปลายเท้า ยกส้นเท้าขึ้น หมุน 10 ครั้ง/ 1 ชุด	ยึดปลายเท้า ยึดชี้ออกไป นับ 1-10/ 1 ชุด

6

การบริหารเท้าผู้ป่วยเบาหวาน 10 ท่า

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6 ยึดหดปลายเท้า

ยึดหดปลายเท้า
ยึดปลายเท้าเข้าหาตัว
นับ 1-10 /1 ครั้ง

7 ยึดปลายนิ้ว

กระดกนิ้วทั้ง 2 ข้าง
10 ครั้ง/ 1 ชุด

8 ยึดปลายนิ้วสลับกัน

กระดกปลายนิ้ว
2 ข้างสลับกัน
10 ครั้ง/ 1 ชุด

9 หมุนปลายเท้า

เหยียดเท้าไปด้านหน้า
หมุนปลายเท้า
หมุน 10 ครั้ง/ 1 ชุด

10 บริหารกล้ามเนื้อเท้า

แผ่หนังสือพิมพ์ออก
ขยำปั้นหนังสือพิมพ์
เป็นก้อนกลมๆให้เล็ก
เท่าที่ทำได้

VITA

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