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ในผู้ที่เป็นเบาหวานชนิดที่ 2



นางรุ่งระวี นาวีเจริญ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาพยาบาลศาสตรดุษฎีบัณฑิต

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EFFECTS OF A MULTIFACETED NURSE-COACHING INTERVENTION ON DIABETIC
COMPLICATIONS AND SATISFACTION IN PERSONS WITH TYPE 2 DIABETES

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A Dissertation Submitted in Partial Fulfillment of the Requirements
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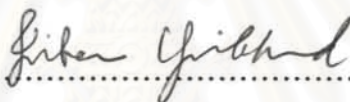
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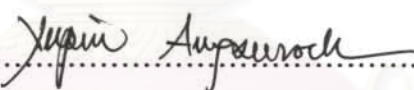
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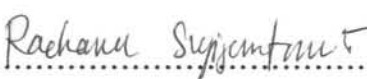
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และความพึงพอใจในผู้ที่เป็นเบาหวานชนิดที่ 2 (EFFECT OF A MULTIFACETED NURSE-
COACHING ON DIABETIC COMPLICATIONS AND SATISFACTION IN PERSONS
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อ. ที่ปรึกษาร่วม รศ. ดร. สุวีพร ธนศิลป์ 220หน้า.

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อเปรียบเทียบภาวะแทรกซ้อนที่ประเมินจากการรับรู้อาการภาวะแทรกซ้อน ระดับน้ำตาล
สะสม ระดับความดันโลหิต ระดับไขมันชนิดไม่ดี ก่อนและหลังการใช้โปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็น
เบาหวานชนิดที่ 2 ซึ่งมารับการรักษาที่สถานีกาชาด สำนักงานบรรเทาทุกข์และประชานามัยพิทักษ์ ในเขตกรุงเทพมหานคร ตั้งแต่
ตุลาคม พ.ศ. 2550 – มีนาคม 2551 ผู้ที่เป็นเบาหวาน 40 ราย ซึ่งได้รับการคัดเลือกตามเกณฑ์คุณสมบัติที่กำหนด ทำการคัดเลือก
ด้วยวิธีการจับคู่ (matched pair) โดยคำนึงถึงความคล้ายคลึงกันด้านอายุ เพศ ระยะเวลาการเป็นเบาหวาน กลุ่มละจำนวน 20 คน
ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับการรักษาพยาบาลที่สถานีกาชาด ที่ 2 เป็นกลุ่มทดลอง และ ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับ
การรักษาพยาบาลตามปกติที่สถานีกาชาด ที่ 11 เป็นกลุ่มควบคุม เครื่องมือที่ใช้ในการวิจัย ได้แก่ 1) โปรแกรมการพยาบาล
ชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวานชนิดที่ 2 สำหรับพยาบาล แผนการสอนและชี้แนะให้แก่ผู้ที่เป็นเบาหวานชนิดที่ 2
2) เครื่องมือที่ใช้ในการทำกับการทดลอง ได้แก่ การประเมินพฤติกรรมตนเองของพยาบาล แบบวัดพฤติกรรมการดูแลตนเองใน
ผู้ที่เป็นเบาหวาน แผนการรายงานพฤติกรรมตนเองในผู้ที่เป็นเบาหวาน 3) เครื่องมือที่ใช้เก็บรวบรวมข้อมูล ได้แก่ ข้อมูลส่วนบุคคล
และปัจจัยเสี่ยงต่อการเกิดภาวะแทรกซ้อน ได้แก่ ระดับน้ำตาลสะสม ระดับความดันโลหิต ระดับไขมันชนิดไม่ดี แบบสอบถามการ
รับรู้อาการภาวะแทรกซ้อนในผู้ที่เป็นเบาหวานชนิดที่ 2 แบบสอบถามความพึงพอใจ เครื่องมือดังกล่าวผ่านการตรวจสอบความตรง
ตามเนื้อหาโดยผู้ทรงคุณวุฒิ 5 ท่าน และมีค่าความเที่ยงเท่ากับ 0.82 และ 0.93 ตามลำดับ สถิติที่ใช้วิเคราะห์ข้อมูล คือ ร้อยละ
ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน สถิติทดสอบที และสถิติทดสอบ two proportion z-test

ผลการวิจัยพบว่า

1. ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับระบบการพยาบาลชี้แนะแบบหลากหลายมีการรับรู้สัดส่วนการเกิดอาการ
ภาวะแทรกซ้อน ต่ำกว่าในกลุ่มที่ไม่ได้รับระบบการพยาบาลชี้แนะแบบหลากหลายภายหลังการทดลองที่ 12 สัปดาห์อย่างมีนัยสำคัญ
ทางสถิติ ที่ระดับ .05
2. ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับระบบการพยาบาลชี้แนะแบบหลากหลายมีค่าระดับน้ำตาลสะสมน้อยกว่าในกลุ่มที่
ไม่ได้รับระบบการพยาบาลชี้แนะแบบหลากหลายภายหลังการทดลองที่ 12 สัปดาห์ อย่างมีนัยสำคัญทางสถิติที่ระดับ .05
3. ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับระบบการพยาบาลชี้แนะแบบหลากหลายและในกลุ่มที่ไม่ได้รับระบบการ พยาบาล
ชี้แนะแบบหลากหลายภายหลังการทดลอง ที่ 12 สัปดาห์มีค่าระดับความดันโลหิต ไม่แตกต่างกัน
4. ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับระบบการพยาบาลชี้แนะแบบหลากหลายและในกลุ่มที่ไม่ได้รับระบบการพยาบาล
ชี้แนะแบบหลากหลายภายหลังการทดลอง มีค่าระดับไขมันชนิดไม่ดี ไม่แตกต่างกัน
5. ผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งได้รับระบบการพยาบาลชี้แนะแบบหลากหลายมีค่าคะแนนความพึงพอใจมาก กว่าใน
กลุ่มที่ไม่ได้รับระบบการพยาบาลชี้แนะแบบหลากหลายภายหลังการทดลอง ที่ 12 สัปดาห์อย่างมีนัยสำคัญทางสถิติ ที่ระดับ .05

สาขาวิชา พยาบาลศาสตร์
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ลายมือชื่อนิสิต..... รุ่งระวี นาวิเจริญ
ลายมือชื่ออาจารย์ที่ปรึกษา..... รศ. อังสุโรจน์
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SATISFACTION

RUNGRAWEE NAVICHARERN : EFFECTS OF A MULTIFACETED NURSE-
COACHING INTERVENTION ON DIABETIC COMPLICATIONS AND
SATISFACTION IN PERSONS WITH TYPE 2 DIABETES. THESIS ADVISOR :
ASSOC. PROF. POL. CAPT. YUPIN ANGSUROCH, Ph.D., THESIS COADVISOR
: ASSOC. PRO. SUREEPORN THANASILP, D.N.S., 220 pp.

The research quasi – experimental was conducted to examine the effects of multifaceted nurse-coaching intervention on diabetic complications and satisfaction in persons with type 2 diabetes. Forty participants with type 2 diabetes received diabetes care from the 2nd and 11th Red Cross Health Stations centers. Relief and Community Health Bureau who met the inclusion criteria were studied and pair matched to experimental and control groups. The participants in experimental group received the multifaceted nurse coaching intervention and the participants in control group received the usual care over 12 weeks. The data collected were; demographic data, the diabetic complications were measured by patient's self-perception of symptoms of diabetic complications, physiological variables including HbA1c level, blood pressure, LDL-C level and satisfaction. These instruments were validated by 5 experts and the reliability of the questionnaires were 0.82 and 0.93, respectively. The data were analyzed using dependent samples T-test, independent sample T-test and two proportion z-test.

Results were as follows:

1. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention had lower proportions of perceived symptoms of diabetic complications (hyperglycemia) than persons who did not receive the intervention at the 12th week.
2. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention had lower HbA1c levels than persons who did not receive the intervention at the 12th week.
3. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention had no significant blood pressure difference from persons who did not receive the intervention at the 12th week.
4. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention had no significant LDL-C difference from persons who did not receive the intervention at the 12th week.
5. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention had higher satisfaction scores than persons who did not receive the intervention at the 12th week.

Field of study Nursing Science
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Co-advisor's signature *Sureeporn Thanasilp*

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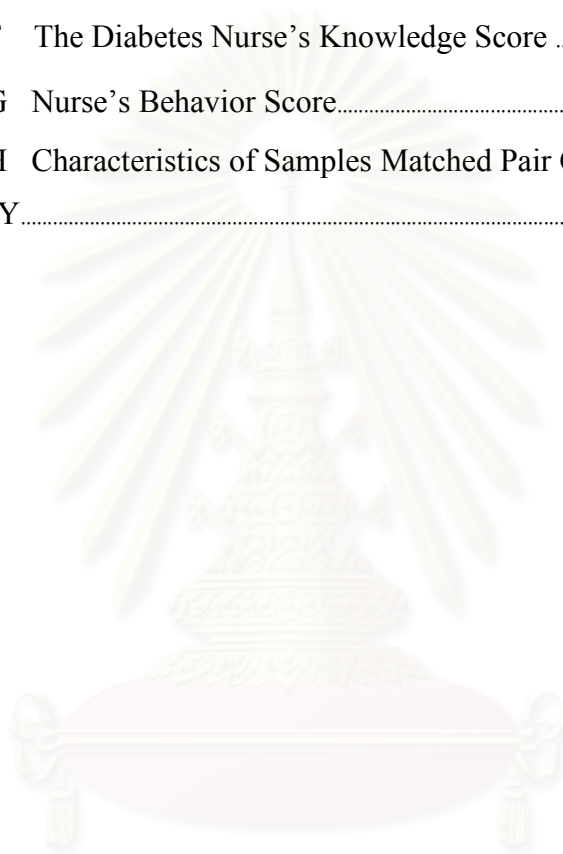
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สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

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CHAPTER 1

INTRODUCTION

BACKGROUND AND SIGNIFICANCE

According to the 9th and 10th Health Development Plans, the emphasis was the persons-centered holistic care, accessible health utilization and continuing care (Wibulpolprasert and Siasiriwattana, 2001). The aims of these plans were: to focus on delivering quality care, to provide the strategy to build stronger communities services which are building-blocks for the nation, and to develop a dependable community-level economy that co-exists harmoniously with the nature and environment (Koomsin, 2007). According to the plans, nursing service system in chronic care area needs to change in the design of delivery system (Boonthong, 2000). Nursing, among other social services, have been significantly affected throughout the delivery care process (Pagaiya and Garner, 2005: 471-477). The process of care delivery also needs to improve in order to suit the client's needs (Boonthong, 2000) and to have patient-centered attitude, i.e., a holistic care system with accessible health utilization as well as continuing care. This improvement would increase patient's satisfaction (Randles and Valanis, 2007: 119-137) and it is aspected to prevent or delay subsequent complications resulting from the disease and treatment (Aubert and Herman, 1998: 605-612; Blonde and Dempster, 2006: 524-533; Chuk, 1997: 501-506; Sikka and Waters, 1999: 1-6).

Chronic illnesses have become health problems worldwide. The WHO (World Health Organization, 2006) has defined chronic diseases as having one or more of the following characteristics: permanent disease, leaving residual disability, non-reversible pathological alteration, requiring special training for rehabilitation, or requiring a long period of supervision, observation or care. Increasing number of persons with chronic diseases are being managed in primary care units by general practitioners and other primary healthcare professionals, often in collaborative arrangements with specialized services. New paradigms of care are driving a shift from acute tertiary hospital care to patient-centered, home-based and team-driven care requiring new skills, disciplinary collaboration and continuity of care (World Health Organization, 2006).

Among all chronic diseases, diabetes is increasing threat to the world's public health. Its prevalence has been increasing rapidly around the world (World Health Organization, 2006). Recently, the estimated prevalence of diabetes in all age groups has been increasing from 171 million in 2000 to 366 million in 2030 worldwide (Wild, 2004: 1047-1053). In Thailand, the number of persons diagnosed with diabetes was expected to increase from 3.4 –4 % in 1987 to 9.6 % in 2000 (Aekplakorn and Stolk, 2003a: 2758-2763). This increasing prevalence rate is estimated in Thai adults aged of ≥ 35 years (Aekplakorn, 2003b: 2758-2763). Approximately, 94 % of the persons with diabetes were type 2 diabetes and most of them received healthcare services in their community level. The consequence of chronic hyperglycemia leads to diabetic complications such as coronary heart disease, stroke, renal failure, foot ulcer and blindness (Isomaa, 2001). Generally, Thai persons with type 2 diabetes were often close to chronic complications particularly cardiovascular diseases (Pratipanawatr and Rawdaree, 2006: S60-65). Because of these evidences, the researcher was interested in studying persons with type 2 diabetes.

In the view of diabetes management, diabetic complications mean a second disease or a disease concurrent with another disease or concurrent of two or more diseases in the same patient or an acquired disease (Dorland's illustrated: medical dictionary, 1974; Wray and Blaum, 2004: 62-81). Complications of diabetes can be divided into acute and chronic or long-term complications (Ignatavicius, 1995). Acute complications were hyperglycemic hyperosmolar non-ketotic syndrome (HHNS) and hypoglycemia unawareness. These can occur at any time in the course of the disease and treatment, and its severity leads to emergency admission (McAulay and Deary, 2001: 690-705). Other chronic complications are macrovascular complications or cardiovascular diseases (heart disease, peripheral vascular disease and stroke), and microvascular complications such eye diseases (diabetic retinopathy, cataracts, glaucoma), nerve damage (neuropathy) and kidney damage (nephropathy) (Wirta and Pasternack, 1995: 177-185).

The impact of these diabetic complications can cause of excessive morbidity, mortality, hospitalization and loss of function. Heart diseases or coronary heart diseases are the leading cause of death in persons with type 2 diabetes. These diseases often become visible earlier in life; they affect the female more than male, and they are frequent fatal compared to those without diabetes (Hu & Stampfer,

2002). Furthermore, the hazard of cardiovascular disease (CVD) mortality is in fact five times higher in the age range of 30-49 and 40-59 years for diabetic individuals as compared to persons without diabetes (Roper & Bilous, 2002; Saydah & Eberhardt, 2002). The median life expectancy is estimated to be eight years lower for diabetic adults aged 55-64 years (Gu and Cowie, 1998: 1138-1145). Blindness and foot ulcer cause disability. Unfortunately, evidence has shown that the prevalence of diabetic complications in persons with type 2 diabetes receiving the majority of their care in Thai community was dissatisfactory (Nitiyanant and Chettakul, 2007: 65-71). The results presented high incidence of diabetic complications such as retinopathy (13.6%), proteinuria (17.0%), end stage renal failure (0.1%), peripheral neuropathy (34%), acute foot ulcer/gangrene (1.2%), healed foot ulcer (6.9%), stroke (1.9%) and myocardial infarction (0.7%). The number of these diabetic complications showed that necessary, routine assessments were not regularly practiced by healthcare providers in primary care units (Nitiyanant, 2007: 65-71). If left without earlier management, these devastating complications (Downs, 1998: 1615-1622) resulted in cognitive impairment, lost days from work, unemployment and poor quality of life (Lloyd, 2001b: 392-400) and poor process of care (Clarke and Gray, 2003: 442-450; King and Aubert, 1998: 1414-1431).

Diabetic complications can be measured as a subjectivity which assessed by perceived symptoms of diabetic complications. The reason for assessment of diabetic complications as subjectivity and objectivity are two folds. Firstly, symptom is a subjective assessment of diabetic complication, the factual occurrence of symptomatic microvascular complications in persons with type 2 diabetes is more reliably measured than asymptomatic complications. Without receiving any assessment at all, the complications would be found incidentally or by screening (Schellhase and Koepsell, 2005: 125-130). Secondly, the symptoms of diabetic complications are noticeable to persons (Garcia, 2005: 543-554). For examples, high blood sugar level more than 180 mg/dl in persons with type 2 diabetes often present frequent urination at night, blur vision, weight loss without controlling and fatigue (Drivsholm and de Fine Olivarius, 2005). Hypoglycemia is a condition that the blood sugar level is lower than 60 mg/dl; it manifests as hunger, dizziness, headache, irritability, trembling, sweating, rapid heart beat and a cold, clammy feeling). From the above evidences, peripheral neuropathy was highly found, up to 34% among persons with diabetes in Thai communities. This complication is related to hyperglycemia and

appears as tingling sensation, burning, pinprick and numbness (Vileikyte and Leventhal, 2005: 2378-2383). These can create distress and also disrupt daily activities (Dodd and Janson, 2001: 668-676). Presumably, this often prompts persons with type 2 diabetes to seek for care. Therefore, the researcher preferred the assessment of symptomatic complications in this study.

On the other hand, objective assessment of diabetic complications should be taken, especially on risk factors for micro-macrovascular complications. HbA1c is an outcome of process of care which presents the self-management of persons with type 2 diabetes in previous 6-12 weeks (Halwachs-Baumann and Katzensteiner, 1997: 511-517). This outcome was a strong predictor developing microvascular disease and macrovascular disease (Standl and Balletshofer, 1996: 1540-1545). To reduce the disease, the goal of the treatment for HbA1c is lower than 7% (American Diabetes Association, 2007: S4-41). Other assessment outcomes were blood pressure and LDL-C level, hypertension was defined as blood pressure $> 140/90$ mmHg. The development of macrovascular endpoints is associated with blood pressure $> 130/80$ mmHg and LDL-C level is higher than 100 mg/dl. These outcomes are predictors of macrovascular disease especially cardiovascular disease (American Diabetes, 2008: S12-54). The International Diabetes Federation called for controlling those outcomes for reducing vascular diseases among individuals with diabetes (International Diabetes Federation, 2005).

Actually, this diabetic complications can be prevented or reduced, if the persons with type 2 diabetes can perceive something that has gone wrong such as their symptoms of diabetic complications. This will lead them to focus on management (Ratanasuwan and Indharapakdi, 2005: 623-631; Skelly and Carlson, 2005: 213-220) and control their blood sugar especially HbA1c, blood pressure and LDL-C level as near normal (Schellhase and Koepsell, 2005 125-130). To reach the goal of diabetes management, persons with type 2 diabetes need self-management skill that includes diet control, physical activity and exercise, medication, stress management, hygienic and foot cares. These complex management requires multifaceted approaches to help change their behaviors (Whittemore, 2000). Additionally, they must access to the learning program of diabetes self management and behavior change (Mensing and Boucher, 2007: S96-103; Skinner and Carey, 2006: 369-377). However, several studies reported that self-management skills of persons with type 2 diabetes were not enough to change their behavior. A lot of persons with type 2 diabetes were still

lacking exercise, choosing inappropriate food, stopping medication by themselves, lacking the knowledge and skills to care their feet ((Borisut, 1997: 121; Keeratiyutawong, 1994: 139; Lertprapai, 1996: 189; Pornviriyasup, 1997: 113).

A conceptual review reported that increasing knowledge and skills to change behaviors in persons with type 2 diabetes need an intervention which focus on patient center, continuing care, patient-provider interaction, goal setting and problem solving strategy (Peyrot and Rubin, 2007: 2433-2440). Although there were many programs that provide diabetes self-management education, the programs offered overwhelm information and focused on didactic knowledge to the persons with type 2 diabetes. The previous program did not provide the goal setting for behavior change and persons with type 2 diabetes did not receive continuing care of knowledge and skills as their needed (Likitratcharoen, 2000). They had no sense of engagement in the diabetes self-management education, and lead to low adherence (Rittichu, 2002). Although persons with type 2 diabetes had a lot of knowledge (Gingkokgraud, 1997: 139), they could not translated it into skills for behavior change (Wagner and Austin, 2001: 64-78). Currently, self-management interventions have to deal with a wide range of psychological problems related to diabetes, such as stress and high rates of depression (Anderson and Freedland, 2001: 1069-1078). It is extensively accepted that a single or irregular interventions are insufficient to promote a stable change. Frequent interventions and regular follow-ups over an extended period of time appear necessary to promote a long-term change (Norris and Engelgau, 2001: 561- 587; Sacco and Morrison, 2004: 113-118).

Currently, effective chronic disease programs have to help persons with type 2 diabetes access to providers for decision support facilitated through evidence based guidelines and to persons for self-management education and team-based care (Siminerio and Piatt, 2006: 253-260). Nevertheless, the care delivery in primary care unit or community care in Thailand are very complex, nurses are the forefront of healthcare services (Hanuchurnkul, 2001: 365-365) and perform a key role in improving the health and well-being (Hanuchurnkul, 2007: 83-93). A study supported that scope of practices have been delivered by nurses in this area such as health promotion and protection; care of chronic illness and conditions, care of dying persons at home, treat minor illness and injury and management of healthcare system. Healthcare service which is often delivered were diagnosis and treatment of common health problems (88.2%), the second were delivering healthcare for the elderly

(87.9%), and the third were providing continuity of care for the chronically ill persons (85.4%) (Hanucharunkul and Suwisith, 2008). With the complex nurses' tasks, primary care service could be provided very limit intervention of health education such as diabetes self-management education for persons with type 2 diabetes receiving treatment. Moreover, the limitation could be found that lack of nursing knowledge, skills, attitudes and beliefs that may also significantly alter their approach to management (Aekplakorn and Suriyawongpaisal, 2005: 741-747).

Such the limitations might take place because the specific skills for diabetes self-management education require for fostering ongoing behavior change have not either been well defined or routinely emphasized in undergraduate health profession training or continuing education program (Antrobus, 1997: 829-835). Although these skills of counseling would be especially important (Vijan and Stevens, 1997: 567-580). The nurses were not prepared to deliver effective teaching and counseling skills that specific for their work to assess adherence, provide direct instruction, promote adherence during follow up and help the persons with type 2 diabetes in problem solving (El-Deirawi and Zuraikat, 2001: 95-100). From the chart reviewed, the nurse did not record the education for advice; they also did not provide the clinical information of diabetic complications such as perceived symptom of diabetic complications, foot examination, and HbA1c. Therefore, improving the quality of care in nursing service requires input, effective care process to achieve health outcomes. This was extreme attention and a structured approach to help the persons with type 2 diabetes change behavior and prevent or delay the subsequent diabetic complications (Blonde and Judith: 524-533).

Coaching has become acceptable in both business and individuals to help improve performance, manage stress and achieve work and personal goals (Palmer and Tubbs, 2003 91-93). The process of coaching has been used in various clinical practices including to improve nurse-patient interaction (Whittemore and Melkus, 2004: 795-804), to assist patient management with procedures (Brown and Butow, 1999: 242-248), to train the patients, to improve their health conditions (Holland and Greeberg, 2005: 697-716; Patharavichein, 2004) and to improve staff teaching (Jirattikarn, 2004). Coaching is the process to help persons change their behavior (Huseman, 2007: 19-20). This concept is based on psychological intervention consisting of a step-by-step approach in which interventions take place in a specific progress. This progression consists of five major steps: constructing a problem

definition, collaborative goal setting, collaborative problem solving, contracting for change and continuing support (Peyrot, 2007: 2433-2440). In this study, coaching is based on Eaton (2001). The process help persons with type 2 diabetes change their behavior. It is composed of assessment, goal definition, explore, analysis, learning, action plan and feedback. These steps are run in a cycle for change behavior to reduce diabetic complications in individual persons with type 2 diabetes through face-to-face meeting, e-mail and telephone contacts (Sacco, 2004: 113-118).

From literature reviewed in western countries, a randomized controlled trial was conducted in persons with diabetes with poor controlled diabetes receiving multidisciplinary diabetes care management and usual care. The diabetic nurse educator acted as a leader in the outpatient care and also collaborated to the team care. The results showed that the participants receiving this intervention showed an improvement in HbA1c level at the end of the intervention and had higher level of satisfaction with diabetes care (Sadur and Moline, 1999: 2011-2017). Other study has presented that persons with type 2 diabetes attending a clinic where was led by nurses having improved HbA1c levels. The group that received care from the nurse had also lower HbA1c than those who got the usual care (Aubert, 1998: 605-612). In yet another study, persons with type 2 diabetes attending a diabetes clinic with a nurse, compared with those getting the usual care, had lower mortality and a lower incidence of adverse clinical events (myocardial infarction, angina, revascularization procedures, end stage renal disease) after a median follow up of seven years (So and Tong, 2003: 606-615). A Cochrane review suggested that persons with diabetes visiting the nurse in diabetes care service could improve their healthy behaviors and patients' outcomes in diabetes; this study summarized that nurses could even substitute physicians in delivering many aspects of diabetes care, if detailed management protocols are available, or if they receive training (Bodenheimer and MacGregor, 2005: 612-613; Renders and Valk, 2001: 1821-1833).

Relief and Public Health Bureau is a part of The Thai Red Cross Society which composed of the 12 Red Cross Health Stations branches all over Thailand , theses health station are located in the community and served as a primary care units to support disaster and health service for public health. Red Cross Health Station is similar to a patient care unit in the community; the scope of its practices has been delivered by nurses as mentioned above. Additionally, Red Cross Health Stations in Bangkok provide health services for chronic care such as diabetes, hypertension and

gout disease. There are eight nurses in the 2nd Red Cross Health Station and five nurses in the 11th Red Cross Health Station. The multidisciplinary care team also includes a family physician, an ophthalmologist and a surgeon. The nurses in both areas work in collaboration as a team. The activities of nurses are associated with diabetes self-management; however, education has not been well established in the health stations because of their overwhelming workloads. On each working day, the nurses are assigned for functional nursing care which is aimed to follow medical treatments and focus on tasks rather than having patient-centered orientation. They provide few times for basic teaching techniques and apply few nursing processes such as assessments, clarifying objectives and evaluating the patients learning to assist them to establish and maintain therapeutic behavior change. In addition, the nurses did not provide counseling and routine engagement to the persons with type 2 diabetes for their problem solving. Actually, this provision could assist the persons with type 2 diabetes to deal with obstacles to self-management that hinder achievement of their therapeutic goal (Vale and Jelinek, 2002: 245-252). They do not have the practical guidelines to support their decision. Evidently, the primary care services in the Red Cross Health Stations need to be changed.

The American Diabetes Association (2008) supports that improved care delivery, early assessment and self-management are keys to the prevention of diabetes complications and this delivery can increase patient satisfaction (Venkat Narayan and Gregg Edward, 2003: 64-70). A chronic care model (CCM) for delivering quality care to persons with diabetes has showed to improve diabetes outcomes (Wagner and Austin, 1996: 511-544). The model has been developed from evidence-based practices. The assumption of the model is to improve nursing care, and this model needs an approach that includes patient, care provider and systematic intervention (Fiandt, 2006). The components of CCM include decision support, clinical information systems, self-management and delivery system redesign. The key elements critical to achievement are: (1) health system, to serve as the foundation by providing structure and goals; (2) community, to link with community resources; (3) decision support, to ensure that care providers have access to evidence-based guidelines; (4) self-management support, to help persons with type 2 obtain skills and confidence to self-manage and focused on patient-centered care, goal-setting; (5) clinical information systems, to provide timely access to registry data about patients and patient populations using clinical information systems; and, (6) delivery system

design, to restructure medical practices to facilitate team care that involves nurses in delivering care (Siminerio, 2006: 253-260). In this study, the selected elements of model: decision support, clinical information systems and delivery system design, and self management support (Wagner and Austin, 1996:12-25) were integrated to help the persons acquire self-management skills and consequently reduce diabetic complications.

As mentioned above, the nurse researcher recognized that community care setting was the forefront of the healthcare system. Therefore, the researcher developed a multifaceted nurse-coaching intervention which uses a structural approach. This intervention is based on system theory (Bertalanffy, 1968), chronic care model (Wagner, 1996: 511-544) and coaching process (Eaton and Johnson, 2001a). The intervention is aimed to prepare nurses as a proactive team to inform and activate persons with type 2 diabetes. The delivery system design is the structure of traditional care that has been altered; the researcher created a proactive nurse team to inform and activate persons with type 2 diabetes. The nurse delivered multifaceted approach via individual coaching process through face-to-face meetings and telephone contacts including assessment, goal definition, explore, analysis, learning, action plan and feedback. This process focused on diabetes self-management education using educational materials to help persons with type 2 diabetes construct their problem definition, collaborative goal setting, collaborative problem solving, contracting for change, continuing support. To facilitate the progress toward change, they tailored the intervention depending on the need of the individuals, if the persons with type 2 diabetes were ready to change. The process could help the persons increase their cognitive knowledge and acquire self- management skills. The nurse also used manual plan as a guideline to support their decision, and use the clinical information of persons with type 2 diabetes such as perceived symptoms of diabetic complications, HbA1c, blood pressure and LDL-C level, and foot examination.

To gain knowledge in nursing practices, this study tested a multifaceted nurse-coaching intervention to increase knowledge and self-management of persons with type 2 diabetes in community setting by improving their diet control, physical activity and exercise, medication used, stress and hygienic managements and foot care for the control of HbA1c, blood pressure and LDL-C level. Thereby, they prevent or delay the onset of diabetic complications. This strategy could facilitate diabetes self-management. Finding from this study may be generalized to all situations of

persons with type 2 diabetes in community setting and this will be possibly important implications for persons with many chronic illnesses. Moreover, this study can be applied in the care for persons with diabetes in other community settings and this will be possibly important implications for persons with chronic illnesses. Moreover, knowledge will contribute to the improvement of nursing practices in the care for persons with diabetes in community care setting or chronic illness areas.

Research Question

Does the multifaceted nurse-coaching intervention reduce diabetic complications which were measured by perceived symptoms of diabetic complications, and increase patient satisfaction with intervention in persons with type 2 diabetes at the 12th week?

Research Objective

To study the effects of a multifaceted nurse-coaching intervention on diabetic complications and patient satisfaction with intervention on persons with type 2 diabetes.

Research Specific Objectives

1) To test the differences between diabetic complications which were measured by using perceived symptoms of diabetic complications and physiological factors such as HbA1c, blood pressure, and LDL-C level between persons with type 2 diabetes receiving a multifaceted nurse coaching intervention and those who did not received the intervention.

2) To test the differences between patient satisfaction with nursing service between persons with type 2 diabetes in the experimental group who receive a multifaceted nurse coaching intervention and the control group who did not received the intervention.

Rational and Hypothesis

Diabetic complications are health problems in community care or primary care service. Both microvascular disease and macrovascular diseases were indicated that current systems of healthcare are delivered at suboptimal level in the area of community care (Nitiyanant, 2007: 65-71). Strong evidence suggested that prolonged

hyperglycemia was the principle cause of retinopathy, nephropathy, neuropathy in type 2 diabetes. Improving management of hyperglycemia is likely to delay the onset and progression of microvascular disease (UK Prospective Diabetes Study (UKPDS) Group, 1998: 837-853). A good control of blood pressure and LDL-C level presented significantly in the reduction of macrovascular complications such as cardiac disease in persons with type 2 diabetes (U. K. Prospective Diabetes Study Group, 1998: 703-713). This improvement of health outcomes offered the structure approach that achieved the health outcomes.

According to improve the quality of care in diabetes care service, the researcher used concepts of coaching model to guide for the intervention. This model seemed to be a process that helped nurse improve outcomes in the structure. According to Bertalanffy (1968), improve health outcomes should be recognized the process and structure (input). A multifaceted nurse-coaching intervention in this study is a structure approach. Input was the community nurses and persons with type 2 diabetes. The researcher developed the multifaceted nurse-coaching intervention as a process of care. The outcomes were perceived symptom of diabetic complications, HbA1c, blood pressure, LDL-C level and patient satisfaction. This intervention was aimed to inform and activate proactive nursing team to use coaching process via face-to-face individual meeting and telephone encouraging persons with type 2 diabetes. The multifaceted nurse-coaching intervention focused on diabetes self-management by adhering to medication, making relevant behavior changes, and monitoring their progression of diabetic complications. Moreover, the intervention had enable self management support including instruction, manual guidelines. Therefore, treatment goals to prevent or delay diabetic complications might be achieved.

There was evidence using a multifaceted nurse coaching for American women with type 2 diabetes (Whittemore, 2004: 795-804). The purpose of this study was to examine the efficacy of a multifaceted nurse-coaching intervention provided after diabetes education for women with type 2 diabetes. The results presented that women receiving the nurse-coaching intervention with multifaceted approach demonstrated significantly better diet self-management, psychosocial adaptation (less psychosocial distress and better integration), with a trend toward better exercise self-management and improved BMI. Although the HbA1c levels decreased in both groups at 12 weeks, the difference between groups was not significant. Finally, participants in the

nurse-coaching intervention report significantly greater satisfaction in the care than women in the control group at the 12th week.

A report from meta-analysis of 31 RCTs which based on patient-centered education and self-management interventions in diabetes revealed a mean 0.75% absolute reduction in HbA1c (Norris and Lau, 2002: 1159-1171). Another suggested that psychological intervention in which addressed individuals' cognitive and emotional functioning could reduce HbA1c by 1%. The finding from this study suggested that the usefulness of the motivational interviewing techniques and counseling strategies focused on Bandura's theory of self-efficacy and goal setting based on clinical information (Ismail and Winkley, 2004: 1589-1597). Moreover, other evidences supported that chronic care model (Wagner, 2001: 64-78) which composes of decision support, self management support, clinical information, healthcare system support, and prepared proactive team to inform and activated persons is effective to improve glycemic control level (HbA1c) (Siminerio, 2006: 253-260). Therefore, these multifaceted concepts present benefits for utilize and integrate into practice in order to improve quality of care.

The RCT research presented convincingly evidences to demonstrate major therapeutic benefit of the educational service offered by health professionals such as nurse (The Diabetes Control and Complications Trial Research Group, 1993: 977-986; United Kingdom Prospective Diabetes Study (UKPDS), 1998: 837-853). The current deliver system design showed that the nurse had done a great job on early assessment of diabetic complications (Sikka, 1999: 1-6), providing diabetes education and performing counseling to improve self-management skill of persons with diabetes (Norris, 2001: 561- 587). As a result of knowledge, skill and attitude on self-perception of persons with type 2 diabetes, and increased early assessment of diabetic complications are performed regularly and the diabetic complications are prevented or delayed (Mensing, 2007: S96-103).

Thus, the researcher proposes the multifaceted nurse-coaching intervention as a program for nursing practices to control blood sugar level resulting in prevention or delay progression diabetic complications at outpatient department by using coaching process as a guide to conduct the effective care which integrating with chronic care model. This intervention consists of a number of activities that nurse performs to improve the outcomes in persons with type 2 diabetes. In delivery care system redesign, the variety of activities based on chronic care model is integrated for

enhancing care management roles, planning visits, improving the visit system, providing proactive follow-up, and implementing patient education. The majority is also providing resources and tools to persons with type 2 diabetes and professional working with type 2 diabetes in care planning. Implementation guideline and provider education training are needed (Wagner and Austin, 1996: 12-25). Using this conceptualize theory, the hypothesis are as follows:

1. Persons with type 2 diabetes who received the multifaceted nurse-coaching have lower in the number of perceived symptoms of diabetic complications than those who did not receive intervention.

2. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in HbA1c level than those who did not receive intervention.

3. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in blood pressure (systolic and diastolic blood pressures) level than those who did not receive intervention.

4 Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in LDL-C level than those who did not receive intervention.

5. Persons with type 2 diabetes who received the multifaceted nurse-coaching had higher satisfaction score than those who did not receive intervention.

Scope of the Study

The researcher indicated the scope of the study as follows:

1. A quasi-experimental design will be conducted to examine effects of a multifaceted nurse-coaching intervention on diabetic complications in persons with type 2 diabetes at Red Cross Health Stations in Bangkok.

2. The population has been divided into 2 groups:

2.1 The registered nurses who delivered diabetes self-management education to persons with type 2 diabetes at the Red Cross Health Station in Bangkok.

2.2 Persons with type 2 diabetes who had high fasting blood sugar > 130 mg/dl, 2 consecutive times and received diabetes management from a family medicine at the Red Cross Persons Health Stations in Bangkok.

3. The intervention variable is a multifaceted nurse coaching intervention. The dependent variables were perceived symptom of diabetic complications, HbA1c level, blood pressure level, and LDL-C level, and patient satisfaction with intervention.

Operational Definition

1. **Multifaceted nurse-coaching intervention** refers to a program which was a part of process of delivery diabetes management based on system theory, chronic care model and coaching focused on patient-centered by further developing a cognitive educational and behavioral intervention. The program was developed to increase cognitive knowledge and skills for changing behaviors in individual person with type 2 diabetes. The program was tailored diabetes self-management information to address the complexity of management including general knowledge of diabetes and diabetic complications, diet control, physical activity, medication, stress management, hygienic and foot care. The program of skills for changing behaviors was delivered seven steps of the coaching process which composes of assessment, goal definition, analysis, exploration, actions plan, learning and feedback at each approach. The nurse coach facilitated integration of diabetes self-management into the patients' daily lives. The content of diabetes self-management education was tailored as the individual need to know and practice for setting the goal. The approaches were face-to-face meeting with the person every two weeks for three times and telephone calls for follow-ups twice over three months.

2. **Nurse Coaches** refer to the community nurses who were trained in the program of the multifaceted nurse coaching and take responsible for delivering diabetes self management education to increase knowledge and acquired self-management skills to persons with type 2 diabetes consequently to prevent diabetic complications in persons with type 2 diabetes. The diabetes self management education via the coaching process as face-to-face with the individual participant and using the telephone to follow up and feedback the action plan.

3. **Usual care** refers to the common nursing activities in the Red Cross Health Station that were delivered to persons with type 2 diabetes on chronic care day. These activities included providing queue for persons person with diabetes visiting to a family physician, measuring blood pressure, taking laboratory testing such as, blood sample, giving basic information, delivering the prescribed medication to persons with type 2 diabetes and persons with type 2 diabetes received treatment and information from the family physician.

4. **Diabetic complications** refer to conditions of a secondary disease or an acquired disease that occurs from uncontrolled blood sugar level and treatment which are divided into acute and chronic complications (Schellhase, 2005 125-130). These

complications could be measured subjectively and objectively. The subjective assessment of diabetic complications is composed of perceived symptom of diabetic complications (Garcia, 2005: 543-554) and the objective assessment of diabetic complications is measured by HbA1c, blood pressure and LDL-C level (Drivsholm and Olivarius, 2005: 210-214).

4.1 Perceived symptoms of diabetic complications refer the perceived symptom occurrence, frequency, distress related to daily activity of life of persons with type 2 diabetes. Perceived symptoms of these diabetic complications were measured self-reported using diabetes covering six dimensions (Grootenhuis and Snoekb, 1994: 253-261). The symptoms of diabetic complication were specific manifestations mainly due to hyperglycemic, hypoglycemia and/or chronic complications. A self-perception of the symptoms of diabetic complication which measures both the occurrence, frequency, distress related to daily activity of life and may be complications.

4.1.1 Hyperglycemic symptoms refer to a classical high blood sugar symptoms. The perception of these symptoms included frequent hunger, frequent thirst, frequent urination, fatigue, weight loss, dry mouth, stupor and progressing to coma.

4.1.2 Hypoglycemia refers to a condition of low blood sugar level that is less than 60 mg/dl. The perception of symptom include hunger, dizziness, headache, irritability, trembling, sweating, rapid heart beat, and a cold clammy feeling.

4.1.3. Ophthalmologic complications were diabetic retinopathy, retinal detachment or macular edema or any other visual impairment resulting from diabetes. The perception of symptoms included floaters or black eye spot, blurred vision, flash and deteriorating vision (Schellhase, 2005 125-130).

4.1.4 Neuropathy refers to a group of disorder involving the nerves. The symptoms included tingling sensations or numbness, burning or shooting or stabbing pain in the toe and fingers, diarrhea and erectile dysfunction (Vileikyte, 2005: 2378-2383).

4.1.5 Cardiovascular diseases often refer to angina, heart attack and stroke. The perception of symptoms of the heart attack was chest pain, tightness, squeezing, the pain that may spread to the shoulder, arm, jaw, neck and back. The symptoms of stroke or cere-brovascular disease include sudden numbness or

weakness of the face, arm or leg, especially on one side of the body (Lloyd and Sawyer, 2001a: 392-400).

4.1.6 Peripheral vascular disease refers to the situation of insufficient tissue perfusion caused by existing atherosclerosis that may be acutely compounded by either emboli or thrombi. The perception of symptoms of intermittent claudication or calf pain are precipitated by walking a predictable distance and are relieved by rest (Stephens, 2007).

4.2 The objective assessment of long-term complications were measured by physical examination and laboratory testing which include assessment of risk factors for developing diabetic complications including HbA1c, blood pressure and LDL-C level.

4.2.1 HbA1c level referred to Glycohemoglobin that was a blood test to check the amount of sugar (glucose) bound to hemoglobin. It reflects an average of blood glucose levels, over a shorter period of 6-12 weeks (Rhee and Slocum, 2005: 240-250). This test can be done any time during the day, and after a meal. The normal blood sugar level was 4-6 %. If the blood level is higher than 7 %, this possible presents non-adherence to diabetes management. It was measured by ion-exchange chromatography and subsequently by automated high-performance liquid chromatography (Halwachs-Baumann, 1997: 511-517).

4.2.2 Blood pressure level referred to the force exerted by circulating blood on the walls of blood vessels, and constitutes one of the principal vital signs. Blood pressure was measured as systolic blood pressure and diastolic blood pressure. High blood pressure refers to systolic blood pressure that is higher than 140 mmHg and diastolic blood pressure that is higher than 90 mmHg. Blood pressure is measured in millimeters (mmHg) by using mercury sphygmomanometer and each person is measured on the left arm after he or she has rested for at least 5 minutes.

4.2.3. LDL-C level referred to the concentration serum total cholesterol, which was a white crystalline substance and measured in milligrams per deciliter (mg/dl). LDL-C cholesterol levels related to coronary heart disease is defined as LDL-C > 100 mg/dl.

5. Satisfaction in persons with type 2 diabetes referred to the persons perceived to the nursing intervention which they received from the nurse at a Red Cross Health Station in Bangkok. The perception of the persons with type 2 diabetes should be in

congruence with the expected quality of nursing care and the actual received care. The measurement was used patient satisfaction questionnaire which based on the concept of access of Penchansky and Thomas (1981). Herein, there are five components involved, namely: affordability, availability, accessibility, accommodation and acceptability.

5.1 Affordability referred to the relationship persons between the precision of the service and the provider insurance or deposit requirements to the Persons with type 2 diabetes's outcomes, ability to willing persons pay for services or pay for traveling and existing health insurance.

5.2 Availability refereed to the relationship of the adequacy of the supply of physicians, nurses, and other healthcare providers and of facilities including clinics and other special programs and services to meet the needs.

5.3 Accessibility referred to the relationship of easy approach or physically enters of the healthcare provider's location, taking account of transportation resource; travel time, distance, cost and the physicians visiting that meet the needs.

5.4 Accommodation referred to the relationship of schedule appointment system, hours of operation, walk in facilities, telephone services and the abilities of persons with type 2 diabetes to accommodate that meet the needs.

5.5 Acceptability referred to the relationship of specific reaction of persons with type 2 diabetes to nurses, attributed to the location of services, the impact of travel time distance, cost and effort of use that meet the needs.

5. Persons with type 2 diabetes refer to Persons individuals who are diagnosed as non-insulin dependent diabetes mellitus and receive the oral hypoglycemic regimen through diabetes care service at a Red Cross Health Station in Bangkok.

Expected benefits

The benefits of this intervention may implement in three areas, namely:

1. Nursing Management: Nurse managers may provide this program to other areas to improve the quality of care.
2. Nursing education: Nurse instructors may develop the curriculum to the student nurse by adding this model to the course.
3. Nursing research: Nurse researchers may utilize and synthesis the knowledge to find new gaps for further research.

CHAPTER 2

LITERATURE REVIEWED

This study was aim to evaluate effects of a multifaceted nurse-coaching intervention in the persons with type 2 diabetes. This chapter presents profile of persons with type 2 diabetes, diabetic complications in persons with type 2 diabetes, nursing service in community for persons with type 2 diabetes, a multifaceted nurse-coaching intervention and research studies on related variables on this study. The researcher reviewed and analysed the literature for extensive reading in several main subjects' area as following:

1. Profile of persons with type 2 diabetes
2. Diabetic complications in persons with type 2 diabetes
 - 2.1 Definition of diabetic complications
 - 2.2 Types of diabetic complications and pathophysiology
 - 2.3 Factors contributing to diabetic complications
 - 2.4 Assessments of Diabetic Complications
 - 2.4.1 Subjective assessment: Perceiving Symptoms of diabetic complications
 - 2.4.2 Objective assessment: Physical assessment and laboratory testing
 - 2.4.2.1 HbA1c level
 - 2.4.2.2 Blood Pressure level
 - 2.4.2.3 LDL-C level
3. Roles of a community nurse for reducing diabetic complications
 - 3.1 Diabetes management and prevention of diabetic complications
 - 3.2 Diabetes self-management education
4. Role of a community nurse
5. A multifaceted nurse-coaching intervention
6. Patient satisfaction with intervention
7. Research studies on related variables on this study

1. PROFILE OF PERSONS WITH TYPE 2 DIABETES

Diabetes was a chronic disease which characterized high blood sugar in the blood stream (Misra,1994: 101). Type 2 diabetes was characterized by the emergence of postprandial and fasting hyperglycemia (ADA, 2003). This type was frequently not diagnosed until complications become visible, and approximately one-third of all persons with diabetes may be undiagnosed. (American Diabetes Association, 2007: S4-41). This part describes the prevalence and incidence of diabetes type 2, pathophysiology, and diagnosis and self-management activities.

1.1 Prevalence and Incidence of Type 2 Diabetes

The prevalence of diabetes increased worldwide. The World Health Organization (WHO) estimated that there were 177 million people with diabetes worldwide in 1995, and predicted the prevalence surpass 300 million by 2025 (King et al.,1998: 1414-1431). A similar increase was occurring in Thailand especially decades, during which time migration from rural area to cities was accompanied by lifestyle and diet changes. In 1965, the population of Thailand had diabetes less than 2.5% (Nitiyanun, 1999; Benjasuratwong, et al 1999), by the year 2000, the estimated national prevalence of diabetes in Thai persons was 9.6%, approximately 95% have type 2 diabetes; 50% of these people have been diagnosed and the other 50% were as yet undiagnosed and do not know they have diabetes (Aekplakorn, 2003). Moreover, the prevalence of diabetes in Thailand differs among regions, with the highest prevalence in Bangkok, and the North (Maikoom, 1997). Several studies found that approximately 70-80% attending diabetic care clinics have hyperglycemia more than 140 mg/dl (Lawang, 1999; Rittichu, 2002; Sihasadhi.S., 2003; Thanamai, 1995). Prolong hyperglycemia more than this level could lead to diabetic complication in 5-10 years (Morsanutto et al.,2004: 1841-1842).

1.2 Pathophysiology

The Pathophysiology of Type 2 diabetes has been definitively identified. Insulin production was firstly unimpaired, but cell tissues were resistant to insulin. In the beginning insulin levels increase in response to the elevation of blood glucose and compensate for insulin resistance for a time. However, after several years, insulin production fails to keep up to the body's demands (Peyrot et al., 1999). In most individuals with type 2 diabetes, hyperglycemia results from a failure of β -cell insulin-secreting capacity to adequately compensate for insulin resistance in peripheral tissues (Weyer, 1999). Results from the bodies are inability to respond properly to the action of

insulin produced by the pancreas. This type was much more common and accounts for around 90% of all diabetes cases worldwide (WHO, 2002).

The etiology of type 2 diabetes mellitus was multifactorial and probably genetically based, but it also has strong behavioral components (Jumnongpol, 1997: 138). It occurs most frequently in women and adults who were older than 40 years old and was frequently associated with obesity (Ignatavicius, 1995) and obesity itself cause or aggravates insulin resistance (Campbell, 1993). Many of those who were not obese by traditional weight certain may have and increased percentage of body fat distributive predominantly in the abdominal region (Kissebah, 1982: 254-260). Additional factors found to increase risk of type 2 diabetes include aging (Jack et al., 2004: 14-17), high-fat diets (Lovejoy, 2002: 435-440) and a less active lifestyle (Hu, 2003: 103-108). As this information, the researcher was interested in studying persons with type 2 diabetes.

1.3 Diagnostic Criteria

Type 2 diabetes was frequently not diagnosed until complications appear, and approximately one-third of all people with diabetes may be undiagnosed. However, diagnostic criteria for type 2 diabetes can be reported from symptom experiences with diabetes and laboratory testing.

1.3.1 Symptoms Experiences with Diabetes

The classic symptoms of diabetes that may occur and lead persons with type 2 diabetes seek help from health care providers include being overly tired and sick, having urinate frequently, feeling very thirsty and hungry, and losing weight (Jumnongpol, 1997: 138). In Type II diabetes, they develop even more slowly, over a period of years, in adults over the age of forty. Adults often do not realize they have diabetes mellitus. The condition may be discovered only during a routine physical examination for some other problem (Marcel et al., 2005: 1501-1509). However, severe hyperglycemia might cause persons with type 2 diabetes feel psychological distress because the symptoms of hyperglycemia disturb the physical function and effect of the activity of daily living such as unsleeping at night due to frequent urination (Talley et al., 2001: 1033-1038).

Physical and psychological symptoms, related to diabetes mellitus Type 2 or associated complications were derived from a literature review and based on a self-administered Type 2 Diabetes Symptom Checklist (DSC-Type 2) (Grootenhuis et al., 1994: 253-261).

1.3.2 The Laboratory Testing

The diagnosis of diabetes can use laboratory testing such as fasting plasma glucose, oral glucose tolerance test and postprandial testing.

1.3.2.1 The best screening test for diabetes was the fasting plasma glucose (FPG) (Mayfield, 1998) that was also a component of diagnostic testing. Fasting blood sugar testing is a method for learning how much glucose (sugar), there was in a blood sample taken after an overnight fast. The fasting blood glucose test is commonly used in the detection of diabetes mellitus. The test was done in the morning before the person had eaten. The normal, nondiabetic range for blood glucose is from 70 to 110 mg/dl, depending on the type of blood being tested. If the level is over 130 mg/dl, it usually means the person has diabetes (except for newborns and some pregnant women).

The FPG test was preferred in clinical settings because it was easier and faster to perform, more convenient and acceptable to patients, and less expensive. In the previous criteria, the diagnostic criteria for diabetes mellitus was a lower cutoff for fasting plasma glucose at 140 mg per dL (Sacks et al., 2002: 436-472). But the evidence support that this criteria still found the persons develop long-term complications at diagnosis ("Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus", 1997: 1183-1197). An FPG 126 mg/dl (7.0 mmol/l) was an indication for retesting, which should be repeated on a different day to confirm a diagnosis. Fasting was defined as no consumption of food or beverage other than water for at least 8 hour before testing (American Diabetes Association, 2004: 11S-14; Mayfield, 1998). Thus the researcher used this level of screening test higher fasting plasma glucose more than 130 mg/dl 2 previous times for being inclusion criteria.

New recommendations for the classification and diagnosis of diabetes mellitus were simplification of the diagnostic criteria for diabetes mellitus to two abnormal fasting plasma determinations; and a lower cutoff for fasting plasma glucose (126 mg per dL [7 mmol/l] or higher) to confirm the diagnosis of diabetes mellitus (Harris et al., 2003: 215-229). This cutoff for fasting plasma glucose may greatly increase the number of people who were diagnosed with diabetes mellitus in the practices (Mayfield, 1998). This rigorous screening testing will increase the number of persons who were diagnosed with diabetes mellitus. However, currently one half of the people who have diabetes mellitus according to the old criteria have not been diagnosed and may remain undiagnosed for up to 10 years (Harris et al., 1987: 523-534).

1.3.2.2 Oral Glucose Tolerance Test (OGTT): OGTT is a test for diabetes when persons who have symptoms or risk factors to develop diabetes, but the fasting blood sugar is not presented the high level. If the FPG was <126 mg/dl (7.0 mmol/l) and there was a high suspicion for diabetes, an OGTT should be performed. A 2-hour postload value in the OGTT 200 mg/dl (11.1 mmol/l) was a positive test for diabetes and should be confirmed on an alternate day.

For diagnosis diabetes, the FPG test and the 75-g oral glucose tolerance test (OGTT) were both suitable tests for diagnosis diabetes.

1.3.2.4 Postprandial blood glucose testing: postprandial referred to after eating a meal (<http://en.wikipedia.org/wiki/Postprandia>). This term is often used in the context of blood sugar (or blood glucose) levels, which are normally measured 2 hours after eating (MedlinePlus: Medical Dictionary). This test is a simpler but less reliable screening test. A plasma glucose level above 140 mg/dl indicates the need for a glucose tolerance test. Currently, persons who were asymptomatic and need to minimize their risk of developing complications (Susman & Helseth, 1997: 471-480), Clinical Guidelines Task Force of International Diabetes federation indicated that the same target levels for capillary plasma glucose levels are <6.0 mmol/l or <110 mg/dl before meals, and <8.0 mmol/l or <145 mg/dl 1-2 hour after meals (International Diabetes Federation, 2005).

However, the researcher applied this test for monitoring intervention to help persons with type 2 diabetes awareness of their self management including diet, medication, and exercise and stress management.

1.4 Diabetes Knowledge and Self-Management Activities

Diabetes was a chronic disease and incurable. Disease-specific knowledge about diabetes is a key element of diabetes self-management and is a focus of diabetes education programs (Glasgow, 1999: 74-88). The evidence report that diabetes knowledge may encourage coping with the disease and may improve decision making to the sickness (Fain et al., 1999: 7-15). However, diabetes knowledge has been found to be not sufficient by itself to ensure optimal diabetes outcomes (Arseneau et al., 1994: 509-514). Illness-specific knowledge is a component of effective self-management. The other components include behavioral skills, cognitive problem-solving abilities, and a sense of efficacy in bringing these capabilities to bear to affect disease outcome (Hill-Briggs, 2003: 182-193). The predictors of diabetes knowledge was educational level (Dickerson et al., 2005: 418-424) but low health literacy was significantly associated with worse glycemic

control and poorer disease knowledge in persons with type 2 diabetes (Powell et al., 2007: 144-151).

Effective self-management of diabetes could reduce blood sugar level (Norris et al., 2002: 1159-1171). This self-management requires not only technical skill to perform regimen behaviors but also need problem-solving skills to manage daily barriers to regimen adherence and to make appropriate adjustments to the self-care regimen (Hill-Briggs, 2003: 182-193). Management of this disease require knowledge and skills of diabetes self -management include lifestyle modifications such as achieving and maintaining proper weight control, dietary control, physical activity and exercise , stress management, medications, prevention of diabetes complications such as hygienic and foot care and accessing diabetes self management education (American Diabetes Association, 2007: S4-41). Thus to prevent diabetic complications and improve diabetes self management, the American Diabetes Association recommends assessment of self-management skills and knowledge of diabetes at least annually, and the provision or encouragement of continuing diabetes education (American Diabetes Association, 2007: S4-41).

2. DIABETIC COMPLICATIONS IN PERSONS WITH TYPE 2 DIABETES

Type 2 diabetes mellitus is a public health problem of increasingly serious proportions for Thai persons. (Rawdaree et al., 2006: S1-9). This part was presented the definition, type, factors contributing diabetic complications and assessment of diabetic complications. Literature reviewed from the publications has showed that Thai persons with type 2 diabetes have developed diabetic complications particular chronic complications such as coronary arties disease, cere-brovascular disease, and peripheral vascular disease, renal disease, eye disease and peripheral neuropathy (Nitiyanant et al., 2007: 65-71).

2.1. Definition and Types of Diabetic Complications

The Wikipedia free encyclopedia stated that complication, in medicine, was an unfavorable evolution of a disease, a health condition or a medical treatment. The disease could become worse in its severity or show a higher number of signs, symptoms or new pathological changes, become widespread throughout the body or affect other organ systems (<http://en.wikipedia.org/wiki/Complication>). A medical treatment, such as drugs or surgery may produce adverse effects and/or produce new health problem(s) by itself. A new disease may also appear as a complication to a previous existing disease.

However, a complication may be iatrogenic, literally brought forth by the physician. In diabetes management, diabetic complications refer to the blood sugar level deviated from normal blood sugar levels. The consequence of chronic hyperglycemia leads to diabetic complications including macrovascular disease and microvascular disease.

Diabetic complications can be divided into acute and chronic disease. Acute complications or short-term complications are composed of hyperglycemia, hyperosmolar nonketotic Coma (HHNC) and hypoglycemic unawareness. While chronic complications consisted of macrovascular complications and microvascular complications. Complications in persons with type 2 diabetes could be easy to ignore, especially in the early stages but this disease affects many major organs, including heart, blood vessels, nerves, eyes and kidneys.

2.2.1 Acute Diabetic Complications: Acute complications or short-term complications: Short-term complications of type 2 diabetes require immediate care. Left untreated, these conditions could cause seizures and loss of consciousness (coma) and lead to be an emergency related to major deviation from normal blood glucose levels. Two emergency complications that occur in persons with type 2 diabetes compose of hypoglycemia unawareness and Hyperglycemia Hyperosmolar Nonketotic Coma (HHNC) (Hillson, 1996).

2.2.1.1 Hypoglycemic Unawareness : This acute complication was the clinical syndrome that results from low blood sugar (Ignatavicius, 1995). Low blood sugars occurred more often in the persons with type 2 diabetes who were managed most intensive therapy protocol with the target glucose level near the normal range (Leese et al., 2003: 1176-1180) and with advancing age (Zammit & Frier, 2005: 2948-2961). The persons with a history of severe hypoglycemia were at increased risk for future episodes. Often the cause was multifactorial including a delay or decrease in food intake, vigorous physical activity, and alcohol consumption may contribute to this symptom. This was necessary for persons with type 2 diabetes and physicians to recognize, especially as the goal for treating person with diabetes become tighter blood sugar control. These symptoms often were developed then contribute to high blood sugar (UK Prospective Diabetes Study (UKPDS) Group, 1998: 837-853).

2.2.1.2 Hyperglycemia Hyperosmolar Nonketotic Coma (HHNC): The HHNC syndrome was a hyperosmolar state resulting from hyperglycemia of various courses. The definition of the HHNC was plasma glucose levels greater than 800 mg/dl and osmolality greater than 350 m°m at diagnosis (Ignatavicius, 1995). HHNC occurs

predominantly in adults older than 50 years and almost exclusively in persons with type 2 diabetes.

2.2.2 Chronic or Long-term Complications: Persons with prolonged blood glucose levels are susceptible to a number of serious chronic complications (WHO, 2003). Chronic complications were responsible for the majority of illnesses and death associated with diabetes. Chronic complications usually appear after several years of elevated blood sugars. Persons with type 2 diabetes may have elevated blood sugars for several years prior to diagnosis, these persons may have evidence of complications at the time of diagnosis (Kissebah, 1982: 254-260). Many complications were seen more frequently in persons with diabetes, three major categories of diabetic complications were large vessel disease (macrovascular), small vessel disease (microvascular) and neuropathy (Vale, 2003: 2775-2783).

2.2.2.1 Macrovascular Complications: Diabetes was an independent risk factor for the development of atherosclerosis. Atherosclerotic or macrovascular disease was responsible for more than 50% of all deaths in persons with type 2 diabetes mellitus (Leung & Lam, 2000: 61-68). Macrovascular complications in

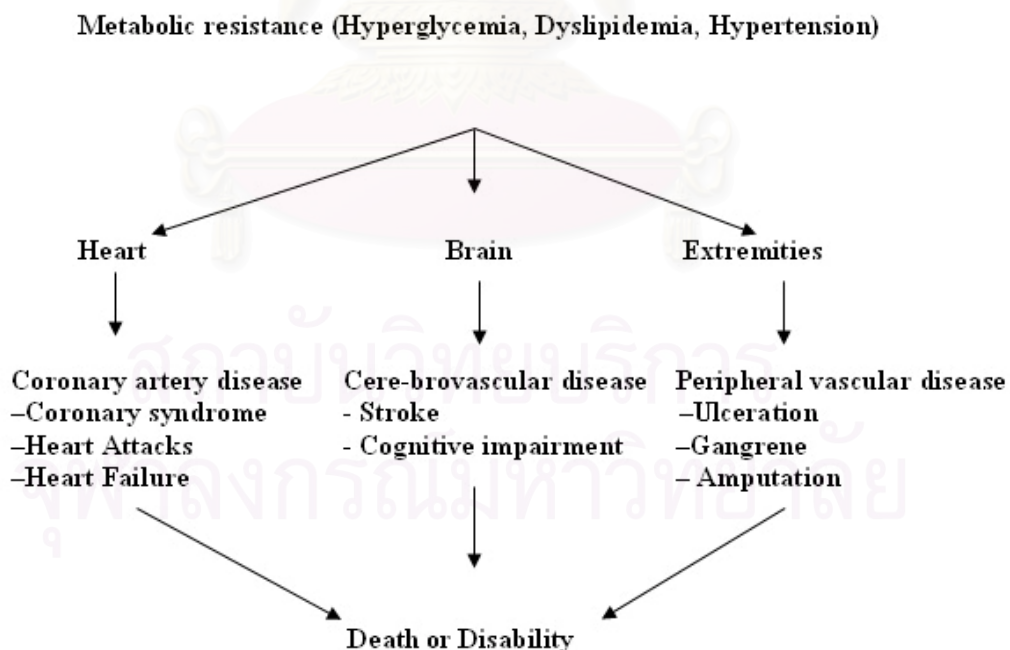


Figure 1 Biology of Macrovascular Complications

persons with type 2 diabetes tend to develop several years before the onset of clinical diabetes (Funnell, 1996: 55-59). The diseases reflect arterioscleroses with deposits of lipids within the inner layer of vessel walls. Typically, very low density (VLDL-C) and low-density lipoproteins (L-DL) were increased and high density lipoproteins (HDL) were decreased. The most characteristic lipid abnormality in diabetes was an elevated Triglycerides level. Data synthesis showed that Diabetes mellitus markedly increased the risk of myocardial infarction, stroke, amputation, and death (Beckman et al., 2002: 2570-2581). These diseases included coronary artery disease, stroke and peripheral vascular disease. These were called cardiovascular diseases (Kendall, 2001: S327-343).

1) Coronary heart disease: a major cardiovascular risk factor is type 2 diabetes, and early-onset (<40 years) type 2 diabetes is becoming more common (Chowdhury & Lasker, 2002b: 241-246). Prolonged hyperglycemia such as HbA1c and fasting blood sugar was now recognized as a major factor in the pathogenesis of diabetic vasculopathy (Grundy, 1997: 1-4). The persons with the metabolic syndrome had a higher prevalence of cardiovascular disease and the metabolic syndrome was associated with coronary heart disease (Isomaa et al., 2001: 1148-1154). The risk factors for heart disease were age, diabetes, high blood pressure, high cholesterol, tobacco use and family history.

2) Cerebrovascular disease (CVA): cerebrovascular disease or stroke was an interruption of the blood supply to any part of the brain, sometimes it was called brain attack. In persons with type 2 diabetes, CVA was more serious and carries higher recurrence and mortality rates. It was speculated that CVA may be related to development of diabetic nephropathy and hypertension and plate adhesiveness (Fain, 2001).

3) Peripheral Vascular Disease (PVD): PVD defined as absent or diminished lower-extremity pulses or an ankle arm index $<$ or $=$ 0.8. This disease was also associated with a significantly higher risk of Lower extremity arterial disease (LEAD)(Adler et al., 1999: 1029-1035). Peripheral vascular disease or lower extremity arterial disease (LEAD) was also identified by intermittent claudication and/or absence of peripheral pulses in the lower legs and feet (La Perna, 2000: S10-S14; Marso & Hiatt, 2006: 921-929). These clinical manifestations reflected decreased arterial perfusion of the extremity. Atherosclerosis of the extremity was characterized by narrowing and hardening of the arteries that supply the leg and feet. This narrowing of the arteries causes a decrease in blood flow. The incidence and prevalence of LEAD rose

with age over than 60 years in both persons with and without diabetes and, raise with duration of diabetes (Beckman et al., 2002: 2570-2581). Some study reported that many elderly with type 2 diabetes had LEAD at the time of diabetes diagnosis. Diabetes was an important risk factor for LEAD. Hypertension, smoking, and hyperlipidemia, which were frequently present in persons with diabetes, contribute additional risk for vascular disease.

2.2.2.2 Microvascular Complications: Microvascular complications or microangiopathy refers to biology of high blood glucose level lead to change that occur in eye, kidney, and nerves (Spijkerman et al., 2003: 2604-2608) which develop to diabetic retinopathy, diabetic nephropathy and diabetic neuropathy. These were the direct end-points of microvascular complications. Moreover, microvascular damage may also affect gingival and cutaneous tissues. These complications lead to disability affecting the functional activity and quality of life in persons with diabetes (Cypress & Tomky, 2006: 719-736). However these developing conditions could be significant reduced by optimizing glycemic control (The Diabetes Control and Complications Trial Research Group,1993: 977-986) and if they were detected and treated early through patient education and regular screening (Leung & Lam, 2000: 61-68).

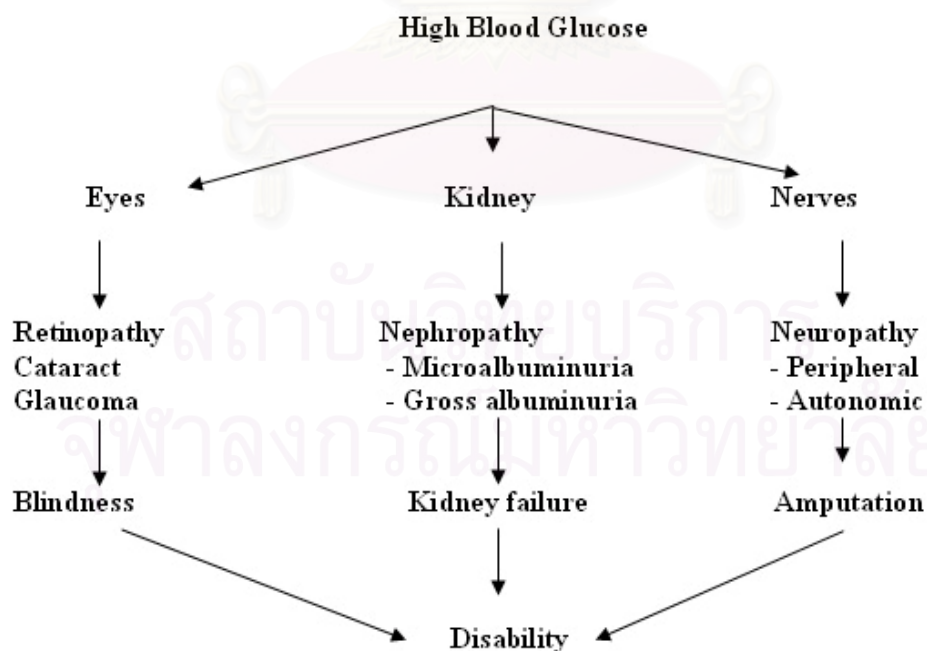


Figure 2 Biology of Microvascular Complications

2.3 Factors Contributing to Diabetic Complications

Diabetes complications are influenced by different factors. This study was analysed the factors which related to microvascular diseases and macrovascular diseases, factors contributing to the complications could be separated into 2 parts; inmodifiable factors and modifiable factors. The detail composes of as follow;

2.3.1. Inmodifiable factors: Demographic factors such as age ethnic minority, low socioeconomic status, and low levels of education were the inmodifiable factors related to diabetic complications (microvascular disease and macrovascular diseases). Several studies were presented and analysed

2.3.1.1 Age: age is a variable which is the strongest risk factors for diabetes complications (Chowdhury & Lasker, 2002b: 241-246). Macrovascular complications often developed in early life such as cardiovascular disease (Chowdhury & Lasker, 2002b: 241-246). In addition, many diabetic complications often develop in elderly for examples, foot ulcers was in patients aged 45–64 years and lowest in patients younger than 45 years (Beckman et al., 2002: 2570-2581). Elderly persons with type 2 diabetes were high risk to foot ulcer (Thomson, 1992; Thomson, 1992). Diabetes is the leading cause of new cases of blindness among adults aged 20 to 74 years (Tapp et al., 2003: 1731-1737). Almost 30 percent of persons with diabetes aged 40 years or older have impaired sensation in the feet. The study of diabetic retinopathy in Thailand found that the majority of the presented patients were between 50 to 69 years old. Increase in prevalence of DR was associated with increased age from 30 to 69 year-old (Deerochanawong et al., 2006: S27-36). From these evidences were confirmed the minimum age of persons with type 2 diabetes could be found diabetic complications at 30 years such as diabetic retinopathy. According to this evidence, the researcher had divided age into 2 levels for using in matched pair, group 1 was age lower than 30 years, group 2 was age higher than 30 years.

2.3.1.2 Socioeconomic status: poor socioeconomic conditions could influence the adherence to diabetes self management and lead to complications of person with diabetes and mortality rate (Gnavi, 2004: 864-871) and some research had reported a higher prevalence of poor glycemic control and complication in person with diabetes with low economic status (Nilsson,1998; Robinson, 1998: 205-212). Studies in western countries had reported that persons with diabetes of lower socioeconomic standing were less likely to receive specialist care (Zgibor, 2000: 472-476) or to use preventive health care services (Freeborn, 1997: 115-128; Zgibor, 2000: 472-476).

Perhaps because of these barriers, these persons with type 2 diabetes have worse complication risk factor profiles (Connolly, 1996: 419-422) including glycemic control (Klein, 1994: 68-76). Bihan et al.(2005) found that the more deprived persons with diabetes were more likely than the less deprived persons with diabetes to have poor glycemic control ($\beta= 1.984$, $P<0.001$), tend to have a higher prevalence of neuropathy, and hypertriglyceridemia ($P<0.053$, $P <0.050$), lower creatinine clearance and being less often admitted for 1-day hospitalization.

Evidence from the Pittsburgh Epidemiology of Diabetes Complications (EDC) Study (Zgibor, 2000: 472-476) was reported that persons with diabetes with lower levels of income reported more problems obtaining medical care. These persons were more likely to skip care, but they were less likely to have health insurance and to visiting a physician in the previous year, and were less likely to report good health. They also had higher HbA1 values. Those with lower levels of education were less likely to have heard of HbA1c testing and were less likely to have received diabetes education. They also had higher HbA1 values. The researcher suggested that targeting interventions to address these barriers include increasing access to and awareness of diabetes education and taking steps to remove financial barriers, might improve adherence to management recommendations and complication risk factor profiles.

2.3.1.3 Duration of diabetes: The incidence of diabetic complications increase with the duration of diabetes. Persons who had diabetes for a long time were at greater risk for developing diabetes complications than persons who had the disease for only a short time (Bowes, 2003). Persons with type 2 diabetes with long duration diabetes were likely to have limited b-cell function. As the result, the duration of diabetes was significant predictors of diabetic complications (el-Shazly, 2002). Other study presented that the prevalence of diabetic complications in the long duration of DM group was higher than that in the short duration DM group. Diabetic duration was independently associated with increased risk of having diabetes-related complications (Chowdhury & Lasker, 2002b: 241-246). For examples, a study reported that diabetic complications were developed in participants with disease duration of 10 years and participants had an increased incidence of kidney, eye and circulation problems or amputation over a 7-year period (Vinod et al., 2007: 194-199). However, this study used method a 7-year prospective cohort of 536 non-institutionalized Mexican Americans aged 65 years with diabetes. There was not the age group lower than 60 years in this study. In

Thailand, the prevalence of diabetic retinopathy in persons with type 2 diabetes was study (Deerochanawong et al., 2006 S27-36). The results found that the risk factors associated with retinopathy were duration of diabetes of more than 5 years.

From the existing evidences could be summarized that those demographic data such as age, socioeconomic status and duration of diabetes were associated with diabetic complications particular duration of diabetes. Therefore the appropriate diabetes management should be provided to persons with type 2 diabetes in the early time as possible to prevent or delay complications. The suggestion from studies were monitoring of complications in persons having long-standing diabetes was warranted in order to provide appropriate management (Leelawattana et al., 2006: S54-59; Vinod et al., 2007: 194-199). Therefore, designing intervention strategies to reduce risks of diabetes complication requires an understanding of the differences in demographic such risks (Vinod et al., 2007: 194-199). This study designed to match pair the participants in the study, according to study of Deerochanawong and Suwanwalaikorn (2006). The different age was used to match pair in persons with type 2 diabetes. The criterion duration of diabetes was divided into 2 levels; lower than 5 years and more than 5 years.

2.3.2. Modifiable Factor contributing to diabetic complications

To prevent diabetic complications in person with type 2 diabetes, it was critical to understand why diabetic complications develop. Modifiable factors associated with adherence were targets for interventions to improve adherence. A number of literature has documented a modifiable factor contributing to diabetic complications were compose of uncontrolled blood sugar, hypertension, dyslipidemia, adherence to diabetes self-management, lifestyle change, overweight, early detection and screening, specialist care.

2.3.2.1 Poor glycemic control: Uncontrolled blood sugar in persons with type 2 diabetes was more likely developing diabetic complications. Prolong blood glucose levels lead to endothelial damage manifesting as microvascular or macrovascular damage (Rohlfing et al., 2002: 275-278). Glycemic control was significant predictors of diabetic complications (el-Shazly, 2002: 289-296) and statistically significant predictors of neglect of self-care (Toljamo & Hentinen, 2001: 618-627).

From the Steno-2 Study (Gaede, 2003: 383-393), the investigators compared the effect of targeted, intensified, multifactorial intervention with that of conventional treatment on modifiable risk factors for CVD in persons with type 2

diabetes and microalbuminuria. This study suggested that the reduction in HbA1c values, systolic and diastolic BP recordings, serum cholesterol and Triglycerides levels measured after an overnight fast and urinary albumin excretion rates were all significant greater in the intensive-therapy group than those in the conventional therapy group. Persons with type 2 diabetes receiving intensive therapy had a significant lower risk of CVD, nephropathy, retinopathy and autonomic neuropathy compared to usual care, an intensive combination of behavioral and pharmaceutical interventions in these persons. However, the result from this study found that persons with taking insulin had weight gain and often had hypoglycemia.

2.3.2.2 Hypertension: Hypertension develops in persons with type 2 diabetes mellitus twice the rate of those who were non-diabetic (Sowers & Ebstein, 1995: 869-879) Hypertension was a key contributor to atherosclerotic diseases and could cause a more rapid progression of nephropathy and renal failure (Donnelly & Davis, 2000: S21-S30; Hseuh & Anderson, 1992: 253-263). The UKPDS has demonstrated that a policy of rigorous blood pressure control reduces the risk of macrovascular and microvascular complications in persons with type 2 diabetes mellitus, even more so than the effect of strict glycaemic management (UKPDS, 1998a: 703-713). Thus, screening and treating hypertensive diabetic persons were important.

2.3.2.3 Dyslipidemia: diabetic dyslipidemia refer to disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency. Dyslipidemias may be manifested by elevation of the total cholesterol, the "bad" low-density lipoprotein (LDL-C) cholesterol and the triglyceride concentrations, and a decrease in the "good" high-density lipoprotein (HDL) cholesterol concentration in the blood (Schwartz, 2005). The most common pattern of dyslipidemia in persons with type 2 diabetes was elevated triglyceride levels and decreased HDL cholesterol levels. The mean concentration of LDL-C cholesterol in those with type 2 diabetes was not significant different from that in those individuals who do not have diabetes (American Diabetes Association, 2004a: 68S-71). According to the American could Diabetes Association, the presence of increased triglyceride and decreased HDL levels was the best predictor of CVD in patients with type 2 diabetes.

2.3.2.4 non- adherence to diabetes Self-management: The development of complications and high costs associated with diabetes could be attributed largely to poor diabetes control. Poor diabetes control was associated with major depression, and non adherence to diabetes self management including less physical

activity, unhealthy diet, and lower adherence to oral hypoglycemic, antihypertensive, and lipid lowering medications (Lin et al., 2004: 2154-2160).

Both patient- and provider-related factors contribute to poor adherence. Patient-related factors include poor adherence, limited access to health care, low socioeconomic conditions, genetic differences, negative attitudes toward health and providers, and personal preferences. Provider-related factors include racial bias, poor communication, and clinical inactivity (Rhee et al., 2005: 240-250).

2.3.2.5 Lifestyle change were the key approach for the obesity management and were used in combination with all other alternative treatment, such as very low-calorie diets, pharmacotherapy, and weight-loss surgery (NHLBI, 1998). Goal of lifestyle change interventions, such as modifying dietary intake and increasing physical activity, have revealed improvement in obesity risk reduction (Whittemore et al., 2003). The Diabetes Prevention Program demonstrated the significant potential of a lifestyle change program in the prevention of diabetes development in high-risk individuals (American Diabetes Association, 2000: 1619-1629). Lifestyle changes include regular exercise, a low-fat/high-fibre diet and moderate weight loss (5–10% of body weight) improved insulin sensitivity and reduce cardiovascular risk (Halle, 1999: 641-644; Kannel, 1996: S419-S422.) and lower HbA1c levels up to 1–2% (Chacra et al., 2005: 148-160; Franz, 1995: 1009-1017). Insulin sensitivity was associated with a significant improvement in aerobic fitness (McAuley et al., 2002: 445-452).

2.3.2.6 Obesity: the prevalence of obesity in Thailand has increased dramatically during the past decade, with approximately 29.3% of adults aged 35 and older overweight or obese (Aekplakorn, 2003: 2758-2763). The Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults defines overweight as a body mass index (BMI) between 25 and 29.9 kg/m² and obesity as a BMI greater than or equal to 30 kg/m². Evidenced-based guidelines was sued by the National Institutes of Health advocate weight loss in obese persons and in overweight persons with another risk factor, such as a family history of type 2 diabetes, because there was strong evidence that overweight and obesity were associated with the health risks of hypertension, type 2 diabetes, coronary heart disease, (National Heart, Lung, and Blood Institute [NHLBI], 1998).

Obesity and overweight were conditions in which weight gain has reach to the point of endangering health (Peate, 2005: 134-138). One study (Dderstrale, 2006: 314-322) was Compared obese with normal and overweight type 2

diabetic persons with type 2 diabetes regarding body mass index (BMI) and cardiovascular risk factors (hypertension, hyperlipidaemia and microalbuminuria, and to analyze changes in weight versus risk factors. A cross-sectional study of 44,042 type 2 persons with type 2 diabetes, and a 6-year prospective study of 4,468 type 2 persons with type 2 diabetes. The results showed that obese in person with type 2 diabetes had elevated for hypertension, hyperlipidaemia and microalbuminuria.

Likewise confirmed in the prospective 6-year study, BMI was an independent predictor of HbA1c and LDL-C ($P < 0.001$), although only slightly associated with HbA1c and not with total or LDL-C. A change in BMI during the prospective study was related to a change in HbA1c in persons with type 2 diabetes treated with diet and oral hypoglycaemic agents (OHAs) but not with insulin. In all persons with type 2 diabetes, an increase in BMI was related to the development of hypertension, and a change in BMI to change in blood pressure, also mostly confirmed when treated with diet, OHAs or insulin. This research concluded that the high frequencies of risk factors in obese type 2 persons with type 2 diabetes imply an increased risk of cardiovascular disease. The other evidence shows that obese person with type 2 diabetes had elevated for hypertension, hyperlipidaemia and microalbuminuria: 2.1, 1.8 and 1.4 in the cross-sectional study, and BMI was an independent predictor of these risk factors (Ridderstrale, 2006: 314-322). This data consistent with data in Thailand, diabetes and obesity were independent risk factors for albuminuria statistically significant (Hatthachote, 2005: S164-174).

2.3.2.7 Early Detection and Screening: The American Diabetes Association recommended that implement early detection and screening intervention would reduce diabetic complications (American Diabetes Association, 2007: S4-41). Health care provider and medical system could be provided support to prevent diabetic complications. Boltria, et al.(2006) studied the impact of a simple nurse-based prompt on fasting glucose screening and counseling regarding diet, exercise and weight loss to persons at increased risk for type 2 diabetes. The participants in intervention group was more likely to receive fasting glucose testing and advice for diet, exercise and weight loss (Boltria, 2006).

2.3.2.8 Specialist care: the person with type 2 diabetes requires preventing chronic complication from the specialist. Specialist care was defined as care received from a board-certified endocrinologist, diabetologist, or diabetes clinic and quantified as the percent of diabetes duration spent in specialist care. Zgibor et al.(2002)

suggested that there was a significant trend for a higher incidence of neuropathy, overt nephropathy, and coronary artery disease with lower use of specialist care. Multivariate analyses controlling for diabetes duration, demographic characteristics, health care practices, and physiological risk factors demonstrated that higher past use of specialist care was found to be significant protective against the development of overt nephropathy and neuropathy and weakly protective against coronary artery disease. This concludes that a higher proportion of diabetes duration spent in specialist care may result in delayed development of certain diabetes complications independent of other risk factors in persons with type 1 diabetes. Such specialist care may benefit with persons with type 2 diabetes.

Moreover, several good evidences present the use of specialist nurse-led clinics as an effective adjunct to hospital-based care of persons with diabetes. This study was a randomized controlled implementation trial to nurse led and usual care at Hope Hospital, Salford, U.K. The subjects consisted of 1,407 subjects presenting for annual review with raised blood pressure ($> 140/80$ mmHg), raised total cholesterol (>5.0 mmol/l), or both. Nurses provided clinics for participants, with attendance every 4–6 weeks, until targets were achieved. Lifestyle advice and titration of drug therapies were provided according to the locally agreed upon guidelines.(Mason et al., 2005: 40-46) Intervention (enrolled to either or both clinics) was associated with a reduction in all-cause mortality. Nurses led in diabetes care could impact on the outcomes. The evidence shows that the impact of nurse case managers has been shown to promote adherence of diabetic persons with type 2 diabetes to diet, medications, SMBG, and weight loss (Polonsky et al., 2003: 3048-3053). Another study showed that having regular, frequent contact with person with diabetes by telephone promoted regimen adherence and achieved improvements in glycemic control, as well as in lipid and blood pressure levels (Aubert, 1998: 605-612).

From the evidences concluded that many factors influence to diabetic complications. Reduction in the macrovascular and microvascular complications of diabetes would manage on modifiable factor contributing to diabetic complications such as lifestyle change, controlling blood sugar, blood pressure and lowering lipid level, provider-patient interaction, ongoing engagement of both the health care team to improve glycemic control, manage cardiovascular risk factors, and screening for reduction of diabetes complications.

2.4 Assessments of Diabetic Complications

Diabetic complications could be assessed as subjectivity and objectivity. These assessment was a strategy to detect and screen diabetic complications to motivate persons with type 2 diabetes adherence to diabetes self-management which could prevent or delay the progressive disease. Subjective assessment of diabetic complications was evaluated by perceiving symptoms of diabetic complications occurrence and impact on daily living in persons with type 2 diabetes and using self-report as a measurement. For objective assessment was evaluated by using physical examination and laboratory testing.

2.4.1 Perceived symptoms of diabetic complications was a subjective assessment of diabetic complications that refers to an evaluation of a symptom or condition perceived by the patient but not by the examiner (Dorland's Medical Dictionary for Health Consumers, 2007). Due to progressive disease, diabetes could cause of several symptoms including prolong hyperglycemia, hypoglycemia, microvascular complications and macrovascular complications. these complications should be assessed directly and simply.

2.4.1.1 Perceived symptom of hypoglycemia could vary from person to person. Classically, hypoglycemia was diagnosed by a low blood sugar < 60 mg/dl with symptoms that resolve when the sugar level returns to the normal range. Usually, the symptoms of low blood glucose were mild, related to catecholamine release, and easily treated by the patient (Briscoe & Davis, 2006: 115-121; Cryer, 2005: 3592-3601). Despite advances in the treatment of diabetes, in large scale studies hypoglycemic episodes were often the limiting factor in achieving optimal blood sugar control. (UKPDS, 1998b: 854-865). The symptoms could make persons with type 2 diabetes suffer to daily activity of life and become obstacle to self management. Detection of clinical hypoglycemia was associated with adrenergic symptoms (apprehension, tremors, sweating, or palpitations) and neuroglycopenic symptoms (fatigue, headache, confusion, coma, or seizure) (Zammit & Frier, 2005: 2948-2961).

2.4.1.2 Perceived symptom of HHNC in any person who has symptoms compatible with hyperglycemia including altered mental status, fatigue, weight loss, blurred vision, thirst, excessive urination, enuresis, abdominal pain, nausea or vomiting. Prevention should be alert to the elderly patient who has a history of NIDDM, an altered level of consciousness, takes diuretics or glucocorticoids, Lacks free access to drinking water, a poor support system at home or lives alone. For persons with several of

these characteristics, periodically monitor the glucose level in the urine or blood. (Monitoring blood glucose was preferred.). If the fasting blood glucose level was above 200 mg/dL, monitor the glucose level more frequently and initiate or adjust hypoglycemic medications as necessary. Early diagnosis of diabetes or early identification of worsening hyperglycemia will permit appropriate therapy that will prevent the development of HHNKC.

2.2.1.3 Perceived symptom of Cardiovascular disease: this disease often refer to Coronary heart disease and cere-brovascular disease. Coronary artery disease was typical or silent killer, and symptoms often present as indigestion, chest pain or unexplained heart failure, dyspnea on exertation, or epigastric pain (Fain, 2001). Persons with type 2 diabetes who have myocardial infarction have an increased chance of complications or of having a second infarction, persons with type 2 diabetes also have an experience a higher incidence of heart failure, shock and dysrhythmias (Chowdhury & Lasker, 2002a: 241-246). For Cere-brovascular disease (CVA) or stroke was an interruption of the blood supply to any part of the brain, sometimes it was call brain attack. The symptoms of This Atherosclerosis were presented transient blindness, dysarthria, or unilateral weakness.

2.2.1.3 Perceived symptom of peripheral vascular disease: Peripheral vascular disease or atherosceloswas of the extremity which was a disease of peripheral of blood vessels. This was characterized by narrowing and hardening of the arteries that supply the leg and feet. This narrowing of the arteries causes a decrease in blood flow. Intermittent claudication was a symptom complex associated with impaired inflow most often associated with Atherosclerosis involving the aorta and large arteries of the lower extremities. Its diagnosis and treatment could not be considered wasolated given the close association with cardiovascular and cere-brovascular disease. Symptoms include leg pain, numbness, cold leg or feet and muscle pain in the thigh calve or feet (LaPerna, 2000: S10-14).

2.2.1.4 Perceived symptom of diabetic retinopathy was the most common cause of visual loss and blindness in people of working age in the western world (Tapp et al., 2003: 1731-1737). Retinopathy was primarily a disease of the retinal capillaries, which later extends to larger vessels. It was classified according to the features seen on ophthalmoscopy (Girach & Vignati, 2006: 228-237). Referral to a specialist ophthalmologwast was required before the disease progresses to sight-threatening proliferative retinopathy. Because retinopathy was usually asymptomatic until the disease

process was advanced, screening was essential (by fundoscopy through dilated pupils), so appropriate early laser treatment could be given if required. Vascular loss in type 2 diabetes was usually associated with macular oedema: it develops more gradually, but was less responsive to laser treatment. The practitioner may elect to perform the examination, but because proper stereoscopic examination requires dilation of the pupils and specialized techniques, such as binocular indirect ophthalmoscopy, referral to ophthalmologists or optometrists appropriately trained and skilled in the diagnosis and classification of diabetic eye disease was preferred. After the initial eye examination, persons with diabetes should receive complete examinations once a year, unless more frequent examinations were indicated by the presence of abnormalities.

2.2.1.5 Perceived symptom of nephropathy: Diabetic nephropathy refers to persistent proteinuria ($>0.5\text{g}/24\text{h}$), increased blood pressure and a steady decline in renal function (Donnelly & Davis, 2000: S21-S30). Proteinuria may be intermittent for years but once persistent proteinuria has developed, renal function usually declines gradually towards end-stage renal failure. Nephropathy was often preceded by a long period of hyperglycemia, but other factors were thought important, especially hypertension and genetic predisposition. The early stages of the disease were asymptomatic but oedema, headache, and nausea and vomiting; tiredness, hiccoughs, foamy urine and pruritus arise in advanced nephropathy, signaling the impending need for dialysis. Diabetic nephropathy was also a marker for cardiovascular disease and was already at an advanced stage by the time protein could be detected by a dipstick in urine. However, during the long stage of incipient nephropathy, while there was insufficient protein in the urine to register on a dipstick, microalbuminuria (traces of protein in the urine) could be measured by sensitive immunoassay (Marilyn, 2006). This was of great significance, because it has been shown that medical intervention at this stage could slow the progression to proteinuria (Saydah, 2002: 714-719).

2.2.1.6 Perceived symptom of neuropathy: There were three major types of diabetic neuropathy; distal symmetrical polyneuropathy, focal neuropathy, and autonomic neuropathy. Sensory neuropathy: the most common type of diabetic neuropathy was distal (peripheral) symmetrical neuropathy, usually affecting the feet in a stocking distribution and, more rarely, the hands and arms. This arises insidiously over many years and could lead to numbness, hypersensitivity (for example to bedclothes or the normal pressures of walking), burning or tingling sensations that were usually worse

at night, and sometimes excruciating pain (Marilyn, 2006). Episodes may last for months or years (Ignatavicius, 1995).

The autonomic neuropathy symptoms were peripheral pain, paresthesia, or numbness, weakness, hypoglycemia unawareness, orthostatic lightheadedness, gastrointestinal symptoms (Talley et al., 2001), such as bloating, nausea, vomiting, constipation, diarrhea, and loss of bowel control, urogenital symptoms, such as loss of bladder control and sexual dysfunction. However, there was a report recommended that some health care providers assessing perceived symptoms of diabetic complications were not sufficient for confirmation of progressive disease (Howorka et al., 1998: 1-8).

2.4.2 Objective assessment: Diabetic complications were a sequel of diabetes that was a growing problem worldwide including cardiovascular diseases, diabetic retinopathy, diabetic nephropathy and foot ulcer (Monami et al., 2006). As the above evidences, persons with type 2 diabetes presenting with variety symptoms, In order to assess those complications objectively, there was a need in early assessment to measure the outcomes that associated with or could be predict developing diabetic complications According to the standard of diabetes care (2008) stated that improving glycemic control, as assessed by HbA1c, could lead to substantial reductions in the risk of developing the microvascular complication of diabetes such as retinopathy, nephropathy, and neuropathy. The UKPDS findings also suggested that the risk of myocardial infarction (the main cause of premature death in diabetes) could be improved by reducing HbA1c values (UK Prospective Diabetes Study (UKPDS) Group, 1998: 854-865). Therefore, the objective assessment for this study aim to evaluate the intervention and this assessment was an outcome of intervention.

2.4.2.2 HbA1c: Glycated hemoglobin (GHb) was a form of hemoglobin used primarily to identify the plasma glucose concentration over time. Hemoglobin (Hb) was the compound in the red blood cells that transports oxygen and HbA1c was a specific subtype of HbA. Glucose binds slowly to Hb and produces glycosylated Hb. There were several types of glycosylated hemoglobin measures (including total glycosylated Hb and HbA1), but HbA1c was now considered the best and standard measure. It was formed in a non-enzymatic pathway by hemoglobin's normal exposure to high plasma levels of glucose. The HbA1c was linearly related to the average blood sugar over the past 1-3 months (but was heavily weighted to the past 2-4 weeks).

HbA1c should be measured at least biannually in all persons with diabetes to document their glycemic control. Treatment goals should be based on the results of prospective randomized clinical trials (The Diabetes Control and Complications Trial, 1993: 977-986) that documented the relationship between glycemic control and the risks for the development and progression of chronic complications of diabetes (Sacks et al., 2002: 436-472). The complications could be often developed when HbA1c > 7%. To delay those complications, The International Diabetes Federation and American could College of Endocrinology recommends HbA1c values below 6.5%, while the range recommended by the American could Diabetes Association (2007) extends to 7%. For This study, the researcher select HbA1c < 7% for the achievement.

However, in some areas, performing HbA1c was very expensive and the interpreting results was somewhat difficult because 1) laboratory results could differ depending on the analytical technique and 2) biological variation between individuals could be up to 1 percentage point. For examples, two individuals with the same average blood sugar could have A1C values that differ by up to 1 percentage point. However, if health care provider needs to calculate mean plasma glucose and HbA1c, the calculation was as follow:

$$\text{Mean Plasma Glucose (mg/dl)} = (\text{HbA1c} \times 35.6) - 77.3$$

2.5.2.3 Hypertension: the other objective assessment of diabetic complication was hypertension. Hypertension was a comorbidity which was predictors of developing macrovascular and microvascular diseases (U. K. Prospective Diabetes Study Group, 1998: 703-713). Hypertension could be assessed by physical examination as measuring blood pressures. The reasons for routinely measuring blood pressures in adults were evident. Raised blood pressure was a common condition that does not have specific clinical manifestations until target organ damage develops. It confers a substantial risk of cardiovascular disease (particularly in the presence of concomitant risk factors), much of which was at least partially reversible with treatment. Finally, screening adults to detect hypertension early and initiate treatment before the onset of target organ damage was highly cost effective (McAlister & Straus, 2001: 908-911). Thus the standard of diabetes care suggested that blood pressure should be assessed at every routine diabetes visiting (American Diabetes Association, 2007: S4-41).

The method for measuring blood pressure is important. The non-invasive auscultatory method was one of the most common ways of monitoring a patient's

blood pressure. To reduce the systemic error, the subject sits down and rests 5 minutes then put their left arm on a table so the brachial artery was level with the heart. A sphygmomanometer cuff was wrapped around the subject's upper arm, just above the elbow and a stethoscope was placed on the hollow of the elbow, over the brachial artery. Improving blood pressure was recommendation calls for a systolic and diastolic. The goal of persons with type 2 diabetes should be treated to a systolic blood pressure <130 mmHg. Persons with diabetes should be treated to a diastolic blood pressure <80 mmHg (American Diabetes Association, 2007: S4-41).

2.5.2.4 LDL-C: Low-density lipoprotein (LDL) belongs to the lipoprotein particle family. Its size was approx. 22 nm but since LDL particles contain a changing number of fatty acids they actually have a mass and size distribution. Each native LDL particle contains a single apolipoprotein B-100 molecule (Apo B-100, a protein with 4536 amino acid residues) that circles the fatty acids keeping them soluble in the aqueous environment (Segrest & et al., 2001: 1346-1367). LDL-C is the predictors of cardiovascular disease. The ADA suggested that reduce the LDL-C lower than 100mg/dl could delay this disease (American Diabetes Association, 2004b: 68S-71).

Therefore, to reduce the onset progression of diabetic complications, the assessment of level of HbA1c, blood pressure, and LDL-C was required and the blood sample would be measured at before intervention and the end of the study at the 12th week but for blood pressure was assessed in persons with type 2 diabetes at every visited. .

2.5 Impact of Diabetes Complications

Living with diabetes can be tough. In the face of a complex, demanding, and often confusing set of self-care directives, patients may become frustrated, angry, overwhelmed, and/or discouraged (Polonsky et al., 2005: 626-631). Moreover, the progression of the complications of diabetes may be the potential to greatly impact the cost, and activity daily living of persons with type 2 diabetes (Lloyd et al., 2001a: 392-400). The long-term complications of diabetes, such as nephropathy, neuropathy, heart disease, and stroke, with their considerable impact on health, may also have a negative effect on quality of life, as shown in the U.K. Prospective Diabetes Study (UKPDS) study and a recent review.

3. NURSING SERVICE IN COMMUNITY FOR PERSONS WITH TYPE 2 DIABETES

Nursing service for persons with type 2 diabetes was important to deliver diabetes management and provide diabetes self-management for them to increase their knowledge and skills for change behaviors and to reduce diabetic complications.

3.1 Diabetes Management

3.1.1 Objectives of diabetes management: to improve care, both health care professional and persons with type 2 diabetes should keep in mind. There are many objectives to direct in the process of care which are (Lauritzen & Borch-Johnsen,2003) 1) to identify people with diabetes, to relive acute and chronic symptoms in those persons identified 2) to inform, educate and empower persons to achieve the highest possible degree of self-care 3) to optimize blood glucose control without causing frequent hypoglycemia 4) to minimize cardiovascular risk through optimizing levels of lipids and blood pressure, and encouraging cession of smoking, weight loss in the obese and regular exercise 5) to screen for late complications 6) to treat late complications 7) to provide appropriate psychological and social support for persons with diabetes 8) to maintain a clinical database (diabetes register) 9) to prompt persons with diabetes and care givers (American Diabetes,2008: S12-54). These objectives directed to the diabetes management and prevention of diabetic complication including diet control, physical activity, medication, stress management, self- monitoring and hygienic and foot care.

3.1.2 Dietary control or medical nutritional therapy: this part is significant for persons with type 2 diabetes. Medical nutrition therapy (MNT) is an integral component of diabetes management (American Diabetes Association,2007: S4-41) and diabetes self management education (Mensing et al.,2007: S96-103). Medical nutrition therapy is the preferred term and should replace other terms, such as diet, diet therapy, dietary control and dietary management. MNT for diabetes includes the process and the system by which nutrition care was provided for diabetic individuals and the specific lifestyle recommendations for that care (Hu et al.,2001: 790-797). However, recommendations should not only be based on scientific evidence but should also take into consideration lifestyle changes the individual can make and maintain. Cultural and ethnic preferences should be taken into account, and the person with diabetes should be involved in the decision-making process (Franz et al.,2002 148-198).

3.1.2.1 Goals of MNT that apply to all persons with diabetes are as followed (American Diabetes Association, 2007: S4-41):

1) To attain and maintain optimal metabolic outcomes, including a) blood glucose levels in the normal range or as close to normal as is safely possible to prevent or reduce the risk for complications of diabetes b) a lipid and lipoprotein profile that reduces the risk for macrovascular disease c) blood pressure levels that reduce the risk for vascular disease

2) To prevent and treat the chronic complications of diabetes; modify nutrient intake and lifestyle as appropriate for prevention and treatment of obesity, dyslipidemia, cardiovascular disease, hypertension, and nephropathy

3) To improve health through healthy food choices and physical activity

4) To address individual nutritional needs, taking into consideration personal and cultural preferences and lifestyle while respecting the individual's wishes and willingness to change.

These goals were guided and support to assist the health care provider learn and translate into study by using diabetes meal plan, food exchange, reading food labels.

3.1.2.2 Diabetes meal plans: A diabetes meal plan is a guide that informs persons with type 2 diabetes how much and what kinds of food they can select to eat at meals and snack times (Hu et al.,2001: 790-797). A good meal plan should fit in with schedule and eating habits. The calories should be concern for type of food including as follow:

1) Carbohydrate (preferably complex) and monounsaturated fat together should provide 60–70% of energy intake; however, the metabolic profile and need for weight loss should be considered when determining the monounsaturated fat content of the diet (A.D.A,2005: S4-S36) Less than 10% of energy intake should be derived from saturated fats

2) Protein should make up 15–20% of caloric intake (A.D.A,2003: S51–S61)

3) Consume 20–30 gram fiber for each 2000 total calories consumed daily (A.D.A,2003: S51–S61). Whenever possible, person with type 2 diabetes should be encouraged to meet with a qualified dietician for instruction in nutrition and meal planning.

The right meal plan help persons with type 2 diabetes improve their blood glucose, blood pressure, and cholesterol level and also help keep

their weight (Ziemer et al.,2003: 1719-1724). To reduce these risks for complications such as heart disease and stroke, meal plan with a healthy diet is a way of eating that help to select a wide variety of foods including vegetables, whole grains, fruits, non-fat dairy products, beans, and lean meats, poultry and fish (Ziemer et al.,2003: 1719-1724). In other words, a variety of different foods and watching portion sizes, picking foods rich in vitamins, minerals and fiber over those that are influence to (Vallis et al.,2003: 1468-1474). Moreover, food records showed that multiple nutritional improvements were achieved with meal plans. There were significant overall reductions in body weight and BMI, fasting plasma glucose and serum insulin, fructosamine, HbA1c, total and LDL-C, and blood pre sure level (Pi-Sunyer et al.,1999: 191-197).

However, persons with type 2 diabetes had to take extra care to make sure that their food was balanced with oral medications, and exercise to help manage their blood glucose levels. There were many ways to help persons with diabetes type 2 follow their diabetes meal plan. Some ways are following the Food Guide Pyramid, Rating their Plate, Exchanges Lists, and Carbohydrate Counting. They were all different but hopefully one is right for them.

3.1.2.3 Food exchange: Diabetic food exchange is a food categorizing system to make meal planning easier for persons with diabetes. The system groups' foods according to their nutritional values, assisting a person with type 2 diabetes eat carbohydrate-consistent, nutritionally balanced meals to achieve glucose (blood sugar) control and overall heath. The American Diabetes Association and the American Dietetic Association devised the method. It categorizes foods into three groups based on carbohydrate content compose of Carbohydrate group, Meat and meat substitute group, and Fat group In addition, foods can be categorized into six groups based on their nutritional value including starch/bread, fruit, milk, vegetables, meat and meat substitutes as well as fat (Nelson et al.,2002: 1722-1728). Using the food exchange list, persons with diabetes could eat the same foods the family enjoys. Everyone benefits from healthy eating so the whole family can take part in healthy eating. It takes some planning but persons with type 2 diabetes can fit their favorite foods into their meal plan and still manage their blood glucose, blood pressure and cholesterol. Therefore health care provider such nurse should inform the persons with type 2 diabetes understand and have all those skills (Ziemer et al.,2003: 1719-1724). (See in Appendix E).

3.1.2.4 Reading Food Labels: Grocery store aisles are avenues to greater nutritional knowledge. Under regulations from the Food and Drug Administration

of the Department of Health and Human Services and the Food Safety and Inspection Service of the U.S. Department of Agriculture, the food label offers more complete, useful and accurate nutrition information and can help persons with type 2 diabetes make wise food choices. Currently most packaged foods in the grocery store list nutrition information on the package in a section called the Nutrition Facts, Nutrient content, the list of ingredients (<http://www.fda.gov/opacom/backgrounders/foodlabel/newlabel.html>). see in the appendix E

There was some evidences reported that persons with type 2 diabetes were randomized to receive instruction in either a healthy food choices meal plan (HFC) or an exchange-based meal plan (EXCH) to compare the impact on glycemic control, weight loss, serum lipids, and blood pressure at 6 months of follow-up. Improvements in glycemic control over 6 months were significant ($P < 0.0001$) but similar in both groups. Improvements in HDL cholesterol and triglycerides were comparable in both groups, whereas other lipids and blood pressure were not altered. (Ziemer et al.,2003: 1719-1724). With newly diagnosed type 2 diabetes, she stated, lifestyle change leads to a fall in HbA1c of 2%, and with existing type 2 diabetes, falls of 1% could be expected. These changes can be seen over 6–12 weeks, a realistic timeframe for intervention.

Diet control or MNT can conclude that for health care providers such as nurse, it involved a nutrition assessment to evaluate the person's food intake, metabolic status, lifestyle and readiness to make changes, goal setting, dietary instruction, and evaluation. To facilitate the adherence, the plan should be individualized and take into account cultural, lifestyle, and financial considerations. Monitoring of glucose and A1C, lipids, blood pressure, and renal status is essential to evaluate nutrition-related outcomes. If goals are not met, changes must be made in the overall diabetes care and management plan (American Diabetes Association,2007: S4-41).

3.1.3 Physical Activity and Exercise: Physical activity and exercise are also known as anything that gets person moving, such as walking, dancing, or working in the yard (American Diabetes Association,2007: S4-41). Person with type 2 diabetes can earn the benefits of being physically active without going to a gym, playing sports, or using fancy equipment. This is as strong as factors in the predicted to lower glycemic control level and lower LDL, increase HDL cholesterol (Firdaus,2006: 18-25). When persons with type 2 diabetes are physically fit, they have the strength, flexibility, and endurance needed for their daily activities. Being physically active helps these persons

feel better physically and mentally (Ramaswami 2005). Increasing physical activity helps decrease insulin resistance by building up more muscle cells and getting rid of fat cells. Exercise also lowers blood glucose levels by helping insulin to be more effective (Kirk et al.,2003: 1186-1192)

Moreover, Regular exercise helps reduce hyperglycemia by improving insulin sensitivity in the muscle and diminishing cardiovascular risk factors including hyperlipidemia, obesity and hypertension. However, person with type 2 diabetes who have peripheral neuropathy or osteoarthritis may not be a candidate for high-impact weight-bearing exercises, such as jogging and high impact aerobics because these may increase the risk of trauma to them with insensitive foot. Physical activities should be realistic for the people as their health status and appropriate time (Firdaus,2006: 18-25). Light-to-moderate exercise for at least 30 minutes three to five times weekly was recommended.

3.1.4 Medications: Medication administration for person with type 2 diabetes is necessary when lifestyle change can not be successful. If diet and exercise are not successful to control their blood sugar within near normal level. Oral hypoglycemic agents and /or insulin can be used (Gaede,2003: 383-393). However, hypoglycemic medication can contribute to hypoglycemic symptoms which often occur in older person with diabetes or the persons who have heavy exercise (Vermeire, 2005) and this symptom can increase weight in the person. Moreover, glycemic control alone for persons with type 2 diabetes who are at risk cardiovascular disease will not total eliminate the excess of CVD, the physician may provide the aspirin tablet, statin , Beta blocker tablet to prevent coronary heart disease(ADA,2006). All of these medications can effect on lipid abnormalities.

Medications Used for Treatment of Type 2 Diabetes Oral Agents that Use Patients' Insulin Stores. There are now many oral medication for type 2 diabetes with different mechanisms of action that might benefit specific patients. Most agents for these patients are aimed at using or increasing sensitivity to the patient's own natural stores of insulin:

3.1.4.1 Sulfonylureas: these medication are a class of antidiabetic drugs that are used in the management of diabetes mellitus type 2 ("adult-onset"). Sulfonylureas act by increasing insulin release from the beta cells in the pancreas(Larsen et al.,1999: 1647-1654). They can induce hypoglycemia when insulin production overshoots. Hypoglycaemia is the major risk associated with the use of sulfonylureas,

particularly in elderly people and persons treated with polypharmacy (Del Prato & Pulizzi,2006: S20-S27). Serious hypoglycaemia is usually defined as that causing death, or requiring hospitalisation or emergency department admission (Chang et al.,2007: 414-416). The resultant hypoglycaemia can be prolonged and recur for a period of more than 24 hours despite treatment. Case fatality rates of 4%–10% are reported and 5% of survivors may have permanent neurological impairment. Sulfonylureas include but are not limited to glyburide, glipizide, and glimepiride). Glimepiride (Amaryl) and glipizide ER (Glucotrol XL) are generally taken once daily. All other sulfonylureas are typically taken once or twice daily (Harrigan et al.,2001: 68-78).

3.1.4.2 Biguanides (metformin). Metformin is an insulin-sensitizing agent with potent antihyperglycemic properties. Its efficacy in reducing hyperglycemia in type 2 diabetes mellitus is similar to that of sulfonylureas, thiazolidinediones, and insulin (Kirpichnikov et al.,2002: 25-33). Metformin assists reduce hepatic glucose output and increases some additional insulin sensitivity in peripheral tissues. Metformin is a fashionable option, especially in persons with obese and insulin resistant. It has an added benefit of weight reduction in many persons. A side effect of metformin therapy is gastrointestinal (GI) disturbances. Metformin is contraindicated in patients with congestive heart failure, liver disease or impaired renal function (creatinine 1.4 mg/dl, women; 1.5 mg/dl, men). Increase tissue sensitivity to available insulin. Such agents may have beneficial effects on cholesterol, blood pressure, and clotting factors. Does not cause weight gain or hypoglycemia (Chacra et al.,2005: 148-160). Metformin can be significant decreased ($P < 0.001$) in mean HbA1c (A1C) levels that were observed by week 12 in all treatment groups (Schwartz et al.,2006: 759-764).

3.1.5 Stress Management: Stress results when something causes the body to act as if it were under attack. Sources of stress can be physical, like illness or injury (Pettinger,2002). Or they can be mental, like problems in the marriage, job, health, or finances. When stress develops, the body prepares fight-or-flight response. In the fight-or-flight response, levels of many hormones shoot up (Epstein,1999). Their net effect is to make a lot of stored energy - glucose and fat - available to cells. These cells are then primed to help the body get away from danger (Jonathan,2002). In persons who have diabetes, the fight-or-flight response does not work well. Insulin is not always able to let the extra energy into the cells, so glucose piles up in the blood. As a result, long-term stress can cause long-term high blood glucose levels.

Diabetes is recognized as one of the most emotionally and behaviorally demanding chronic illnesses, yet most patients seem to adapt to and cope reasonably well with the disease and report a satisfactory quality of life (Snoek & Skinner,2006: 61-62). The diabetes management demand self management behaviors such as control diet, regular exercise, and medication. These contribute to stress for persons with type 2 diabetes because they have to change their lifestyle both themselves and their family. Park, Hong, Lee, Sung (2004) found that Higher depressive –symptom were associated with poor self-care behaviors and significant with poor participation in education programs and poor medication taking. However, success in undertaking wellness behaviors in those with diabetes has been shown to be a function of having a positive attitude and acceptance of the challenges of the illness (MacLean and Lo, 1998). There was also a strong positive correlation between low levels of HbA1c and high levels of an index of active management and emotional acceptance of diabetes (Sanden-Eriksson,2000: 1393-1397).

The management for stress may use variety techniques of relaxation such as meditation, breathing exercises, progressive relaxation therapy, and exercise; replace bad thoughts with good ones. This relaxation can be learnt to reverse the body's hormonal response to stress. Several studies present the benefit of using stress management. A study is applied group stress management program in a setting that can result in clinically significant benefits for patients with type 2 diabetes. (Surwit et al.,2002: 30-34). Other study is used biofeedback and relaxation therapy to helps persons with type 2 diabetes to change their physical and mental responses to stress, after the study, the researchers found that the participants who took biofeedback and relaxation therapy continued to manage their glucose levels better than the people who took the education sessions (McGinnis et al.,2005: 2145-2149).

3.1.6 Self Monitoring: Measuring blood sugar levels at home has become a cornerstone of diabetes care. This strategy could prevent low blood sugar at night, help persons with diabetes make informed decisions about the amount and type of insulin to use, help persons with diabetes manage illness at home and alert them if they need to do a ketone test, help persons with diabetes understand the effects of certain foods, exercise, and stress on their blood sugar. Six randomized controlled trials evaluated the effects of SMBG in persons with type 2 diabetes who were not using insulin. The overall effect of SMBG was a statistically significant decrease of 0.39% in HbA1c compared with the control groups. This is considered clinically relevant. Based on the U.K. Prospective

Diabetes Study, a decrease of 0.39% in HbA1c is expected to reduce risk of microvascular complications by 14% (Welschen et al.,2005: 1510-1517).

These evidences suggested that using the blood sugar results to keep their sugar levels normal help reduce the risk of eye, kidney, blood vessel, and nerve complications.

3.1.6 Hygienic and foot care

3.1.6.1 Hygienic care: The simple prevention of diabetic complications in the part of microvascular complications is hygienic and foot care. This basic include cutaneous, oral and foot care, which can be prevented by persons with type 2 diabetes. Normally cutaneous, oral seen in diabetes had been not always recognized as part of microvascular complications. Persons with diabetes have often seen a health care provider for diabetes care but were less likely to have seen a dentist (Tomar & Lester,2000: 1505-1510) Therefore, the nurse must encourage the persons with type 2 diabetes understand and aware of caring these organ to avoid the problems that may occur.

3.1.6.2 Foot care: foot care was often neglected in persons with type 2 diabetes and helath care providers (Rerkasem et al.,2004). Foot ulcer had been frequent found in community care (Nitiyanant et al.,2007: 65-71). Therefore, the community nurse should inform and guide persons with type 2 diabetes to aware and increase the skill to perform foot care. The evidence suggests that inspection feet everyday can reduce the foot ulcer (International Diabetes Federation (IDF),2005). The the persons who had high risk foot uler must be encourage their knowledge and skills to prevent foot ulcers (Adler et al.,1999: 1029-1035;Vileikyte et al.,2005: 2378-2383)

3.2 Prevention of Diabetic Complications

Reducing chronic or long-term complications may significantly reduce health expenditure associated diabetic complications arising from type 2 diabetes (Wilson,2005). Several RCTs have demonstrated the effects of improved glycemic control on microvascular and neurological complications of diabetes (Skyler,2004 162-166). A large study recommended that intensive therapy slows the development and progression of retinopathy, nephropathy, and neuropathy by 60 to 70 % in people with type 1 diabetes (The Diabetes Control and Complications Trial Research,1993: 977-986) By reducing these complications, the high human and economic cost of diabetes can be reduced.

The study of UK Prospective Diabetes Study (UKPDS) Group included 5,102 subjects with newly diagnosed type 2 diabetes. Subjects were 25–63 years of age (median

53 years) at entry (UK Prospective Diabetes Study (UKPDS) Group, 1998: 854-865, 1998: 837-853). Intensive policy aimed at achieving fasting plasma glucose of 108 mg/dl (6.0 mmol/l) using various pharmacological agents. Conventional policy tried to control with diet alone, adding pharmacological therapy when symptoms developed or fasting plasma glucose exceeded 270 mg/dl (15 mmol/l). The intensive policy group achieved a median A1C of 7.0% versus an A1C of 7.9% in the conventional policy group. Mean follow-up was 11 years (6–20 years). The diabetes related end point was significantly affected, with a 12% risk reduction. Additionally, risk reductions were found for other end points, including 25% risk reduction in microvascular end points (most because of a 29% risk reduction for retinal photocoagulation), 24% risk reduction for cataract extraction, 21% risk reduction for deterioration in retinopathy, and 33% risk reduction for microalbuminuria. Eventually, UKPDS researchers found that monotherapy could not keep on the treatment goal in the intensively managed groups, thus combination therapy was used. Similarity in the conventional group, diet often was insufficient to maintain blood sugars less than 15.0 mmol/L, consequently at least one hypoglycemic medication was initialized in 80 % of person with type 2 in the conventional group.

A second study of the UKPDS evaluated the management of hypertension in person with type 2 diabetes (U. K. Prospective Diabetes Study Group, 1998: 703-713). The subjects were randomized to tight blood pressure control (less than 150/85 mm Hg) or less stringent blood pressure control (less than 180 /105 mm Hg). They were randomly assigned to treatment with either an angiotensin converting enzyme (ACE) inhibitor (captopril) or a beta-blocker (atenolol). The tight control group achieved a mean blood pressure of 14/82 mm Hg compare to the less stringent control pup with a mean blood pressure of 154/87 mrnHg. Tight blood pressure control significantly reduced the risk of strokes by 44 96, diabetes-related deaths by 32 %, and rnicrovascular complications by 37 %. There were no differences between ACE inhibitor and beta-blocker on any outcome measured including microalbuminuria or proteinuria. The subjects on Beta-blockers had slightly better blood pressure control (1-2 mm Hg).

From the evidences of the above studies suggested that the message in the both the DCCT and UKPDS was that hyperglycemia should be treated vigorously in persons with diabetes. Furthermore, the UKPDS recommended the systematic treatment of hypertension in persons with type 2 diabetes. However, the physicians have increased concerns about the possibility of achieving strict glycemc control in the diabetic population. At issue are a lack of physician expertise and time, financial

resources, and the persons' adherence with complex lifestyle modification. In the DCCT, a team of physicians, nurses, and dietitians educated, monitored, and followed persons with type 1 diabetes receiving intensive insulin therapy. This specialized multi-disciplinary team is not available to the majority of people with diabetes. Interestingly, it has been noted that non-physician health care professionals had the most involvement with patient education and follow-up in the DCCT.

People who report having a regular provider visited of diabetes care had improved self-management activities including: following a special diet, monitoring blood glucose levels, and undergoing a HbA1c test, foot exam, and cholesterol check. However, in 2007 in community care, the routine assessments were not regularly practiced by health care providers in primary care units. The monitoring of glycemic control was mainly based on measurement of Fasting Plasma Glucose. The HbA1c was hardly assessed. In addition, peripheral neuropathy was the most common observed complication and this might explain the high rate of foot ulcers in the study (Nitiyanant et al., 2007: 65-71). Nurses were the most prevalent health care provider in the community areas. It was suggested that nurse could deliver some level of primary care to persons with diabetes. There is also a recognized lacking of diabetes self management education in rural areas and nurse can assist the persons with type 2 diabetes adhere to the diabetes self-management (Norris et al., 2001: 561-587).

3.3 Diabetes self Management Education

Diabetes self management education (DSME) service was an essential element of diabetes care (Funnell et al., 2008: S97-104) and National Standards for DSME were based on evidence for its benefits (Mensing et al., 2007: S96-103). Education facilitates persons with diabetes initiate effective self-management when they were first diagnosed (Chas et al., 2006: 369-377). Ongoing DSME also helps persons with diabetes maintain effective self-management as their diabetes presents new challenges and treatment advances become available (Skinner et al., 2006: 369-377). DSME also helps persons with diabetes optimize metabolic control, prevent and manage complications, and maximize quality of life, in a cost-effective manner (American Diabetes Association, 2007: S4-41).

A meta-analysis suggested that on average the diabetes self management education could decrease HbA1c by 0.76% more than the control group at immediate follow-up; by 0.26% at 1–3 months of follow-up; and by 0.26% (0.05– 0.48) at 4 months of follow-up. HbA1c decreased more with additional contact time between participant

and educator; a decrease of 1% was noted for every additional 23.6 hours (13.3–105.4) of contact (Norris et al.,2002: 1159-1171). To improve the outcomes, the researcher recognized that the key element for achievement of outcomes should have provision of access to diabetes education service.

3.3.1 Access to Diabetes Self Management Education in Community Setting.

Persons with diabetes affected by diabetes have the right to access diabetes education and the diabetes team (Belton et al.,2006). While the significance of diabetes education has also been recognized in the literature, but not all persons have equal access to diabetes education (Duangla,2002). A Survey Study on Diabetes Management and Complication Status in Primary Care Setting in Thailand found that although two-thirds of the patients engaged in diabetes self-management education more than 5 days in the previous year, it was noted that only 28.9% of the persons followed diet instruction regularly, and 17.2% did a regular exercise (Nitiyanant et al.,2007: 65-71).

Diabetes self-management education (DSME) could help nurse develop educating persons with type 2 diabetes about self-management support; assisting the them in setting self-management goals and teaching, guiding, providing environment or improving action planning and problem-solving skills (Mensing and Boucher et al., 2005: S72-79). The standard of diabetes self -mangement education indicated that the health care provider who deliver diabetes self management education to persons with diabetes have to train in the deliveries of effective program care, efficient clinical care through individual and group, visiting appropriate use of all team members, planned patient interactions, regular follow-up (Nutting et al., 2007: 14-20). The evidence reported that the persons with diabetes access to health care service positively associated with health status (Sihasadhi,2003). Access to multimedia lessons resulted in an increase in perceived susceptibility to diabetic complications (Gerber et al.,2005: 1574-1580).

3.3.2 Availability of Diabetes Educator

Diabetes educators are vital members of the diabetes teams but there were few formal training of these professions in Thailand. The credentialed diabetes educators are not available to provide DSME in Community setting in Thailand (Lawang,1999). The committees of Thai Diabetes Educator Association attempted to produce the diabetic educators. The many health care providers learnt to be an educator in their setting. However, the number of diabetes educators is insufficient in the community (Himathongkum,2005). Health care providers include registered nurses, registered

dietitians, pharmacists, physicians, registered psychologists, physiotherapists, and social workers, who have a sound knowledge base in both diabetes care and educational processes, could develop good communication skills and a dedication to excellence in diabetes education (Funnell et al.,2008: S97-104). However, some evidence report that the nurse in the community lack of knowledge about health education for prevention of diabetic complications including cardiovascular disease (Aekplakorn et al.,2005: 741-747).

Diabetes education is effective for improving clinical outcomes and quality of life, at least in the short-term (Funnell et al.,2008: S97-104). This education had traditionally been provided by nurses and dietitians but nurses have been frequent utilized most often as instructors in the delivery of formal DSME (Norris et al.,2001: 561-587;Norris et al.,2002: 1159-1171). Normally, the literature current practice that utilizes the registered nurse, as the key primary instructors for diabetes education and members of the multidisciplinary team responsible for designing the curriculum and assisting in the delivery of DSME (Renders et al.,2001: 1821-1833). DSME will be provided by one or more instructors. The instructors should have recent educational and experiential preparation in education and diabetes management.

3.3.4 Team Nursing Care

Today' several significant factors affected on healthcare environment including higher numbers of aging and older individuals, the development of new technologies, advances in medical management, and the tremendous increase in scientific knowledge about health and illness. One result is that more people are living with diabetes and its complications (Centers for Disease Control and Prevention, 2001)

Team nursing care is very important to deliver diabetes management and diabetes self management education. Team nursing is the respectful term for task allocation. As no individual nurse has both control of and responsibility for the care of any individual patient, team nursing completely destroys all lines of accountability and responsibility (Heenan,2007). Although by itself, team nursing would not improve morale or reduce staff turnover; but it could improve nursing care, which can then contribute to staff job satisfaction.

In chronic care area, team nursing was need for a better system and for delivery of diabetes care (Centers for Disease Control and Prevention, 2001). There was an evidence reported that provide team care in the diabetes care, One year after baseline measures were taken, documented care was assessed for quality improvement. Indicators

included mean HbA1c, proportion of HbA1c values <8%, use of an angiotensin converting enzyme (ACE) inhibitor for patients with hypertension or proteinuria, treatment for dyslipidemia, and screening tests for complications. Comparative feedback of data to each plan in the above study stimulated changes in provider behavior and led to significant improvement in most of the indicators. For example, mean HbA1c level fell from 8.9% to 7.9%; the proportion of persons with HbA1c values <8% rose from 40% to 62%; the use of ACE inhibitors increased by 69%; and the treatment of dyslipidemia improved from 16% to 40%, but there was no significant improvement in lipid profiles (Marshall et al.,2000: 65-71).

From the mention above, the nurses in community should provide care as a team in diabetes care to improve patient satisfaction, HbA1c, and lipid level.

4. ROLES OF A COMMUNITY NURSE FOR PREVENTIVE AND DELAYING DIABETIC COMPLICATIONS

Role was a description of the responsibilities and functions of a health care worker in a specific role, including the current activities common to this role. Diabetes was a comprehensive condition, and has effects on many aspects of persons' lives. A majority of persons with diabetes receive their diabetes care exclusively from their physician. The role of nonphysician health care professional in the treatment of diabetes has emerged over the last 25 years. There were many roles in nursing service of diabetes care to help persons with type 2 diabetes prevent or delay diabetic complications (Loveman et al., 2006). From the evidence, diabetes complications often found in the community care which service was delivered as general care (Zgibor et al.,2002: 1584-1590). The community nurses in this area performed many roles including educator, counselling

4.1 Nurse educator

Education was probably the most important role of the nurse practitioner, with a large amount of information regarding the disease, its control and life style changes, needing to be imparted over a prolonged period of time. Increasing the patient's understanding of the disease through education could prevent or reduce the onset of complications and reduce the number of hospitalizations(Landry et al.,2006 163-169), and as such was the key to improving the quality of life (Loveman et al., 2003).

The nurse has become an educator in the complexity of patient care. Provision of education needs to achieve change behavior. However, to change behavior in

persons with type 2 diabetes to prevent diabetic complications including cardiovascular disease requiring providers who have knowledge and skills of diabetes management. However, the outcomes may not achieve. Accordingly Aekplakorn et al (2005), they explored community members' knowledge and perceptions about cardiovascular disease (CVD), risk factors and prevention, and identified the current capacity of community care providers to manage and control CVD at the provincial level. A qualitative study was conducted in Thailand. Participants included community members, CVD patients and healthcare providers in health centers and hospitals. The results showed that community members had little knowledge about the symptoms and signs of heart attack or stroke. They perceived that existing health centers and community hospitals were insufficiently equipped to treat CVD patients. Primary healthcare workers reported that they lacked skills to manage heart disease, particularly emergency care. Nurses reported that they had inadequate training in health education for the prevention of CVD therefore, local programs, should be implemented with community participation.

4.2. Counselling

Alongside the role of educator, the community nurse also provided a counselling role (Brown 1988). The persons with type 2 diabetes had to take on the implications of a life-long disease, and might need help in accepting the changes which were occurring in their lives. The nurse was in a unique position in that a relationship. Between patient and nurse will be maintained over a long period of time, and could provide support and time for patients as part of their role (Loveman et al.,2003). The counselling needs the technique of motivational interviewing (MI). This technique includes a strategic approach to help individuals develop a commitment to changing problematic behavior. Four elements of MI address both what clinicians discuss with patients and how they discuss it: 1) express empathy, 2) roll with resistance, 3) develop discrepancy, and 4) support self-efficacy. The first two elements pertain to the practitioner-patient relationship. Reflective listening (accurately understanding a patient's story through open questions, reflections, gentle probing for more details, and use of summaries) is fundamental to MI. There were several studies reported the result of utilized the MI in including interventions targeting alcohol and drug abuse, dual psychiatric diagnoses, diabetes, weight control, exercise, HIV prevention, and eating disorders. overall, the adding of MI produced significant adherence effects and helped patients move from one level of treatment adherence to a higher one (Hettinga et al.,2005: 1:91-111).

4.3 Leadership

In chronic care area such diabetes care, nurse perform as a leader. Numerous studies show the key role of nurses in implementing components of the chronic care model, most importantly planned chronic care visitings (Bodenheimer et al.,2005: 612-613). In Kaiser Permanente's trial of planned visitings by groups of persons with diabetes led by a nurse educator, participants had significant lower Glycated haemoglobin levels and lower use of hospitals than controls (Sadur et al.,1999: 2011-2017).

In yet another study, persons with diabetes attending a diabetes clinic with a nurse, Compared with those getting the usual care, had lower mortality and a lower incidence of adverse clinical events (myocardial infarction, angina, revascularization procedures, end stage renal disease) after a median follow up of seven years (So et al., 2003: 606-615). Patients allocated to nurse led clinics reached target BPs and lipid concentrations. In persons with diabetes and high blood pressure (BP) or high cholesterol, nurse led hypertension or hyperlipdemia clinics were more effective than usual care for achieving target BPs and lipid concentrations (Mason et al.,2005: 40-46).

A Cochrane review discovered that planned nursing visiting could improve healthy behaviors and patients' outcomes in diabetes; it summarized that nurses " could even replace physicians in delivering many aspects of diabetes care, if detailed management protocols were available, or if they receive training." (Peters et al.,2001: 179-188;Renders et al.,2001). This evidence consistent with a report which present that nursing care can create an important contribution to diabetes care, especially in primary care (MacKinnon,1996: 295-296) and improving management of diabetes within primary care is successful if appropriately trained practice nurses are engaged (Stearn & Sullivan,1993: 952-956)

The role of nurse in community care could be summarized as verities of role such as educator, counselling and leadership in the clinical care to assist the persons with diabetes type 2 achieve their outcomes. Community care was likely to increase the role of primary health care nurses in diabetes. Research and evaluation was required to ascertain whether this increasing role translates into improved outcomes for persons with type 2 diabetes (Kenealy et al.,2004: 68-75).

Even though a lot of evidences and examples presented the pivotal role played by nurses in improving chronic care, several barriers inhibit the spread of nurse provide intervention in community in Thailand (Hanuchurnkul,2007: 83-93). The nursing shortage has made nurses difficult to recruit; although nursing education in Thailand has

emphasised the role that nurses can play in chronic illness care (Siritarungsri & Francis,2006: 17-25), in some health systems such as the Red Cross Health Station, nurses were underused, taking blood pressures and putting patients into rooms rather than providing education for and encouraging self management by chronically ill patients. Until these barriers are overcome, the potential for nurses to lead a national effort in community to improve chronic illness care may be dissatisfied (Hanuchurnkul,2001: 365-365).

5. A MULTIFACETED NURSE-COACHING INTERVENTION

Current delivery diabetes care in the health care system especially community care had been complex; many components were utilized to improve health outcomes in persons with type 2 diabetes because these persons were at risk of death and disability from diabetic complications such as from cardiovascular disease, renal failure, visual loss and foot ulcer (Bunnag et al.,2006: S72-77). There was a need to identify effective practical interventions to increase their cognitive knowledge and change behaviors. The effective intervention was expected to prevent or delay diabetic complications in persons with type 2 diabetes mellitus (Aekplakorn et al.,2003: 2758-2763).

A Multifaceted nurse-coaching intervention was a program which based on system theory , chronic care model (Wagner et al.,1996: 511-544) and coaching (Eaton & Johnson,2001b). This program focused on patient-centered by further developing a cognitive educational and behavioral intervention. The nurses was trained to deliver diabetes self-management education and to address the complexity of management including general knowledge of diabetic complications, diet control, physical activity, medication, stress management, hygienic and foot care. The nurse coach facilitates integration of diabetes self-management into the persons' daily lives. Diabetes self-management education was tailored as the individual need via individual coaching with face to face and telephone. At each approach, the nurse applied 7 steps of the coaching process: assessment, goal definition, analysis, exploration, actions plan, learning and feedback. This program was a process of care that delivered to the persons aiming to achieve outcomes. According to based on system theory, chronic care model and coaching concept, these concepts were underpinning and derived to become a conceptual framework. Finally all these concepts was translated into nursing practices.

According to improve the quality of care in diabetes care service, the researcher used concepts of system theory which composed of structure (input), process and outcome (Bertalanffy,1968) (Figure 4). This model is consistent with a study which required to establish definitions of quality of nursing care (Kunaviktikul et al.,2001: 776-784). The finding from the qualitative study found that the indicators in the nursing system were categorized into three groups: structure, process, and outcome.



Figure 1 Input, Process, and Outcome Model (Bertalanffy,1968)

However, when Donabedian (1966) had also proposed this framework, he used review the more general knowledge about the relationship between organizational structure and outcomes of care across provider settings.

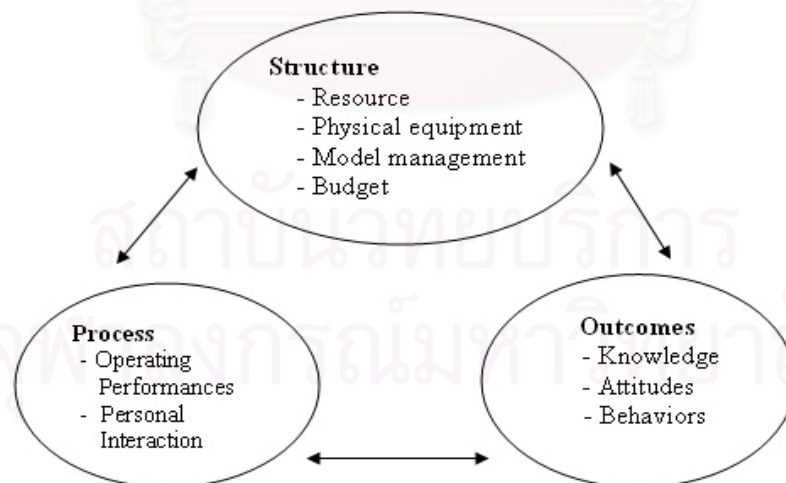


Figure 2 Evaluation of Quality of Care

5.1.1 Structure was considered based on the concepts of Donabedian (1966), the first element in the model was structure. This refers to the resources, physical equipment, model management, budget in place to deliver care to persons with type 2 diabetes. Examples were also comprised of nurse training, the structures of diabetes education area including documentation forms, education aids, and facility accessibility. Although structures do not guarantee quality care, they are important to provide quality of care. In this study, the researcher chose the Red Cross Health Station, relief and Community Public Health Burua, Thai Red Cross Society, Public Health Care is comprised of 12 Red Cross Health Stations; 2 Red Cross Health Station branches in Bangkok and other provinces (Thai Red Cross Society,2008). The scope of practice included as followed:

1) Health promotion services including family planning, child nutrition, and home cares are targeted to mothers and their newborns, schools, and the elderly.

2) Disease Prevention: this scope of practices is immunization for against various diseases which is delivered to children and adults both in and outside health station.

3) Primary medical care: this scope of practice was examination, diagnosis, and treatment of common diseases which are offered including blood and urine tests, wound dressing, and injections.

4) Health Education Courses: the courses were offered both in the setting and the outside setting and through the press.

Such the scope of practice in the health station, the researcher chose the 2 Red Cross Health Station in Bangkok to be the setting in the study. These 2 setting has similar to the health care service of Bangkok Metropolitan and minister of public Health, Thailand.

5.1.2 The second element was processes which are the actual activities of care provided. This element was comprised of operating performance, personal interaction (Donabedian,1966: 166-203). In the current health care system, the nursing care for persons with type 2 diabetes is very difficult, this chronic care require ongoing process, empower to the persons to manage themselves. In this study, the researcher chose chronic care model (Wagner et al.,1996: 511-544) and coaching (Eaton & Johnson,2001b) as elements of process of care which could improve the health outcomes in persons with type 2 diabetes.

5.1.3 The final of element of the system model is outcomes. Donabedian generally defined outcomes as “changes in the current or future health status of clients that take place as results of antecedent health care” when evaluating the outcomes of a nurse’s care, Donabedian present the knowledge, attitudes and behavior as an short-term outcome for evaluation. Hanuchareonkul (2005) recommended the goals of nursing care. These included holistic care, patient-centered, advocate persons, nurse-patient relationship, care for the human response, integrated nursing care based on the objectivity and subjectivity as well as patient’s experience, elimination or reduction of symptoms, slowing of disease process, and prevention of disease or symptoms. Such these recommendation, the outcomes of this research were diabetic complications which were measured perceived symptom of diabetic complications as a subjectivity assessment and physiological outcomes which strongly associated with diabetic complications including HbA1c, blood pressure and LDL-C level as objectivity assessment.

From the concepts of Bertalanffy (1968) the Donabedian (1966) stated about the elements of system theory including input, process and outcomes. These concepts need to clarify the elements of process of care this study, however, with the complexity of the health care system and chronic care illness such diabetes, there was a need to integrate some elements in the chronic care service to deliver to the persons with type 2 diabetes.

5.2 Chronic care model (CCM)

Translating verified therapies and interventions into routine practice and measuring change in population level health was difficult (Roberto and Carol, 2007 215-222). The chronic care model (CCM) was a framework for managing chronic illness such as diabetes, which facilitated planning and coordination among providers while helping persons with type 2 diabetes to play an informed role in managing their own care (Wagner et al.,2001: 64-78). This model was developed in the United States in 2002 for primary care of persons with chronic illness because these group have received service from the family physician and community nurse (Bodenheimer,2002: 1775-1779). The components of the CCM have been shown to be effective for improving certain process measures (Renders et al.,2001) including community resources and policies, health care organizational support, delivery system design, decision support, clinical information systems, self management support, productive interaction.

5.2.1 Community Resources and Policies: Increasing access to effective programming in the organization through linkages with the relevant agencies was a cost-effective way to obtain important services such as nutrition counseling or peer-support

groups. Similarly, negotiations with other health care organizations in the setting were often important to enhance continuity of care and expand services or to gather data useful to the registry. For example, ambulatory care organizations negotiated new relationships with neighboring hospitals or specialty groups to gain access to self-management classes or nurse educator services, or with their commercial laboratories to get download of laboratory data for their registries. Community linkages proved to be especially useful for smaller organizations. On the other hand, effective programs were identified and patients were encouraged to participate. Partnerships with community organizations were formed to develop evidence-based programs and health policies that support chronic care. (Siminerio et al.,2005: 225-234).



Figure 5 : Chronic care model (Wagner et al.,1996: 511-544)

5.2.2 Health care organizational support was the concept that directed the culture of the practice as well as system leadership. The ideal practice has a culture where the optimal management of chronic illness and practice improvement were key values (Piatt et al.,2006: 811-817). In addition, in the ideal practice, leadership was committed and visibly involved, supports change and quality improvement, and creates incentives for providers and patients to improve care and adhere to evidence-base practice. A critical role of practice leaders was to set the expectations, make quality a priority, and provide the resources to support chronic care and practice improvement programs. There was

strong evidence to support the importance of organizational support in improving outcomes (Bonomi et al.,2002: 791-820). When creating a system dedicated to the improvement of chronic illness care, system elements highlight the need for visible support at all levels of the organization. Senior leadership needs to identify and communicate care improvement as important and promote transparent handling of errors and care problems to facilitate learning and system improvement (Wagner et al.,2001: 64-78).

This study was supported from the head nurses of the Red Cross Health Station for improvement in chronic illness care. Family physician and head nurse also supported learning session for the nurses for improving outcomes. Therefore, the researcher invited the head nurse of the 2nd Red Cross Health Station where was assigned to be an experimental setting, the head nurse involved in the study. They could provide the health care resource and advice the registered nurse to be proactive team.

5.2.3 Delivery System Design: this concept refers to the structure of medical practice had to altered and create proactive team to manage chronic care illness (Fiandt,2007). Non physician personal were trained to support persons' self management arrange for routine provide task such as laboratory testing for persons with diabetes, eye examination, foot examination and ensure the appropriate follow up (Bodenheimer et al.,2002: 1775-1779). Team roles were defined and tasks delegated. Planned visitings were used to provide care. Continuity was assured by the community care team. Regular follow-up was ensured (Nutting et al.,2007: 14-20). Nurses redesign system of care. Nurse team plan visits care, coordination -team practice and visit system change.

5.2.4 Decision Support: this was Evidence based guidelines were integrated into daily clinical practice. Specialist was integrated into community care. Provider education modalities proven to change practice behavior were utilized. Persons with type 2 diabetes were informed of guidelines pertinent to their care (Nutting et al.,2007: 14-20). This study the researcher developed manual program training for nurse. The program was use as a guide for intervention. Thus these were document as the Guideline for persons with type 2 diabetes to prevent diabetic complications in the setting.

5.2.5 Clinical Information Systems: now the computerized equipment has been provided to the community care. the computerized information has 3 essential role (1) as a reminder system which help primary care team adhere with the guideline, (2) as a feedback to physician presenting how much is performing on chronic illness measure

such as fasting blood sugar, HbA1c, LDL-C level (3) as a registries for planning individual patient care (Bodenheimer et al.,2002: 1775-1779). All these computerized information roles was useful and timely information (Nutting et al.,2007: 14-20).

In the health station, the nurse in the team had developed the registries program for persons with chronic illness such as diabetes but there was not HbA1c testing information before intervention. The researcher recommended the nurses in the team putting this information in the registry as data for planning individual person care.

5.2.6 Self-management Support: this section was to empower and prepare persons with type 2 diabetes to manage their health and healthcare more effectively (McCulloch et al.,2004: 92-96) and diabetes self management education (DSME) was used in this section. To support self management in persons with type 2 diabetes. DSME was defined to understand the concept. DSME means an interactive, collaborative, ongoing process involving the person with diabetes and the educator (s). This process consist of 1) assessment of the individual's specific educational needs; 2) identification of the individual's specific diabetes self-management goals; 3) educational and behavioral intervention directed toward assisting the individual achieve self-management goals; and 4) evaluation of the individual's attainment of identified self-management goals (Mensing et al.,2007: S96-103). Many other definitions of diabetes education also exist. The International Diabetes Federation, for instance, uses DSME in the term of "therapeutic education" , which refers to education that results in the person being willing and able to self-manage their disease to the best of their ability using the health care professionals as a resource (International Diabetes Federation,2005).

According to Mensing (2007), persons with type 2 diabetes have to engage in DSME program which is an crucial part of the clinical care of diabetes and includes consideration of the physical, psychological, cultural and spiritual aspects of diabetes care to ensure a holistic approach was adopted (Belton et al.,2006; Tibbetts, 2006). In addition, providers emphasized the persons' active and central role in managing their illness (Anderson et al., 1995: 943-949). Standardized patient assessments include self-management knowledge, skills, confidence, supports, and barriers (Glasgow et al.,2005: 2655-2661). Effective behavior change interventions and ongoing support with peers or professionals were provided. Collaborative care planning and assistance with problem solving were assured by the care team (Nutting et al.,2007: 14-20; Siminerio et al.,2005: 225-234; Siminerio et al.,2006: 253-260).

5.2.7 Productive interaction was a part of good chronic illness care requires productive clinical interactions between informed activated patients and prepared proactive practice teams. An informed activated patient understands the disease process, and realizes his/her role as the daily self-manager. The proactive team members have the patient information, decision support, people, equipment, and time required to deliver evidence-based clinical management and self-management support at the time of the visiting (Nutting et al.,2007: 14-20). A thorough assessment was conducted and clinical management was guided by tailoring clinical management protocols to the needs and preferences of the patient. As a result of their interaction a shared care plan was developed including goal setting and problem solving. Active, sustained followed up ensures progress toward meeting the goals and amending management to meet them (Siminerio et al.,2004: 54-58).

Generally, the CCM initiates at the bottom with improved outcomes what providers (nurse) and patient (persons with type 2 diabetes) would consider the most important aspect of care (see Figure 1). In order to achieve the result, change was necessary to the way in which persons with type 2 diabetes interact with their practice team. This needs productive interactions between a prepared proactive practice team and an informed, activated person with type 2 diabetes. It was clinical and behavioral interventions that reflect evidence based, guideline-driven chronic care delivered in a fairly systematic way. These interactions also include assessments of clinical status, self-management skills, confidence, as well as collaborative goal setting as a matter of design. Productive interactions need not necessarily occur in person or individually but could be by phone, e-mail or tele-health or home visiting (Michele, 2007: 1-3).

As the evidence above, the CCM was the collaborative combine rapid-cycle change methods with multiple change strategies to facilitate improvements in processes and outcomes of care for persons with chronic illness such diabetes, hypertension (Pearson et al.,2005). As the fundamental of concepts, the self management support could not be delivered alone, it needs other elements such as clinical information system, and (redesigned) delivery system and community resources (Wagner et al.,1996: 511-544). Support from the health system and the community was necessary to facilitate the productive interaction between patients and providers (Siminerio et al.,2005: 225-234). Therefore this framework was also used to guide to develop the effective intervention to reduce diabetic complications in persons with type 2 diabetes.

From productive interaction concept suggestion, the researcher found a concept of coaching to create the intervention and this intervention help nurses in community delivered diabetes self-management education to persons with type 2 diabetes as step by step. The researcher also selected the 4 concepts from chronic care model which could be integrated into practice such as delivery system design, decision support, clinical information systems, self-management support. These concepts were provided to the nurses for preparing the proactive team to create the productive interaction and recognizing the improvement of quality of chronic care.

5.3 Coaching

The word coach was originated from the Middle English word "coche", meaning wagon or carriage, a means of conveyance from one destination to another. Currently coach was used as meaning a teacher was suitable because a coach facilitates the safe and security passage of a person in transition from one situation to another (Hamric et al., 2005). Coaching was a complex interpersonal work that assists people who were facing personal transitions of journeys. This meaning of coaching was able to be applied to nurse-patient, faculty-student, preceptor-student, and mentor-protégé relationships (Hamric, 2005).

5.3.1 Definition of coaching: Because coaching was a newly growing and rapidly expanding field of intervention expertise, variations in practice and definition abound. Over the past 5 years, nevertheless, professional associations and accrediting bodies have started to distill common critical aims and attributes that uniquely distinguish coaching from other intervention approaches. Thus, coaching might be broadly defined as a structured, process-driven professional relationship between a qualified coach and a client designed to foster the achievement of extraordinary results based on specific aspirations and goals set by the client to reach higher levels of performance, learning, growth, or satisfaction/fulfillment in any aspect of work or life (Flaherty, 1999; Hargrove, 2003; International Coach Federation, 2004). It was a holistic and systematic conversational approach designed to increase clients' competency and confidence by creating an empowering and appreciative context (based on what's working, existing strengths, and aspirations) for clients to clarify their values; assess discrepancies between their ideal state and their current situation; identify what they need to change; determine their internal motivations and hidden obstacles to success; increase their thinking to include new and intriguing possibilities not imagined before; and identify the strategies,

action steps, and accountability measures they will implement to produce and sustain their desired outcomes (Maynard, 2006: 135).

Donner, Wheeler and Waddell (1997) defined coaching similar to Lewis as “an unending, face-to-face process by which the manager (leader) and employee collaborate to accomplish increased job knowledge, improved skills in carrying out job responsibilities, a stronger and more positive working relationship, and chances for personal as well as professional growth for the employee. Coaching combined with teaching, training and counseling. This method could be assisted clients set priorities and goals, take action, make changes, and reshape their lives (Gracey,2001: 176-180). At the key of coaching was the concern for the development of the individual, which in turn assist the manager/leader or the staff nurse to reach his or her full potential (Haas,1992: 54-58).

Coaching was first introduced as a distinctive approach to personal and professional development in 1982 by Thomas Leonard. This concept was commonly known as personal or life coaching (Leonard & Laursen, 1998). Coaching (Andhara, 2000) has been also expanded into a wide variety of fields, including health. In applied coaching, the principles and signature approaches of coaching were followed, but certain aspects of the implementation were adapted to fit within the constraints and purposes of the specific application.

Coaching was a purposeful process. It was viewed as integral to the learning process for its effect on accelerating training efforts (Cunningham & McNally,2003: 46-49). A coach was used as a person established his or her readiness for making a transition and advancement along the clinical practice development model (CPDM) continuum. This concept was the role accountability of all managers and CNSs. All coaches were validated in their ability to read clinical narratives and identify characteristics of nursing practice (Lewis,1996: 48-52).

Coaching was also an individual effect and had an overall effect on the nursing staff as a team. The meaning concept was more often a shorter-term relationship than mentoring and tends to have very specific aims to achieve (Gracey,2001: 176-180). This concept helps individuals to think about and plan to move forward, cope with novel or unusual situations at work, settle into a new role, work through periods of change or innovation, refine their approach to situations at work, and actively develop themselves (Girvin,1999: 55-57). Moreover, coaching (Brounstein,2000) serves as a vehicle for performance feedback, setting goals and building performance plans with individuals,

conducting periodic performance reviews, motivating employee performance, and delegating accountability to empower and increase productivity. It was not an preclass teaching session but an opportunity to support persons to find out their own potential and improve their performance by assisting them to learn.

From the above mention could be summarized that coaching incorporates a variety of concepts and principles drawn from the behavioral sciences, organizational development, learning theory, spiritual traditions, the arts and humanities, personal development techniques, appreciative inquiry, and sports training to increase self-awareness of others and self confidence in persons.

5.3.2 Attribute of coaching: Coaching was associated with training for a particular predefined purpose (Carroll,2004: 318-322); for example to coach in a subject, to prepare for examination, or to serve as an overseer (Hargrove, 2000). Coaching frequently involves formalized evaluative and concentrated motivating processes. Famous athletes were often coached, sport teams were coached, and there were coaches for weight loss, and there were coaches for training amateur athletes for events such as marathons. In these coaching examples there were specific focused purposes and outcomes of both individuals and teams associated with coaching activities.

Coaching was a collaborative relationship between professional coach and client to assist the client see new possibilities and take effective action. Coaching was an excellent strategy for developing the leadership competencies of emotional intelligence, change management, problem solving, and decision making (Cunningham & McNally,2003: 46-49).

5.3.3 Outcomes of coaching : when nurse use this concept, they can focus on the following learning outcomes for persons with diabetes (Hughes,2003: 42-44).

5.3.3.1 Knowledge: Coaching could be used to clarify gaps in knowledge and classify understanding of health issues. It could enhance self-awareness and knowledge and other resources in persons. Motivated persons are resourceful in finding alternative sources of help.

5.3.3.2 Beliefs and values Coaching focuses patients on what is important for them, and enables them to explore what their ill health means to them without feeling threatened.

5.3.3.3 Skills and tasks: Coaching allows persons with type 2 diabetes to reflect on how or what they need to do to increase their ability for self-care. This in turn will increase confidence and self-esteem.

5.3.4 Process of coaching : The processes of coaching from establishing a relationship, recognizing an opening, observing and assessing, enrolling clients, and coaching conversations were overviewed (Bartlett II,2007: 91-93).

Eaton et al (2001) demonstrated that steps of coaching process were goal definition, analysis, exploration, action, learning, feedback. The detail of coaching process was

Step1: Goal Definition; this step occurred when the coach and coachee agree what the coaching goals were. The collaborative setting was shared between the coach and coachee. Goals need to be specific, measurable, achievable, relevant, and timed.

Step 2: Analysis; analysis, assist the two to examine the “present reality”: where the coachee was at the present time with regard to the coaching goal.

Step 3: Exploration; what were the different options aimed at obtaining the goals? Within the third step, exploration, the two explore different options available to achieve the goals.

Step 4: Action; Moving forward; identify and commit to a course of action. During the fourth step, action, they identify what tasks need to be done to accomplish the goal and then commit to a course of action. Often times the first 4 steps could be achieved in a single coaching session.

Step 5: Learning; Implementation of the agreed-on actions. During the fifth step, learning, the coachee begins implementation of the agreed-on actions to reach the desired goal with the support of the coach.

Step 6: Feedback; What has been learned? In the final step, feedback, the coach and coachee hold a feedback session and consider what has been learned and how the learning could be built on.

Gracey (2001) stated that whenever advance practice nurse used the framework developed by Eaton and Johnson (2001) on the conditions, the process were:

1) Building Skills: was often a situation arises where opportunities were set up for learning and practicing new skills.

2) Progressing Projects: oversight of the progress of projects by the APN.

3) Solving Problems that APNs were often involved in situations in which problems need resolution. She or he could assist coach staff to classify the problem and possible routes to the solution.

4) Developing Careers: helping staff/colleagues prepare for career changes or promotions.

5) Overcoming Conflicts: defusing disagreements among team members or staff.

6) Remotivating Staff: restoring hope and enthusiasm and commitment within the team by role modeling his or her own enthusiasm and helping others work through the issues that were bothering them.

7) Brainstorming: an area in which the APN could help to direct the creative input of the team or individual to help keep projects and goals on track

Girvin (1999) proposed 5 steps, these 5 coaching process steps included:

- 1) Agreeing on the environment
- 2) Assessment and analysis
- 3) Reflection and development planning
- 4) Action planning
- 5) Evaluation.

Coaching was frequently a continuous process; with each new achievement the coachee reaches leading to a platform for the next challenges and potential coaching sessions. Five principles to transform performance were: accurately assess the readiness to change, clearly state the overall strategic direction, identify the key stages on the journey, gain commitment to the common goal, establish a process to learn and grow. Normally the final stage of a coaching cycle initiates a new cycle by defining the next achievable goal that the coachee has identified through the learning process of being coached.

Huseman (2007) stated that coaching could use in the Hospital executives and nurse leaders. Coaching hospital executives and senior leaders started the process with targeting goals, analyzing processes, and gathering feedback on current performance at multiple levels. Before moving forward in any way, coaches need to be certain that the executive has a clear picture of where things were right now. With a clear picture in place, performance coaches then help executives find their blind spots, identify problem areas hindering performance, offer solutions, and then support their executives as they work to reach their self-determined goals (Huseman,2007: 19-20).

5.3.5 Determinants of Successful Coaching Outcomes: The coaching process involves the development of rapport, relationship building, gathering of

information through assessment and review, negotiation of carefully defined goals, and implementing problem solving.

The research had suggested that improved patient outcomes require effective patient education. This education also encourages patients or persons with type 2 diabetes had active participation and interact with the health care provider such as nurse (Norris et al.,2001: 561-587). To achieve the productive interaction that lead to outcomes, the coaching or partnering process was typically occurs in a series of defined steps in productive interaction between persons with type 2 diabetes and nurse as a coach. Eaton and Johnson had structured the coaching process into 6 steps: definition, analysis, exploration, action, learning, and feedback. But Girvin (1999) proposed 5 steps of coaching process including: agreeing on the environment, assessment and analysis, reflection and development planning, action planning, and evaluation. While Hamric et al (1996) suggest that coaching compose of assessment, process and outcomes. As the idea of experts in coaching concept, the process that use in This study was assessing, goal definition, analyzed, exploration, action, learning and feedback.

Coaching was an integral independent function of nursing practice; it also bridges the gap between health information and health practices resulting in altered behaviors of persons with type 2 diabetes in the desired direction. This was also an approach used in this study. The nurse practitioner could perform coaching during home care to visit the patient on a part-time and intermittent basis. Because the nurse's contact with the patient and caregiver was limited, it was important that the nurse teaches patients how to manage their health care needs at home. Part of the process will involve making feedback information available to patients and asswasting them to take those health actions that work the best for them.

5.3.6 Program for the multifaceted nurse coaching intervention: this development of the program based on system theory, integrated chronic care model and coaching process. This study aimed to reduce diabetic complications, and improve quality of care. The effective intervention should be prepared for nurse to be a coach because the community nurse could establish well relationship with the persons with type 2.

5.3.6.1 Preparing nurse to be a proactive team:

Deliver system design was altered from medical practice to nursing practice. In the previous time, the physicians mainly provided diabetes information to the persons with diabetes but this intervention was developed to use community nurse as a

coach who was a non physician. The nurses were trained to be a proactive team to inform and activate persons with diabetes type 2. Increasing the number of HbA1c testing in the persons with diabetes which had never done before to evaluate the self management for persons with type 2 diabetes in the previous 6-12 months. Furthermore, the nurse also deliver diabetes self management education to help individual person with type 2 diabetes increase knowledge and acquired self management skills to change behaviors via coaching process with face to face and telephone. The nurse planned visited appointment for coaching in each session.

Self management support was trained to the nurses to use coaching process and integrated diabetes self management education during nurse-person interaction. The all instruction and manual guideline which the researcher developed as a decisions support were also utilized. The nurse collected the clinical information including assessing perceived symptom of diabetic complications from the persons, chart reviewed, and from the computerized equipment such as fasting blood sugar, HbA1c, blood pressure, Lipid profil level especially LDL-C to plan for deliver health care to the individual person and, developed action plan. The nurse learnt coaching process and diabetes self management components. These could help nurse provide coaching process which was a collaborative problem solving solution to increase knowledge, attitude and aquired skill of self management in persons with type 2 diabetes in short term. These shorterm outcomes could be mediated to achieved HbA1c, blood pressure, and LDL-C level. The consequence of this program might reduce diabetic complications both microvascular diseases and macrovascular diseases. The intervention conducted after the nurse was trained in the program. Some components of chronic care model were selected to integrate into persons with type 2 diabetes such as deliver system design, clinical information, and self management support.

5.3.6.2 The nurse conducted the intervention: the nurse provided the program and used 2 different approaches; individual face to face and telephone composing of;

- 1) Assessment for solves the problem: a nurse coach met with the participant and the nurse assess perceived symptom of diabetic complications and the diabetes self management's knowledge of persons with type 2 diabetes and the summary of diabetes self care activities measure (SDSCA) as monitoring instrument to reflect about the problems related to change behavior including diet control, exercise,

medication therapy, and reducing stress management, hygienic and foot care. To address this individuality, the nurse and participant as a partnership begins with the person's opportunity to tell their "story." That personal story, which includes past illness experiences, view of health, current illnesses, and current life priorities, societal/ethnic meaning of health activities, and perception of self-efficacy, provides the background to lifestyle choices and current health and illness experiences.

2) Goal definition: was a process for behavior change to set up the priority of each goal setting. By actively listening to these integral components of life, nurse coaches enable a participant to reflect on the readiness to address specific behavioral changes in a way that was consistent with their personal priorities, resources, and impediments to change. The statement was in terms of participant achievement that was specific and measurable, and includes a target date and hour for evaluation. The goal was to enable participants to feel empowered and motivated to change, rather than having professionals doing it for them. Effective Goal Setting should be an intrinsic motivation predicts health outcomes, match goals and stage of readiness to change, process and outcome goals (controllability) and positive reframing.

3) Analysis: assist the persons with type 2 diabetes examine the "present reality": where they were at the present and help the individual identify small steps to begin the process of reaching those goals. The nurse employs opened questions to seek the strength and weakness in that may become barriers

and looked for opportunity and threats from the environment that could help the people develop their behavior to achieve their goal.

4) Exploration: this is a process in which the two explore different options available to achieve their goals, as well as other possible options to meet the energy concerns of the people. This exploration was made one or two changes in diet if the people with type 2 diabetes feel ready to make those changes. For example, if exercise and diet are parts of the individual's goals, the nurse will briefly comment on the potential side benefits of lowering cholesterol. When the client does not wish to address cholesterol lowering activities, the nurse should convey confidence that the individual will be successful in making those changes when s/he was ready.

5) Actions plan: the nurse and participant identify what their first tasks need to be done to accomplish the goal, and then commit to act the plan. The strategy was a combination of firmness and encouragement with patience and empathy and motivation for action by having encouraged the participant to decide a plan of action that involves a gradual step-by-step route to a goal. The coaching with face-to-face meeting was provided for encouraging and increasing knowledge and skills.

6) Learning by themselves: Then, the participant began implementation of the agreed-on actions to reach the desired goal at home for two weeks.

7) Feedback: Then, the nurse coach used schedule appointment and visited the community setting to follow up the participant and evaluate progress towards their chosen goal(s) and contact was made every two weeks.

5.3.2 The 2nd approach at the community care: 2 weeks after the 1st visit. The process was the same as the first visit. The person chose the diabetes self-management session as they need to know and further practice. The coaching process also was delivered to the person and the followed up visiting was made the next two weeks. The time for approach was approximately 1 hour.

5.3.3 The 3rd approach at the community care: 2 weeks after the 2nd visit and the process was the same as the first and second visits. The final of this phase was that the nurse and participant held a feedback session at the health station at the end of the six weeks. At this week, the researcher performed post-test to

evaluate the diabetes knowledge of people with type 2 diabetes questionnaire and the summary of diabetes self-care activities measurement (SDSCA). This evaluation was a feedback to each participant to show them their progression. Blood samples of HbA1c and LDL were taken and the nurse explained these two variables for feedback the person's self-management with the telephone. The time for approach was approximately 1 hour.

5.3.4 The 4th approach with Telephone coaching: the nurse called the participants and gave them the results of blood sample taken, i.e., HbA1c and LDL. The results could present the self management ability during the past 6-8 weeks. The nurse reviewed the action plan and asked about the problems that contributed to unachieved the behavior change. The nurse encouraged the participants to describe and explain the behavior that was still unchanged. The nurse further used the steps of coaching especially to set up the goal with the participant to be evaluated during the next visit. The time for discussion was 15-30 minutes.

5.3.5 The 5th approach with Telephone coaching: the nurse called the participant for an interview and followed up with the action plan. The nurse also used the motivational interviewing by asking the open questions to assist the participant to recall their plans and self management such as diet, medication used and exercise, etc. After discussion and interact to the individual, the nurse then summarized the achieved plan and coaching goal and appoints the time to end the program. The time for discussion was 15-30 minutes.

6. SATISFACTION WITH NURSING INTERVENTION

Quality of care from the patient's perspective and satisfaction were major multidimensional concepts that were utilized several times interchangeably. Quality of care has a subjective profile as it includes a cognitive evaluation process and an objective determinant which was care as an outcome, a process or a structure measure (Raftopoulos, 2005 1-15). For person with type 2 diabetes perceive quality of care, caring must be viewed from their view. The persons' perception of nursing intervention should be a component of satisfaction surveys (Williams, 1998). In fact, in the USA the importance of satisfaction was routinely included in accreditation standards and in standards of care developed by professional organizations (Thapinta and Anders, 2004: 271-277).

6.1 Definition of satisfaction

Satisfaction refer to the subjective evaluation of persons' cognitive and emotional reaction as a result of the interaction between their expectations regarding ideal nursing care and their perceptions of the actual nursing care (Eriksen, 1995: 59-76.;Johansson and Oleni, 2002: 337-344). Satisfaction with nursing intervention in persons with type 2 diabetes has become an important indicator to measure the quality of care (Fan and Burman, 2004: 226-233).

6.2 Concept Related to the Theory

This study, satisfaction represents a global cognitive evaluation or judgment in term of satisfaction with the quality of care provided. According to this view, satisfaction could be viewed as an attitude: "a summary evaluation of care episodes ranging from positive to negative". In another word, satisfaction was an evaluative summary of one's likes or dislikes of the care provided. We emphasized the role of broad individual differences in personality, satisfaction and the role of certain situations, events, during hospitalization or during previous uses of healthcare services in overall satisfaction with care provided. Several aspects of patients' personality affect the way they consider the certain or all stimuli of care environment. From a healthcare provider's perspective, one of the main reasons for measuring satisfaction was to provide information to facilitate improvements to the process of care. To identify aspects of the care process, a variable that measures could affect patients' overall perceptions of the quality of care received (Sandoval and Levinton, 2006: 151-156). This study found that clinical experience and technical competency of nursing intervention may contribute to satisfaction.

However, quality of care depends person's subjective perception of what represents satisfaction that counts (Leino-Kilpi and Vuorenheimo, 1992: 22-28). In this regard, the concept should be considered as an adequate indicator of nursing intervention. Persons with type 2 diabetes could look forward to and demand satisfaction from nursing intervention and should be allowed to take an active part in decision making concerning their care. This contributes to making nursing intervention both patient- and result-orientated. Different healthcare professionals exert different influences on the person's perception of satisfaction (Johansson and Oleni et al., 2002: 337-344). In persons with type 2 diabetes assessments of their satisfaction with healthcare, the nursing intervention provided by nurses was

considered as the most important factor. In This respect, the nurse was at the forefront of the healthcare system. If the nurse was unable to fulfill this role, a high level of satisfaction in persons who received the intervention will not be achieved. It was, therefore, of crucial importance that all healthcare professionals co-operate to improve care quality, in consultation with the care-receivers (Idwall and Rooke, 1997: 6-17). However, satisfaction in the nursing intervention may occur from several factors.

6.3 The factors that influence the concept of patient satisfaction

As seen from the patient's perspective, the factors that influence the concept of patient satisfaction were of primary importance, such as those of the health care professionals, were of lesser value. If the patient was satisfied with the nursing service received, This was positive not only for the individual but also for the nurse and the whole health care organization (Johansson et al.,2002: 337-344).

Hornsten and Lundman used qualitative in order to elucidate patients' perspectives about clinical encounters in diabetes care. Five themes were connected to patient satisfaction and dissatisfaction, namely 'being in agreement vs. in disagreement about the goals'; 'autonomy and equality vs. feeling forced into adaptation and submission'; 'feeling worthy as a person vs. feeling worthless'; 'being attended to and feeling welcome vs. ignored'; and, lastly, 'feeling safe and confident vs. feeling unsafe and lacking confidence. The researcher suggested that despite efforts to individualize diabetes care and find ways to communicate with persons with diabetes, many people had experiences of clinical run into dissatisfaction. Experiences of dissatisfaction encounters have elements that may threaten their perception of self and identity, while elements included in satisfaction encounters were those characterizing patient-centered care (Hornsten et al.,2005: 609-617).

A Medical Survey (2002) found the following variables to influence patient satisfaction: top management commitment; linking of patient satisfaction scores with employee and management monetary incentives; and recognition of employees who contribute to patient satisfaction. Determinants of patient satisfaction include, but were not limited to, gender and familiarity with the number of physician visitings (Esterhai et al. 1998). Patients varied in their level of satisfaction; Gines et al. (2002) reported that medical patients were more satisfied than non-medical patients, while Middletown et al. (2002) reported that surgical patients have higher levels of satisfaction than medical patients (Mrayyan,2006: 224-230).

Fan (2004) found that among the many factors influencing satisfaction were health care setting, characteristics of the medical provider such as experience, age, or gender, and continuity of care. Along with patient characteristics such as age, gender, and income, patients' self-reported general health status has consistently predicted their satisfaction with health care. Patient education and ability to cope with chronic conditions were more strongly associated with satisfaction with community care provider than disease severity.

6.4 Component of satisfaction

Several components have been proposed, some appropriate for specific health care contexts, others aiming at broad applicability.

The study based on the concept of access to care of Penchansky and Thomas (1981). They used access as a key concept in health policy and health services to find out the customer satisfaction. "Access" refers to entry into or use of the health care system, while to others it characterizes factors influencing entry or use. As created by Penchansky and Thomas (1981), access reflects the fit between characteristics and expectations of the providers and the clients. They grouped these characteristics into five As of access to care: affordability, availability, accessibility, accommodation, and acceptability.

Affordability was determined by how the provider's charges relate to the client's ability and willingness to pay for services. Availability measures the extent to which the provider has the requisite resources, such as personnel and technology, to meet the needs of the client.

Accessibility refers to geographic accessibility, which was determined by how easily the client could physically reach the provider's location.

Accommodation reflects the extent to which the provider's operation was organized in ways that meet the constraints and preferences of the client. Of greatest concern were hours of operation, how telephone communications were handled, and the client's ability to receive care without prior appointments.

Acceptability captures the extent to which the client was comfortable with the more immutable characteristics of the provider, and vice versa. These characteristics include the age, sex, social class, and ethnicity of the provider (and of the client), as well as the diagnosis and type of coverage of the client.

Cheevakasemsook and Yunibhabd (2005) developed a patient satisfaction with quality of nursing care questionnaire. The concepts consists of

- 1) Art of nursing care dimension consists of various aspects of satisfaction with the nurse ' behavior, such as
- 2) Technical nursing dimension
- 3) Managing environment dimension
- 4) Available nursing service dimension
- 5) Continuing of care dimension
- 6) Effectiveness of nursing care or outcomes of nursing care dimension

Phattharayuttawat and et al (2005) developed the taxonomy of the Thai Psychiatric Satisfaction Scale (TPSS) (Phattharayuttawat & Ngamthipwatthana, 2005: 1067-1076). Each conceptual dimension of the TPSS consists of a certain number of items that cover various aspects of satisfaction with services:

- 1) The Professionals' Skills and Behavior dimension consists of various aspects of satisfaction with the professionals' behavior, such as technical skills, interpersonal skills, cooperation between service provider respect of patients' rights, etc.; psychiatrists, psychologists, nurses and social workers assessed in separate items;

- 2) The Information dimension consists of 3 items which cover aspects related with satisfaction with service information;

- 3) The Access dimension consists of 4 items which cover aspects related with satisfaction with service location physical layout and costs;

- 4) The Efficacy dimension consists of 5 items which cover aspects related with satisfaction with overall efficacy of the service, and service efficacy on specific aspects such as symptoms, social skills, and family relationships;

- 5) The Type of Intervention dimension consists of 9 items which cover various aspects of satisfaction with care, such as drugs prescription, response to emergency, psychotherapy, rehabilitation, domiciliary care, admission, housing, recreational activities work, benefits, etc.

- 6) The Relative's Involvement dimension consists of 4 items which cover various aspects of the patient's satisfaction with help given to his/her closest relative, such as listening, understanding, advice, information, help coping with the patient's problems

- 7) Environment and Setting dimension consists of five items which cover various aspects of the patient's satisfaction with the Environment and Setting of the psychiatric services.

8) The Overall Satisfaction dimension consists of 4 items which cover general aspects of satisfaction with psychiatric services.

6.5 Measurement of patient satisfaction

Patient satisfaction measures were among the most frequently used techniques in health care quality assurance. Patient satisfaction measures have been used for a variety of purposes and in a wide range of settings some were designed to identify problems and potential improvements (Ellis & Whittington, 1993). For this study, the researcher designed to measure improvement of quality of diabetic care service that takes part in a multifaceted nurse coaching intervention.

The measurement of patient satisfaction was becoming of more interest to providers and administrators. Especially patient satisfaction with nursing service could become an outcome measurement because satisfaction with nursing service has been shown to be the most important predictor of all over satisfaction with hospital care (Munro, et al 1994). For this study, provision of nursing service in community care, the researcher selected the concept of access to care of Penchansky and Thomas (1981) because it clearly outlines the dimensions of satisfaction to be measured.

7. RESEARCH STUDIES AND RELATED VARIABLES ON THE STUDY

Literature reviewed related to coaching: coaching could be used in various areas such as in clinic, nurse education, nursing management, nursing practice. From the evidence could be summarized that the coaching method could be used among inpatient, outpatient and home care for patients to increase the skill or improve behavior change and could increase performance during transition in the patients, nurse and student nurses, for examples, coaching could be used in various areas such as in clinic, nurse education, nursing management, nursing practice. From the evidence could be summarized that the coaching method could be used among inpatient, outpatient and community care for persons with diabetes to increase the skill or improve behavior change and could increase performance during transition in the patients, nurse and student nurses.

Vale, et al (2002) used coaching in an effort to close the management gap and accomplish recommended outcome cholesterol levels. Patients hospitalized for PCI or CABG at a single teaching hospital in Australia were assigned to two groups by random numbers and stratified by type of procedure. The control group received usual care, while the intervention group received usual care as well as the coaching intervention. Participants in the intervention group were contacted by the coach who was

nurse or dietitian and by phone 2 weeks after randomization and then three additional times at 6-week intervals, with a reminder call at 24 weeks to schedule the 6-month blood sample. Control group participants were contacted 2 weeks after randomization for a “how were you?” phone call and then at 24 weeks to schedule the 6-month blood sample. Both groups were encouraged to participate in a separate cardiac rehabilitation program. Each of the coaching interventions followed a quality improvement cycle that involved (a) asking questions to evaluate participants’ knowledge, attitudes, and beliefs about their risk factors, (b) educating as needed and explaining the treatments recommended to achieve risk factor goals, (c) training in assertiveness to assist in receiving information from the treating physician as well as requesting appropriate medication therapy, (d) setting goals for the next coaching session and negotiating a plan of action, and (e) reassessing at the next coaching session. All coaching sessions were conducted by the lead author, a dietician with educational and cardiovascular experience. At 6 months the effect of coaching on Total Cholesterol was significant, with $p < .0001$. However, the validity of intervention in this study was not clarified how to prepare coach for conducting intervention. There was no set time frame for coaching sessions. The length of calls varied according to the length of time the coach needed to establish a plan of action with the patient to be achieved by the next coaching session.

A pilot study was to determine the efficacy of a 6-month nurse-coaching intervention that was provided after diabetes education for women with type 2 diabetes. 53 women were randomized to the nurse coaching intervention or a standard care control condition. The nurse-coaching intervention consisted of 5 individualized sessions and 2 follow-up phone calls over 6 months. The nurse-coaching sessions included educational, behavioral, and affective strategies. Data were collected on physiologic adaptation (hemoglobin A1c [A1C] and body mass index [BMI]), self-management (dietary and exercise), psychosocial adaptation (diabetes-related distress and integration), and treatment satisfaction at baseline, 3 months, and 6 months. Women in the treatment group demonstrated better diet selfmanagement, less diabetes-related distress, better integration, and more satisfaction with care, and had trends of better exercise self-management and BMI. The A1C levels improved in both groups at 3 months, yet the difference between the groups was not significant. Attendance at nurse-coaching sessions was 96%. This nurse-coaching intervention demonstrates promise as a means of improving self-management and psychosocial outcomes in women with type 2 diabetes

(Whittemore et al.,2004: 795-804). However, the validity of intervention in this study was not clarified how to prepare nurse coach for conducting intervention.

Sangkapong, et al (2003) studied effects of coaching and reflective learning on competency and satisfaction towards the teaching and learning process of nursing students. The findings revealed that the students who participated in the coaching and reflective learning activities had a high level of clinical competency and a high level of satisfaction with the teaching and learning process. Meanwhile, the students who participated in usual teaching and learning activities had a moderate level of clinical competency and a moderate level of satisfaction. When comparing the two groups, the means scores of clinical competency of the students who participated in the coaching and reflective learning activities were significant higher than those in the usual teaching and learning activities ($P < 0.05$), whereas the mean scores of satisfaction of both groups were not statistically different ($P > 0.05$). Based on these findings, nurse educators as well as clinical nurses might consider coaching and reflective learning activities as a strategy for fostering effective teaching and learning process as well as improving competency of the nursing students. The process of the intervention might contaminated to the control group because the participant was stayed in the same setting. therefore the outcome of satisfaction was not different.

Patharavichein (2004) studied the effect of coaching regarding self practice program on distress in mechanically ventilated patients in critical care Unit. The sample was 30 opened heart surgery. The researcher aimed to reduce distress in patents with receiving endotracheal tube and mechanical ventilation, post-operative opened heart surgery. She also used coaching method to assist the participants remove endotracheal tube. The results found that the patients receiving coaching from nurse could improve the distress after post operation but there was no difference distress with mechanical ventilator between groups. This study claim to use coaching but there was the step of goal setting between nurse and patients. so the step of coaching was not completed. This might result in the achieved outcomes.

Bennett et al (2005) used nurse coaching as a method for behavior change in older adults. The sample included 111 individuals randomized to a nurse coaching group or usual-care control group. Participants in the intervention group chose the health behaviors they wanted to change and received coaching by nurses in a single in person session followed by telephone calls or e-mail contact for 6 months. Nurse was trained in motivational interviewing (MI). The intervention group had significant less illness

intrusiveness and health distress than the control group at 6 months, but there were no statistically significant differences between groups on social/role activities limitations, energy, and general health. The researcher recommended the lack of clinically significant might be due to measure health outcomes.

Pranote (2004) conduct a quasi-experimental research to compare the job satisfaction of staff nurses before and after coaching supervision using by head nurses, and to compare the job satisfaction of staff nurses between the experimental groups which using coaching supervision and the control group which non coaching supervision. The research samples were 26 head nurses who had at least 1 year of working experience divided into two groups, 13 head nurses each. Then 226 staff nurses who had work with the head nurses divided to the experimental group 116 nurses and control group 110 nurses. The job satisfaction of staff nurses questionnaire was developed by the researcher from Hackman & Oldham frame work (1980) and judged by the panel of experts. The Cronbach alpha coefficient of reliability was .87 Statistical techniques that had been used for data analysis were t-test statistics. Major findings were the followings: 1. the mean score on job satisfaction of staff nurses after received coaching supervision were significant higher than before received coaching supervision at the .05 level. 2. The mean score on job satisfaction of staff nurses in the received coaching supervision group after intervention was significant higher than non coaching supervision group at the .05 level. however, this study was encouraged to improve satisfaction in the nurse but there was no evidence to improve quality of care.

Panthong (2004) conducted a quasi experimental research was to compare labor pain during active phase of between primigravidas who received Childbirth Preparation with Labor Coaching Program (CPLC Program) and those who received conventional childbirth preparation. Study sample was forty and match pairs of primigravidas and their labor coaches. The samples were obtained from primigravidas who attended prenatal clinic and delivered at Pakpanang Hospital. Twenty subjects each were randomly assigned to either experimental of control group. Additionally, subjects, age range were matched between the two groups. Research instruments included 1) CPLC Program lesson plan and handbook and 2) Pain scale developed by Proniran Udomthavornsak. Data collection was done twice at the beginning and at the end of active phase of labor. Using independent -t-test, research findings were as flow: Labor paing in the beginning and the end of active phase were significant lower in primigravidas who received CPLC Program the those who received conventional childbirth preparation ($t=3.09$, $p<.01$,

respectively). Findings suggest the need for nurses to implement DPLC Program in order to reduce labor pain during active phase.

Masadit (2004) conducted a study to examine the relationships among organization climate, coaching and competencies of professional nurses in regional hospital and medical centers. Subjects, recruited by multi-stage sampling were 378 professional nurses, who had at least 1 year of experience in the nursing units. Data were collected by 4 questionnaires: demographic data, organization climate, coaching and competencies of professional nurses. Questionnaires were tested for content validity by a panel of experts. Reliability by Cronbach 's alpha coefficient were .92, .91 and .92 respectively. The data were analyzed by frequency, percentage, mean, standard deviation and Pearson's product moment correlation coefficient. The major finding was as follows: 1. The organization climate, coaching and competencies of professional nurses were realted at the high level. ([Mean] = 3.86, 3.80 and 3.74) 2. Organization climate and coaching were positively related to competencies of professional nurses at the 0.05 level ($r = .553, p < .05$ and $r = .546, p < .05$, respectively).

From such above evidences could be concluded that preventing and delaying diabetic complications in persons with type 2 diabetes should use the variety strategy that lead to change behavior. A multifaceted nurse- coaching intervention was various approaches that use for change behavior. To date, the existing evidence presented that there were not a multifaceted nurse-coaching intervention that use for prevention of diabetic complications in Thailand.

It is hoped that data gained from this study will present a few of the benefits of utilizing a multifaceted nurse-coaching intervention to improve diabetic complications which were assessed by perceiving symptoms of diabetic complications related to distress and declining physical function, HbA1c, blood pressure level and LDL-C level as well as patient's satisfaction to nursing service . It is also expected that this study will produce rich, data pertaining to persons with type 2 diabetes who have received diabetes management in community setting In addition, findings generated from this study will be evidence for instituting transitional and/or community-based as a mechanism for further improvement of outcomes related to persons with type 2 diabetes..

Conceptual Framework

The Multifaceted Nurses-Coaching

Intervention

The nurse interacted to a person with type 2 diabetes. Nurse tailored the diabetes self management and conducted coaching process as individual face to face 3 times every 2 weeks and 2 telephone call every 2 week over 12 weeks composing of the process as followed;

1. Assessment: assessing for solves the problem, discrepancies between their ideal states and identify what they need to change.

2. Goal definition: collaborating goal setting using techniques of opened questioning, active listening and motivating.

3. Analysis: helping the individual identify small steps to begin the process of reaching those goals, analysing their thinking to include new and intriguing possibilities not imagined

4. Exploration: exploring their internal motivations and hidden obstacles to success

5. Action plan:

- Identifying the strategies, action steps, and accountability measures they will implement to produce and sustain their desired outcomes,

- Providing the tailor session to the person with type 2 diabetes as in the action plan to provide information and counseling as well as assist the persons solve their problems.

6. Learning: the participant had begun implementation of the agreed-on actions to reach the desired goal at home for 2 weeks.

7. Feedback: considering what has been learned and how the learning could be built on evaluating the next goal.

Diabetic Complications in Persons with type 2 diabetes

Subjective

- Perceived symptoms of diabetic complications

Objective

- HbA1c
- Blood pressure
- LDL-C

Satisfaction with nursing intervention

1. Availability
2. Accessibility
3. Accommodation
4. Acceptability

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The study design was quasi-experimental, pretest-posttest control group. The aim of this study was to evaluate the effect of a multifaceted nurse-coaching intervention on diabetic complications and satisfaction. This chapter will discuss the research methodology selected for this study. The discussion will include the study design, population/sampling plan, instrumentation, procedure and data analysis.

C	O ₁		O ₂
E	O ₃	x	O ₄

C = Control group

E = Experimental group

O₁ = Perceived symptoms of diabetic complications, HbA_{1c}, blood pressure, LDL-C level, and satisfaction with nursing services for persons with type 2 diabetes before entry to the program.

O₂ = Perceived symptoms of diabetic complications, HbA_{1c}, blood pressure, LDL-C level, and satisfaction to nursing services for persons with type 2 diabetes after entry to the program.

O₃ = Perceived symptoms of diabetic complications, HbA_{1c}, blood pressure, LDL-C level, and satisfaction with nursing services for persons with type 2 diabetes before receiving a multifaceted nurse-coaching intervention

O₄ = Perceived symptoms of diabetic complications, HbA_{1c}, blood pressure, LDL-C level, and satisfaction to nursing services for persons with type 2 diabetes after receiving a multifaceted nurse-coaching intervention.

X = A multifaceted nurse-coaching intervention proving over 12 weeks

Setting

To improve the quality of care, the researcher selected two Red Cross Health Stations in Bangkok (the 2nd and 11th Red Cross Health Stations) which are primary care centers in urban community organized by the Relief and Public Health Bureau of The Thai Red Cross Society. These two settings provided the same usual care to patients. The nursing staff acted as leaders and delivered chronic care such as diabetic care services in collaboration with family physicians.

Population

The population in this study was composed of two groups, namely:

1. Community nurses at the 2nd and 11th Red Cross Health Stations.
2. Persons with type 2 diabetes who received diabetic care services in community setting. Three hundred and fifty persons with type 2 diabetes received diabetes care at the 2nd Red Cross Health Station, while approximately 100 persons with type 2 diabetes received diabetes care at the 11th Red Cross Health Station.

Participants

The research staff and participants in this study were divided into 2 groups, namely:

1. The community nurses at the 2nd and 11th Red Cross Health Station in Bangkok, they were assigned to participate in the study. The 2nd Red Cross Health Station served as experimental group whereas the 11th Red Cross Health Station control group. The nurses at the 2nd Red Cross Health Station were trained to be a proactive team but the nurses at the 11th Red Cross Health Station did not received the special training, so that they provide usual care to the patients.

2. All persons with type 2 diabetes were invited to participate in the study and were selected from a chart review according to the inclusion criteria which are as follows:

Inclusion Criteria: The persons with diabetes:

- 1) Who had been diagnosed of type 2 diabetes;
- 2) Who had fasting blood sugar above 130 mg/dl on two earlier consecutive tests.
- 3) Aged \geq 30 years

- 4) Having good communication skills, i.e., writing and reading;
- 5) Having no active severe diabetic complications such as congestive failure, stroke, amputation, renal failure, blindness, as well as being free from mental illness, liver disease or pregnancy.

Persons with diabetes were identified according to the chart review. The researcher invited persons with type 2 diabetes into the two settings to take blood samples of HbA_{1c} and LDL-C. The participants at the 2nd Red Cross Health Station were the experimental group who received the multifaceted nurse-coaching intervention while those at the 11th Red Cross Health Station served as the control group who did not receive the intervention.

The researcher matched pair of the subjects between both settings according to their sex, age and duration of diabetic history. This matched pair was performed by the researcher to reduce confounding factors which might error the results. The descriptions for match paired were as follows:

1. Sex: the subjects were paired for the same male or female.
2. Age: a period of human life, measured by years from birth. This was a strong factor associated with diabetic complications. For matched pair in this study, the age was divided into 2 groups as follows:
 - 2.1 Those who were < 30 years
 - 2.2 Those who were > 30 years
3. Duration: this is the risk factors to predict the development of diabetic complication. Duration refers to the time span since they were diagnosed as diabetes. The longer the duration would increase the development of diabetic complications. According to the study of Deerochanawong and Suwanwalaikorn (2006), the duration difference which was matched pair in participants between the experimental group and control group was divided into 2 levels:
 - 3.1 Duration of diabetes < 5 years;
 - 3.2 Duration of diabetes > 5 years.

The participants consisted of 20 persons with type 2 diabetes who were successfully matched to experiment and control group (table 1).

Sample Size

Participants were persons with type 2 *diabetes mellitus* who were of higher prevalence in the population (90 % of persons with diabetes). The calculation of the sample size in this study was determined, basing on the levels of variance of HbA_{1c} in a previous research. The sample size in this study was determined, basing on the power and effect size. The effect size is based on a meta-analysis study of Likitrachoen (2000), in which she synthesized the diabetes self-management in persons with diabetes in Thailand, most of whom were type 2. The average effect size of dependent variable (metabolic control) is medium ($d=0.60$). In this study, the researcher establishes one tailed test level at .05 ($\alpha=0.05$). A power of 0.80, the participants needed are of 14 participants (Denenberg, 1987). Therefore, to prevent the attrition rate, the researcher increased the number of participants to 20 and decided to follow the same pattern and divided them into two groups: the experimental ($n=20$) and control ($n=20$).

Table 1 Characteristics of Samples Matched Pair Criteria: Sex, Age, and Duration.

Pair No.	Experimental group			Control group		
	Sex	Age (year)	Duration (year)	Sex	Age (year)	Duration (year)
1	F(1e)	> 30	>5	F (4c)	> 30	> 5
2	M(2e)	>30	>5	M (34c)	>30	>5
3	F(4e)	>30	>5	F(9c)	>30	>5
4	M(5e)	>30	<5	M(21c)	>30	<5
5	F(7e)	>30	<5	F(50c)	>30	<5
6	M(9e)	>30	<5	M(39c)	>30	<5
7	F(10e)	>30	>5	F(11c)	>30	>5
8	M(11e)	>30	<5	M(5c)	>30	<5
9	F(17e)	>30	>5	F(28c)	>30	>5
10	M(13e)	>30	>5	M(35c)	>30	>5
11	M(14e)	>30	>5	F(30c)	>30	>5
12	M(15e)	>30	<5	M(6c)	>30	<5
13	M(16e)	>30	>5	M(43c)	>30	>5
14	M(18e)	>30	>5	M(47c)	>30	>5
15	F(19e)	>30	<5	M(2c)	>30	<5
16	F(20e)	>30	<5	F(8c)	>30	<5
17	M(21e)	>30	>5	M(37c)	>30	>5
18	F(22e)	>30	<5	F(12c)	>30	<5
19	F(25e)	>30	<5	F(17c)	>30	<5
20	M(26e)	>30	>5	M(18c)	>30	>5

The Instruments

There were three types of instruments for conducting the study including instruments for data collection, for intervention and instruments for monitoring. Each instrument was developed by the researcher based on coaching process and diabetes self-management for reviewing, and from literatures were related journal articles and text books, as well as suggestions by the advisors. All instruments were developed by the researcher after reviewing the related literatures, text books, journal articles as follows:

1. Instruments for Data Collection: the instruments were composed of demographic data, physical examination, laboratory testing, and self-perception symptom of diabetic complications questionnaire.

1.1 Demographic data instrument was developed by the researcher. This instrument consisted of personal characteristics (sex, age, education, career and duration of diabetes, and well as history of admission with acute complications such as hypoglycemia or hyperglycemic hyperosmolar non-ketotic syndrome (HHNS).

1.2 Physiological Outcomes were variables in this study including HbA_{1c}, blood pressure and LDL-C level. These were assessed by the researcher at the 2nd and 11th Red Cross Health Stations.

1.2.1 HbA_{1c} level or Glycosylated (or Glycated) hemoglobin level was measured by ion-exchange chromatography and subsequently by automated high-performance liquid chromatography. The calculation for HbA_{1c} may be error due to the technique of health care provider. Therefore the researcher has sent the blood sample to the large laboratory at the tertiary care setting where the expert technician had taken the validity of equipment everyday.

1.2.2 Blood Pressure included the measuring of blood pressure (BP) using a standardized mercury sphygmomanometer which was validated from the company. For reliability, the researcher followed the British Hypertension Society's guidelines. Persons with type 2 diabetes rested (seating for 5 minutes) before BP would be measured on the left arm. Measurements were carried out in sitting position by a nurse in the team. The target of blood pressure control was 120/80 mmHg, the level for monitoring was blood pressure control > 130/90 mmHg. Poor control level was blood pressure higher than 140/90 mmHg (American Diabetes Association, 2007: S4-41).

1.2.3 LDL-C level was measured by ion-exchange chromatography (Wasolab, Akron, OH) and subsequently by automated high-performance liquid chromatography (Diamat; BioRad, Hercules, CA). LDL-C levels related to coronary heart disease which was defined as LDL-C level > 100 mg/dl (A.D.A, 2005: S4-36). The outcome of LDL-C levels were divided into three levels: good when LDL-C level < 100 mg/dl, fair LDL-C > 100 mg/dl; and, poor when LDL-C level > 130 mg/dl (National Commission on Correctional Health Care, 2001: 97-156). Blood sampling for LDL-C level had been also sent to the large laboratory at the tertiary care setting. This testing was preformed in the same laboratory of HbA_{1c}.

All blood samples were obtained at 8 a.m. after an overnight fasting and before the morning medication. The measurements were obtained by a nurse in the team and the researcher.

1.3 Self-Perception's Symptom of Diabetic Complications Questionnaire.

The self-perception's symptom of diabetic complications questionnaire had been developed by the researcher and used to assess symptom occurrence, symptom frequency and distress. The measurement was a self-report questionnaire. It was extracted from the literature (Grootenhuis, Snoekb ;, 1994: 253-261) and clinical experiences. This measurement covered six dimensions; 19 symptoms were assessed. If the participant perceived several symptoms, the occurrence of symptom were high scored. The symptoms of diabetic complications are presented as follows:

1) Hyperglycemic symptoms which are frequent thirst, drinking a lot of water, fatigue, frequent urination and itching.

2) Hypoglycemic symptoms which are hunger and shakiness, headache, fainting and unconsciousness.

3) Ophthalmologic complications which are blurred vision, floaters or black eye spots.

4) Neuropathy symptoms which are constipation, diarrhea, erectile dysfunction, burning or shooting or stabbing pain, a tingling sensation, numbness in the toes and fingers.

5) Cardiovascular diseases symptoms which are chest pain which include symptoms of tightness, squeezing, and the pain may spread to the shoulder, arm, jaw, neck and back. The symptoms of stroke or cerebrovascular diseases which include sudden numbness or weakness of the face, arm or leg, especially on one side of the body.

6) Peripheral vascular disease symptom which were intermittent claudication or calf pain precipitated by walking a predictable distance and relieved by rest.

The self-perception's symptom of diabetic complications was used to compare the participants before and after the intervention. The perceived symptoms occurrence of diabetic complications in each participant was either a response of "Yes" or "No". The frequency of perceived symptom occurrence was divided into three levels and perceiving level of symptom distress was divided into four levels as below, the steps were as follows:

1) Each participant was first asked about each specific symptom as listed above. If they had perceived any of the symptoms during the last 30 days, the score of the perceived symptom occurrence would be given as follows:

Yes = 1;

No = 0.

2) The participant was asked to rate the frequency the symptom appeared. The frequency scale was ranged as follows:

1 = one or more times per month;

2 = one or more times per week;

3 = daily.

3) The individual participant was asked the degree of distressful the symptom appeared; the scale of perceived level of symptom distress was ranged from:

0 = not at all;

1 = a little bit;

2 = very much;

3 = a great deal;

1.4 Satisfaction with Nursing Intervention Questionnaire was a measurement to assess the perception of persons with type 2 diabetes who received the multifaceted nurse-coaching intervention and those with type 2 diabetes who did not receive the intervention at the Red Cross Health Station. The researcher developed a satisfaction questionnaire by reviewing the related literatures concerning consumer satisfaction which was based on concepts access (Penchansky and Thomas, 1981: 127-140). There were five dimensions including affordability, availability, accessibility,

accommodation and acceptability. Twenty-two items were separated into each dimension as follows:

Affordability was composed of items No. 1 and 2;

Availability was composed of items No. 3, 4 and 5;

Accessibility was composed of items No. 6, 7, 8 and 9;

Accommodation was composed of items No.10, 11, 12,13,15,16 and 17;

Acceptability was composed of items No. 18, 19, 20, 21, 22

The satisfaction with nursing intervention scale consisted of five components evaluated on a 5-point Likert's scale response ranging from very satisfied to very dissatisfied as follows:

1 Score = Very dissatisfied meaning agrees with the item

2 Score = Lightly dissatisfied meaning agrees with the item

3 Score = Moderately satisfied meaning agrees with the item

4 Score = Slightly satisfied meaning agrees with the item

5 Score = Very satisfied meaning agrees with the item

The total score was obtained by summing up the score of all the items; the lowest score was 0 and highest score was 110. The translated results score was used as mean average created by using total score /total items (Kunnasuit, 1995) as follows:

Mean average 4.50 - 5.00 very satisfied.

Mean average 3.50 - 4.49 slightly satisfied

Mean average 2.50– 3.49 moderately satisfied

Mean average 1.50 - 2.49 slightly dissatisfied

Mean average 0.00 - 1.49 very dissatisfied.

2. Instrument for Intervention: the instruments for intervention were composed of the multifaceted nurse-coaching program, the diabetes management's knowledge questionnaire for the nurses and the diabetes self-management's knowledge for persons with type 2 diabetes questionnaire.

2.1 The Manual of the Multifaceted Nurse-Coaching Program. This manual was used for nurses training, based on the chronic care model (Wagner, Austin :, 1996: 12-25) diabetes self-management (American Diabetes Association, 2007: S4-41) and coaching (Eaton and Johnson, 2001). The content was divided into 2 parts:

2.1.1 Concepts of Chronic Care Model: These concepts were explained and suggested to the nurse coaches to serve as an proactive team, and enabling them to recognize the improvement of quality care services at the health station Self-management Support; the content was selected only 4 concepts including delivery System design, decision support, clinical information systems, self-management support

2.1.2 Content for Knowledge Improvement:

Session 1: General knowledge of diabetes and its complication: this session was a discussion about the alteration of the body due to hyperglycemia.

Session 2: Medical nutrition therapy: food exchange, meal plan, and label reading.

Session 3: Physical activity and exercise: preparing the body before exercise, choosing the type of exercise, intensity, warming up and cooling down.

Session 4: Medication: having appropriate medication for the right time, avoiding, preventing and solving hypoglycemic symptoms.

Session 5: Stress management: realizing stress and its management.

Session 6: Self-monitoring: glucometer for monitoring blood sugar.

Session 7: Hygienic and foot care: preventing oral and skin infection foot ulcer.

2.1.3 Coaching Process: this outline was used by nurse coach as a method to help participants change their behavior. The content for interaction was explained on the part of self-report for behavior change and procedure for the intervention. The outline of the content was presented (See Thai version in Appendix E) as follows:

- 1) Assessment
- 2) Goal definition
- 3) Analysis
- 4) Exploration
- 5) Actions plan
- 6) Learning
- 7) Feedback

2.2. The Diabetes Management's Knowledge Questionnaire for the nurses. This questionnaire was developed by the researcher based on content of The American Diabetes Association (2007) and extracted from various reviewed literatures, journals and text books. The questionnaire was multiple choices which were composed of 6 components: general knowledge of diabetes, dietary control, physical and exercise, oral hypoglycemic medication, and hygienic and foot care. A pretest was done to assess the nurse's knowledge before they act as a coach. The purpose of the questionnaire was to judge the passing criteria of the training program.

Knowledge about diabetes management was evaluated by the general subscale of the Diabetes Knowledge Test, a standardized measure to assess diabetes knowledge among affected individuals. The items on this test were designed to be representative of a larger domain of illness-specific diabetes knowledge, appropriate for individuals with type 2 diabetes. The domain of diabetes management's knowledge questionnaire was composed of general knowledge of diabetes, diet control, physical activity and exercise, medication, stress management, hygienic and foot care. There were 32 items which were separated into each domain as follows:

General knowledge of diabetes comprises of items: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 26 and 31.

Diet control comprises of items: 12, 13, 14, 15, 16, 17, 18, 19 and 20.

Physical activity and exercise comprises of items: 21, 22 and 30.

Medication comprises of items: 23, 24, 25 and 27.

Hygienic and foot care is item: 28.

Method for education is item 32.

2.3 The Questionnaire on Diabetes Self-management's Knowledge for persons with type 2 diabetes. This was an instrument to assess the diabetes self-management knowledge of the persons with type 2 diabetes. The researcher developed it from reviewed literature to increase the knowledge of persons with type 2 diabetes. The 28 items represented a test of general diabetes knowledge self-management including general knowledge of diabetes, diabetic complications, dietary, physical and exercise, oral hypoglycemic medication, and hygienic and foot care. The questionnaire was administered to persons who used only oral hypoglycemic medication and there was 2 answers for choosing ; right or wrong. The questionnaire addressed the understanding of the key diabetes self-management content which includes:

General knowledge of diabetes and its complications was composed of items: 1, 2, 3, 4, 5, 6, 7, 8, 9 and 24.

Diet control was composed of items: 10, 11, 12, 13, 14, 15, 16 and 17.

Physical activity and exercise was composed of items: 18, 19 and 20.

Medication was composed of items: 21, 22, 23

Hygienic and foot care is composed of items: 24, 25, 26, 27 and 28

3. Instruments for Monitoring the Intervention

There were three instruments for monitoring the intervention in this study; they consisted of the nurse's behavior report form, a summary sheet of diabetes self care activities measure (SDSCA), a self-report form for behavior change the details are as follows:

3.1 The Nurse's Behavior Report Form was observed during delivery of intervention. This report form was based on the concept of coaching process which was developed by the researcher to evaluate the nurse coaching behaviors during their delivery of the intervention including assessment, goal definition, analysis, exploration, action, learning, and feedback's behaviors. The nurse reported themselves whether they have performed or not performed the items, and the rational with each item.

3.2 The summary Sheet of Diabetes Self-care Activities Measure (SDSCA):

3.2.1 This instrument was a short self-report questionnaire on diabetes self-management. Toobert & Glasgow (2000) developed the original version in five

elements of the diabetes regimen: general diet, specific diet, exercise, medication-taking and blood sugar testing. The Thai version of SDSCA was translated by Keeratiyutawong (2005) and subsequently used in her study. The researcher borrowed this instrument from her.

3.2.2 Scoring Instructions for the summary of diabetes self-care activities. The scores were calculated for each of the five regimen areas assessed by SDSCA: Diet, Exercise, Blood-Glucose Testing, and Foot-Care. This includes: diet control items 1-7; exercise = items 8 and 9; medication= items 10, 11; self monitoring =12, 13, and 14; hygienic and foot-care = items 15,16,17,18, and 19. As for items 1–19, the number of days per week was used on a scale of 0–7.

Scoring scales was reversed for diet control items: 2, 3 and 4, 7 (0=7, 1=6, 2=5, 3=4, 4=3, 5=2, 6=1, 7=0). The scores were calculated by the total number of days in each item. The score of each component was assessed separately and they were then added up across the board. The total score was 133 points. A higher score indicated greater achievement of diabetes self management.

3.3 Self-report for behavior change was a document for individual planning composed of collaborative action plan and problem solving method. The researcher developed this instrument from the coaching process of Eaton and Johnson (2001) and the usual nursing process. Finally, the multifaceted nurse-coaching intervention was composed of assessment, goal definition, analysis, exploration, action plan, and evaluation. The contents of the interaction process are as follows:

3.3.1 Assessment: performed by a face-to-face interview between a nurse and a participant when baseline HbA_{1c}, blood pressure and LDL-C level and self-perception's symptom of diabetic complications questionnaire were obtained. The nurse also identified self-perception's symptom of diabetic complications, activity of daily life with the time including dietary patterns, physical activity and exercise levels, medication, hygienic and foot care. The aim of the assessment was to review the problems that were barriers to behavior change as well as reducing blood sugar, blood pressure and LDL-C level.

3.3.2 The goal definition for behavior change: Having obtaining the essential baseline assessment data, the nurse could then assist in realistic goal definition with the participant and increase the efficiency of care. The goal definition was developed by the nurse together with the participant to set up individual behavior

change and state in terms of participant achievement. The established goal was therefore mutual between the nurse and the participant. The goal setting was measurable, specific, attainable and relevant, within limited time frame. The goal needed to be composed of at least one “short-term goal” and one "long-term goal".

For example: The persons with type 2 diabetes were to decrease the quantity of rice, starch and sugar consumption within two weeks.

: The persons with type 2 diabetes were to increase the physical activity within two weeks.

3.3.3. Analysis: a process which assisted the nurse and the persons with type 2 diabetes examine his/her “present reality”, i.e., where the persons with type 2 diabetes were at the present time with regard to the coaching goal. The strength, weakness, opportunity and threaten situation were asked by the nurse coach to develop the next process.

3.3.4 Exploration: a process which assisted the nurse and the participant examine different options available to achieve the goals. This step helped the nurse and the participant seek for the behavior that assisted the participant to achieve the goal. The nurse used motivation interviewed as the strategy of approach to increase the participant’s awareness of the potential problems, causes, consequences, experience and risks. The nurse also helped the participant to see a better future, and became more motivating for the participant to achieve it. Either way, the strategy sought to help the participant think differently about their behavior, and ultimately consider what might be gained through change.

3.3.5 Actions Plan /Implementation: The nurse tailored the diabetes self-management to the participant as the priority goals including diet control, exercise, medication and stress management. The nurse described and demonstrated any behavior that the participant needed to know or change. The nurse also helped the participant select the behavior that would lead to the achievement of the goal by using the importance-confidence ruler. The importance-confidence ruler is technique that incorporated many basic elements of motivational interviewing including carefully listening, appreciating ambivalence, eliciting change talk, empowering and collaborating. Furthermore, the ruler exercise yielded for practitioners a clear sense of how ready the participant was for change, and how to be most helpful. The nurse

wrote the behaviors that were required to achieve the goal of participant. The nurse also explained each of these step again and the participant was encouraged to commit themselves to act on each behavior. The nurse demonstrated to do a mark at the end of each behavior after it was performed and the nurse told the participant to bring this self-report form with him/her on the next visit for feedback.

3.6 Glucose meter for self-monitoring: was used as evaluating and feedback tools for behavior change. The researcher provided this device to the nurse. The portable glucose meter was a small battery-operated device. These devices offered self-monitoring to test participants' blood sugar before meal, or two hours after meals (postprandial). The glucose meters were chosen from the Accu-Check type 1 (1068333) which were validated by the Dietham Co., Ltd.

The Validity and Reliability of Instruments

1. The step of validity and reliability was performed to reduce error that might occur from using the instruments. This part required the precision of the instrument before applying to the participants. The content validity was done by five experts. The criteria for choosing the experts are as follows:

- 1) Having experience in caring persons with type 2 diabetes;
- 2) Having experience in nursing administration;
- 3) Having experience in nursing community;
- 4) Having experience in teaching persons with type 2 diabetes.

Following the above criteria, the researcher contacted five experts from several areas including:

- 1) One nurse instructor, an expert in adult nursing and nursing administration with more than 20 years of experience;
- 2) One nurse instructor, an expert in nursing administration with more than 20 years of experience;
- 3) One nurse instructor, an expert in adult nursing and diabetes care with more than 20 years of experience;
- 4) One nurse instructor, an expert in public health nursing with more than 20 years of experience;.
- 5) One family physician who has experience in caring persons with

diabetes for more than 15 years.

In this study, steps involved in the developmental stage included domain identification, item generation and instrument formation. (Singhchangchai, 1993). For domain identification, the researcher developed the items and obtained many recommendations from the advisors. The researcher also adapted a specific correction for the items that did not reflect any specific intended domain of content. Then, the researchers brought this instrument to determine content validity aside from the five experts' opinions.

The content validity was confirmed by a panel of experts using inter-rater agreement method and content validity index (CVI) method. Inter-rater agreement method was examined the content validity of the instruments using experts suggested regarding the content of the instruments. Experts were asked via documents to comment on the degree of appropriateness of the instruments in relation to construct and content. Four rating scales were used including very appropriate, mostly appropriate, moderate appropriate, and inappropriate. The meaning of scales were as followed:

A rating of "Very Appropriate" indicates overall satisfaction with the content as it relates to content and level appropriateness.

A rating of "Moderate Appropriate" suggests there were some fair satisfaction with the most content as it relates to content.

A rating of "Mostly Appropriate" suggests there were rare instances where instruments content seemed unrelated to content or was not level appropriate.

A rating of "Inappropriate" suggests that on more than a few occasions, content seemed unrelated to instruction and was not level appropriate.

Data obtained from the five expert recommendations were analyzed and using content validity index (CVI) to determine and calculate relevance of each item (Walttz, Strickland & Lenz, 1991: 243 cited in Singhchungchai, 1993).

$$CVI = \frac{\text{The number of items which the 5 experts agreement of the most relevance and moderate relevance of items}}{\text{The total number of items}}$$

2. Content Validity and Reliability for Instruments using in this study were divided into three types: instrument for data collection; instrument for intervention; and instrument for monitoring.

2.1 Instruments for Data Collection:

2.1.1 Self-perception's symptom of diabetic complications was an instrument for data collection. Self-perception's symptom of diabetic complications is composed of six dimensions including hyperglycemic symptoms, hypoglycemic symptoms, ophthalmological symptoms, neuropathy symptoms, cardiovascular disease symptoms and peripheral vascular symptoms. The step of content validity and reliability were provided as follows:

2.1.1.1 Content validity of perceived symptom of diabetic complications was performed. The experts had checked the content that was related to the concept. A rating scale was provided to check whether or not the content of the item was related to the concept. Any item that had been rating of inappropriate was excluded but any item had rating of mostly and moderate and very appropriate was included. However, rating of mostly and moderate appropriate item were changed in some content. The results of this step found that 14 of the 33 items met the criteria and other items were excluded. The remaining 19 items, described in the Appendix, were distributed over the six dimensions as follows: five hyperglycemic items (1-5); three hypoglycemic items (6-8); two ophthalmologic items (9-10); six neurological items (11-16); two cardiovascular items (17-18); and, one peripheral vascular disease (19). The researcher calculated a content validity index (CVI), based on experts' ratings of items' relevance. The content validity index was 81.81. When the index had high content validity, it adequately represented all facets of the concept.

2.1.1.2 Reliability of perceived symptom of diabetic complications: The instrument was administered to 30 persons with type 2 diabetes in community of similar characteristics (the No. 5 Health Station of Bangkok Metropolitan) to determine the reliability of the items. The reliability of this instrument was evaluated and the reliability of the coefficient tests was 0.86.

2.2.2 Satisfaction questionnaire was an instrument for data collection. After the researcher had developed satisfaction questionnaire in the study, there were 22 items which were separated into each domain.

2.2.2.1 Content validity of satisfaction refers to the extent to which a measure represents all facets of a given concept. At the beginning of the study, the researcher took this questionnaire to the advisors. A lot of suggestions from experts were given back and the researcher adjusted some of the items that did not reflect the specific intended domain of the content, and some items were duplicated. Twenty-two items were developed at the initial phase and the researchers brought this instrument to determine the content validity from four experts' opinions (the same as above).

Initial item correction before application to the participants in the intervention was based on the following criteria: items with less than 50 % scores on 'Yes, more, or less are associated with satisfaction or more than 25 % scores on 'No' are not associated'. Two items in the component of affordability were considered as the same meaning. Three items in the accessibility component was reduced to be the same item because of it was assessed to deliver care at the same time. One item in accommodation component had wording adjustment. When this was performed, the remaining 22 items over the five components were described in (the Appendix D), as follows:

The researchers calculated a content validity index (CVI), based on experts' ratings of item relevance. The construct validity of the instrument was 92.37 %.

2.2.2 Reliability of satisfaction with nursing intervention questionnaire after adjusting the item and language, the instrument was administered to 30 persons with type 2 diabetes in similar characteristics community (the 5th Health Station in Bangkok Metropolitan) to determine the reliability of the items. The internal consistency was measured by using Cronbach's Alpha and the coefficient tests score was 0.93.

This instrument was administered to the 40 participants in the experimental and control groups both before and after the intervention. The researcher calculated the internal consistency of this instrument again before the intervention. The 22 items were analyzed and the reliability coefficient was .93. According to the component of affordability, there was only one item which might influence to the total reliability of the instrument. This item was reflected to the specific meaning of payment for the healthcare service. However, the majority of participants had health insurance, and item of affordability was asked about certain

information that might not bring about satisfaction to the participant. This was found that the 1st correlation coefficient of the 1st item was .189. This item was a low item-total correlation which meant that the item was little correlated with the overall scale ($r < .3$). If this item was deleted, Cronbach's Alpha reliability would be .92. Therefore, the researcher considered dropping one item in the affordability component. The reliability analysis was re-run and computed only the 21 items. Finally, the result of the coefficient was .92.

2.2. The instruments for intervention:

2.2.1 The multifaceted nurse-coaching program was an instrument for intervention: This instrument was developed by the researcher. It was consisted of the program for nurses training with the content of the chronic care model, diabetes management and coaching process for improve quality of care and behavior change in persons with type 2 diabetes.

2.2.1.1 Content validity of the program: the researcher presented the manual program to achieve suggestions from the advisors, and then the researcher revised the detail of the content. After this, the researcher brought this manual program to determine content validity aside from five experts' opinions. Then, the researcher accepted and took their suggestions to correct the content of the manual program. Finally, it was utilized in the learning session to improve the knowledge and skills of nurse for prevention of diabetic complications in persons with type 2 diabetes.

2.2.2. The diabetes management's knowledge questionnaire for the nurses.

The questionnaire contained a series of multiple choices and was composed of six components: general knowledge of diabetes, dietary control, physical and exercise, oral hypoglycemic medication, and hygienic and foot care, 32 items in total.

2.2.2.1 Content validity of the diabetes management's knowledge questionnaire for nurse's coach: at the beginning, the researcher brought the questionnaire for suggestions from the advisors, and then the researcher revised the details of its content. After this, the researcher brought this questionnaire to determine its content validity aside from the five experts' opinions. The questionnaire was completed after correction of the content, and finally it was used as a pre-test of

knowledge before beginning the multifaceted nurse-coaching intervention to improve the nurses' knowledge on diabetes management.

2.3 The diabetes self-management's knowledge for persons with type 2 diabetes questionnaire contained 28 items represented a test for general diabetes knowledge self-management including general knowledge of diabetes, diabetic complications, dietary, physical and exercise, oral hypoglycemic medication, and hygienic and foot care.

2.3.1 Content validity of the diabetes self-management knowledge of persons with type 2 diabetes: at the initial process, the researcher brought the observation report to receive suggestions from the advisors, and then the researcher recommended the details of the content. After this, the researchers took the diabetes self-management's knowledge of persons with type 2 diabetes questionnaire to determine content validity aside from five experts' opinions. The questionnaire was completed after correcting the items and finally it was used for monitoring the knowledge of persons with type 2 diabetes and help the participant increase his/her knowledge.

2.3.2 The questionnaire was tested and administered to persons who used only oral hypoglycemic medication in similar setting. The reliability of this questionnaire was 0.64.

3. Instruments for monitoring intervention:

3.1 The summary of diabetes self-care activities measure (SDSCA): This instrument was developed as a Thai version by Keeratiyutawong (2005) and was used primarily in her study. She deleted the item of smoking because few persons with type 2 diabetes smoked and she performed reliability test. The two-week test-retest showed the reliability of SDCA was .89.

3.2 Glucose meter testing was used for evaluating postprandial after meal and to encourage the participant understand their management before meeting the nurse. This equipment was validated by Dietham Co., Ltd.

Protocol

This section was divided into 2 parts including preparation of the intervention, procedure for intervention.

1. Preparation of the intervention

Before the research was conducted at the Red Cross Health Stations, the researcher prepared all the instruments, contacted the persons who were involved with the research as follows:

1.1 The researcher prepared all those instruments by developing, correcting, validity and reliability as the mentioned above.

1.2 Preparing the setting for intervention:

1.2.1 The researcher contacted the officers of Faculty of Nursing to ask for permission and brought it to the Director of the Relief and Public Health Bureau of The Thai Red Cross Society before implementing the research.

1.2.2 The researcher collaborated with the two head nurses of the Red Cross Health Stations in Bangkok and explained to them the objectives, the method and data collection in the setting of the research and time schedule. The 2nd Red Cross Health Station was an experimental group and the 11th Red Cross Health Station served as control group.

1.3 The researcher provided knowledge and trained the nurses under the title of a multifaceted nurse coaching which included the content of chronic care model, diabetes management and coaching process to the nurses at the 2nd Red Cross Health Station.

1.3.1 The researcher performed a pre-test for evaluation of knowledge. The diabetes management's knowledge questionnaire for the nurse was used. If the nurse got lower than 60 %, the researcher would approach the individual and allow the nurse with lower score to ask and gave answers until s/he understood.

1.3.2 The researcher gave the manual guideline, diabetes self-management teaching plan, coaching process and brief manual for diabetes self-management for persons with type 2 diabetes. The manual guideline was composed of the content of chronic care model including healthcare organization, decision support, clinical information systems, self-management, and delivery system redesign, and community recourse (Wagner and Austin, 1996:12-25). Diabetes management teaching plan was composed of diet control, physical activity and exercise; medication, stress management, self-monitoring hygienic and foot care. The learning session was provided to the nurse team and the researcher discussed with them in the afternoon, two hours for four days (See Appendix E).

1.3.3 The researcher introduced the project to the nurses and described the process of intervention including the instrument for undertaking the intervention.

1.3.4 The researcher evaluated the nurses' knowledge at post-test and determined the level for passing at 80%. If any nurse could not reach this level, the researcher would give a chance and allow them to ask and review their knowledge again until they understood and could participate in the research. The result of the learning session was that six nurses passed the examination. The researcher utilized the Wilcoxon signed-rank test which was a non-parametric statistics. It was often used to test the difference between scores of collected data before and after an experimental manipulation. The result indicated that the group of the nurse had higher score in knowledge after receiving the program with statistical significance ($p = .027$) (table 2).

Table 2 Comparisons of different Nurse Knowledge Score before and after training

	N	Mean Rank	Sum of Rank	<i>p</i>
Negative Ranks	0 ^a	0.00	0.00	.027
Positive Ranks	6 ^b	3.50	21.00	

a; Score2 < Score1, b; Score2 > Score1,

1.4. The researcher reviewed the chart of persons who had inclusion criteria and then performed the marker code on each chart. The researcher approached and perused them to join the project. If the participants were interested in the project, they were taken the blood exam for HbA1c, LDL-C level and assigned to the control or experimental group by matching sex, age, duration. All participants were given written informed consent. The Ethics Committee of the Faculty of Medicine, Chulalongkorn University approved the study.

1.5. The researcher assessed demographic data including diabetes knowledge, diabetes self-care activities, and perceived symptom of diabetic complications as well as satisfaction. These assessments were given to each nurse for coaching as background characteristics of the subject.

2. Procedure for Intervention

The procedure of study was divided into 2 types:

- 1) for persons with type 2 diabetes who received the multifaceted nurse-coaching intervention; and,
- 2) for persons with type 2 diabetes who receive the usual care.

2.1 Procedures for the Intervention Group

Persons with type 2 diabetes received the multifaceted nurse-coaching intervention at the community setting and telephone-call follow ups. According to the different in physical and psychological of the persons with type 2 diabetes, the program was tailored to fit in with the needs of each person. The beginning of each session for individual person was not the same for everyone.

2.1.1 The participants in the experimental group were received the multifaceted nurse-coaching intervention and they completed the data collection before entering the intervention.

2.1.2 The researcher randomly assigned each participant to each nurse coach to reduce the bias. The participant was first introduced to the nurse; all their clinical information, diabetes self-management knowledge score, and diabetes self-care activities were then handed to the nurse coach.

2.1.3 The delivery system design of diabetes Self-management education was created because the nurse had made little appointment to deliver the diabetes self-management education and generally they used basic teaching or didactic information provided to the persons with type 2 diabetes. The nurse coach was suggested by the researcher to make appointment with individual participants three times at the health station and two telephone calls for follow up. The nurse coach arranged each appointment with the participant at the health station in the afternoon (1 a.m. - 4 p.m.) on Monday to Friday. The appointment date depended on the available time of both the participant and the nurse. They had to meet each other three times every two weeks for six weeks. However, if the participant could not meet at the time of appointment, a postpone could be done, but the delayed time should not be longer than a week.

2.1.4 Delivering the multifaceted nurse coaching was performed to improve cognitive knowledge and skills in a participant by a nurse coach who was

trained in the program. When the appointment date was established, the nurse coach provided this education on each session. The learning session was tailored for encouraging and increasing knowledge and skills (see the content in Appendix E). Each learning session was chosen by the participant as they need to solve the problems and delivered it within 3 times for every 2 weeks over 6 weeks including:

2.1.4.1 The 1st Visit at the Health Station: the nurse measured blood sample for postprandial using the glucometer and measured blood pressure for evaluating the physical problems. The nurse recorded this clinical information and used them to discuss during the session.

1) The nurse coach provided cognitive knowledge. The nurse and participant discussed the problem; the nurse used the self-report for change behavior form (See Appendix E) to be an assessing tool. This tool was provided the activities of daily living in individual participant at the waking up morning time to the bed time. The nurse used this tool as a monitoring and guiding tool to helped individual participant solve their problems. The nurse asked the participant what the topic of self-management should be learnt, the participant chose the topic of each session as they need to know. The rest content of the session would be provided in the next 2 weeks. The content of each session was presented by using the computer notebook and presenting with the PowerPoint. The content (See Appendix E) was as follows:

Session 1 Medical nutrition therapy: knowing food exchange, planning for each meal, reading food label.

Session 2 Exercise: preparing the body before exercise, type of appropriate exercise for persons with type diabetes

Session 3 Medications: type of oral medication for persons with type 2 diabetes, knowing side effects and preparing for prevent hypoglycemic symptoms.

Session 4 Stress management: problem solving, realizing stress

Session 5 Self-monitoring: using postprandial monitoring for evaluate self-management with Glucometer.

Session 6: Hygienic and foot care: self-management for prevention of oral and skin infection, foot ulcer, choosing the appropriate shoes and footwear.

1.4.1.2 Coaching for behavior change: this process was designed to provide the participant at each visit or through a telephone call. The nurse helped the participant solve their problems that barrier behavior change as shown in following (See the Thai version: Appendix E):

1) Assessment for problem solving: a community nurse met the participant and the nurse assessed the perceived symptom(s) of diabetic complications related to distress and activities of his/her daily living, and the diabetes self-management's knowledge of persons with type 2 diabetes and the summary of diabetes self-care activities measure (SDSCA) as monitoring instrument to reflect on the issues related to behavior change including diet control, exercise, medication therapy, and stress management, and hygienic and foot care. To address this issues individually, the nurse and participant needed to work in partnership which began with the person's opportunity to tell his/her "story." That personal story, which included past illness experiences, view of health, current illnesses, and current life priorities, societal/ethnic meaning of health activities, and perception of self-efficacy, provided the background to lifestyle choices and current health and illness experiences.

2) Goal definition: was a process for behavior change to set up the priority of each goal setting. By actively listening to these integral components of life, nurse coaches enabled a participant to reflect on the readiness to address specific behavioral change in a way that was consistent with their personal priorities, resources, and impediments to change. The statement was in terms of participant achievement that was specific and measurable, and included a target date and hour for evaluation. The goal was to enable participants to feel empowered and motivated to change, rather than having the professional doing it for them. Effective Goal Setting should be an intrinsic motivation predicts health outcomes, matched goals and stage of readiness to change, process and outcome goals (controllability) and positive reframing.

3) Analysis: to assist the persons with type 2 diabetes examine his/her "present reality" where they were at the present and help the individual identify small steps to begin the process of reaching those goals. The nurse employed open questions to seek the strength and weakness of behaviors in that may become

barriers and looked for the opportunity and threat(s) from the environment that could help the person develop their behavior change to achieve the goal.

4) Exploration: this was a process to achieve the goals and explore possible ways to meet the energy consumption concerns of the persons. This exploration made one or two changes in the diet if the individuals with type 2 diabetes who were willing to make those changes. For examples, if exercise and diet were part of the individual's goals, the nurse would comment briefly on the potential side and benefits of lowering cholesterol. When the client did not desire to address cholesterol lowering activities, the nurse would convince that the individual that s/he would be successful in making those changes when s/he was ready

5) Action plan: the nurse together with the participant identified what would be their first task to be done to accomplish the goal, and then the participant would take the action. The strategy was a combination of firmness and encouragement with patience and empathy and motivating for action. This is done through encouragement of the participants to decide their own plan of action that involved a gradual step-by-step transition to a goal.

6) Learning: After tailoring the session and setting up the action plan, a copy of self-report for behavior change would be given to the participant for to achieve each goal. The nurse would let the participant go home and each participant would follow the agreed-on action plan to reach the desired goal for two weeks.

7) Feedback: Then the nurse evaluated the knowledge and action plan. Then the nurse made an appointment with the participant to follow up and evaluate the progress toward their chosen goal(s) and contact at every two weeks for the next 2 times as follows:

1.4.2 The 2nd visit at the health station: the nurse and the participant would hold a feedback coaching session and consider what was learned and how the learning could be built on to start in two weeks. The nurse assessed the postprandial level with glucometer. This assessment was used to analyze the quantity and type of food, exercise and medications together with feedback and results. The nurse and the participant would discuss the self-management and evaluate the behavior goals that could or could not be achieved. If the goal was not achieved, the nurse would reassess the problem and explained more details about the strategy that might assist

the participant. Next learning session was then delivered and a new coach goals for the next two weeks. The visiting time was about 30 minutes to one hour. The learning session was tailored again and the topic of each session was chosen by the participant as they needed.

1.4.3 The 3rd visit at the health station: two weeks later and the process of intervention was the same as that of the first and second visit. The participant would select a topic in each session as they needed. The other session would be provided to the participant in the time. The final step of this phase was the nurse and the participant hold a feedback session at the health station at the end of the 6th week. The nurse researcher performed post-test to evaluate the diabetes knowledge of persons with type 2 diabetes questionnaire and the summary of diabetes self-care activities measurement (SDSCA). The evaluation would be a feedback to each participant for perceiving their progression of behavior change. At the end of this visit, the nurse took the blood testing (HbA1c and LDL-C) to evaluate the adherence and the result of the testing was would be informed to the participant in the next few days because the testing had to be sent to a tertiary care facility. After the end of program, the nurse then evaluated their knowledge and behavior using the summary of diabetes self-care activities measure. This information and score were told to the participant to recognize the integrated diabetes self management.

1.4.4 Telephone calls for follow up: The second phase was delivered by the nurse using telephone calls after the final visit to the health station every two weeks for four weeks to deliver informational and emotional support, monitor adherence, enhance motivation, and foster problem-solving, as well as to ensure the participant's understanding of the diabetes self-management plan. This phase would end at the 10th week. After the phase was finished, the participant visited the family physician to evaluate the treatment but s/he would not change the treatment.

Open questions were used to reflect the participant's behavior and knowledge that was integrated into their real life for examples:

“What kind of symptoms of diabetic complications did you perceive?”

“What did the kind of food you have in the morning or at lunch or dinner?”

“How many meals did you have on each day?”

“What is the nature of physical activity or exercise do you take?”

“When did you do physical activity or exercise?”

“What was the problem when you have physical activity or exercise?”

“When did you take the oral hypoglycemic, before meal or after meal?”

“What was the kind of problem that make you delay to take the medication?”

“How did you solve the symptoms of hypoglycemia when it occurred?”

1.4.5 At the 12th week the researcher took blood samples in the morning, measured blood pressure and completed data collection of self-perception’s symptom of diabetic complications, satisfaction with the nursing intervention.

2.2. Procedure for the Control Group

2.2.1 The participants were taken blood samples, i.e., fasting blood sugar, HbA_{1c}, LDL-C level in the morning at the beginning of the program, the 6th week and at the end of the program.

2.2.2 The data collection was performed by the researcher at the 11th Red Cross Health Station where it was assigned for the control group. The data were collected at the beginning and the end of the program including self-perception of symptom of diabetic complications, and satisfaction questionair. Telephone call was used to contact at the 6th week and the 12th week to remind them of the date of appointments and to report their HbA_{1c} and LDL-C levels.

2.2.3 The researcher made appointment with the participants to take blood samples of HbA_{1c}, LDL-C at the 6th and the 12th weeks.

2.2.4 After the blood samples were taken, the participants waited for measuring blood pressure and to wait online for to visit their family physician.

2.2.5 The participants in the control group were given appointment to visit the diabetes clinic.

2.2.6 Traveling expenses (50-100 baht) and fasting blood sugar expenses was paid for some participants. The cost of HbA_{1c} and LDL-C testing was not paid.

2.2.7 The physician delivered prescribed oral hypoglycemic medication and made appointments with the participant at the 6th week and the 12th week.

The Roles of the Researcher

The researcher had three roles in this study: educator, facilitator and evaluator. In each role, the nurse acted in different time and provided many activities to help nurses launch the intervention.

1. **Educator Role** was the first responsibility in this research. The researcher set up a schedule to teach and demonstrate the concept of chronic care model, diabetes management, and coaching process. The objective of the training program was explained to the nurses. This was aimed to increase the nurse's knowledge and skills of diabetes self-management education, coaching and assessing perceived symptom of diabetic complications.

2. **Facilitator Role** was the second task. The researcher was responsible to provide the multifaceted nurse-coaching intervention to the nurses. All the knowledge and skills were integrated and elaborated to increase the knowledge and skills of the persons with type 2 diabetes. The researcher developed a manual of guideline and teaching plan. The researcher also facilitated a note book, computerized assisting instruction and a brief manual for diabetes self-management education for the participants. The researcher attended the diabetes self-management session which nurse coach offered to individual participants at the first time. The researcher observed the process of coaching, content of diabetes self-management, techniques and methods.

3. **Evaluator Role** was the last task. The researcher took this role to evaluate the knowledge and self-care activities of the participant using the diabetes self-management's knowledge for persons with type 2 diabetes questionnaires and the summary of diabetes self-care activities measure (SDSCA). For the nurse's knowledge, the evaluation was based on the diabetes management knowledge questionnaire. The process of obtaining data from the nurse coach was through the evaluation by the researcher using nurse's behavior report form. Moreover, the researcher also collected data at pre- and post-test in the experimental and control groups including perceived symptom of diabetic complications using self-perception symptom of diabetic complications questionnaire, HbA_{1c}, blood pressure, LDL-C level and satisfaction using satisfaction through nursing intervention questionnaire.

Ethical Considerations

Approvals of the study were obtained before the trial was launched. The ethical considerations of this dissertation followed the principles of research ethics as approved by the Faculty of Medicine, Chulalongkorn University, i.e., respect for personal autonomy and human dignity with the beneficence to the human subjects and social justice (Polit and Beck, 2004).

The principle of respect for human dignity includes the rights to self-determination and freedom to control their own activities, including voluntary participation in the study (Polit, 2004). In addition, verbal approval will be obtained from the diabetic outpatient manager and endocrinologist of the participants. Participants will be provided with special information for informed consent and will be recruited into the study after signing a consent form. Due to telephone call intervention, in this dissertation, it was the participants, who chose the time for their interviews. The confidentiality of the participants will be maintained by each nurse coach.

The principle of justice includes the rights to fair treatment as well as privacy. This mandates the selection of research subjects is to be done ethically. The participants in this study would be invited to participate regardless of their gender, race, nationality and social status. If the participants did not want to participate in a specific part of the study, they were free to do so. They were also continuously informed about their rights to end their participation whenever they want.

Regarding the permission to carry out this study at the 2nd and the 11th Red Cross Health Stations would be allowed from the Director of the Relief and Public Health Bureau of the Thai Red Cross Society, the nurse director of the Red Cross Health Station sent the permission to the head nurse of the 2nd and the 11th Red Cross Health Stations. Having obtained all the approvals through these processes, the nurse researcher conducted the intervention.

Data Analysis

Both the descriptive and inferential statistics were utilized to describe the research hypothesis. The process of data analysis was as followed:

1. The researcher checked the data collection instrument for competition and accuracy at the time of data collection. All data were cleansed using double-entered into comparative databases.

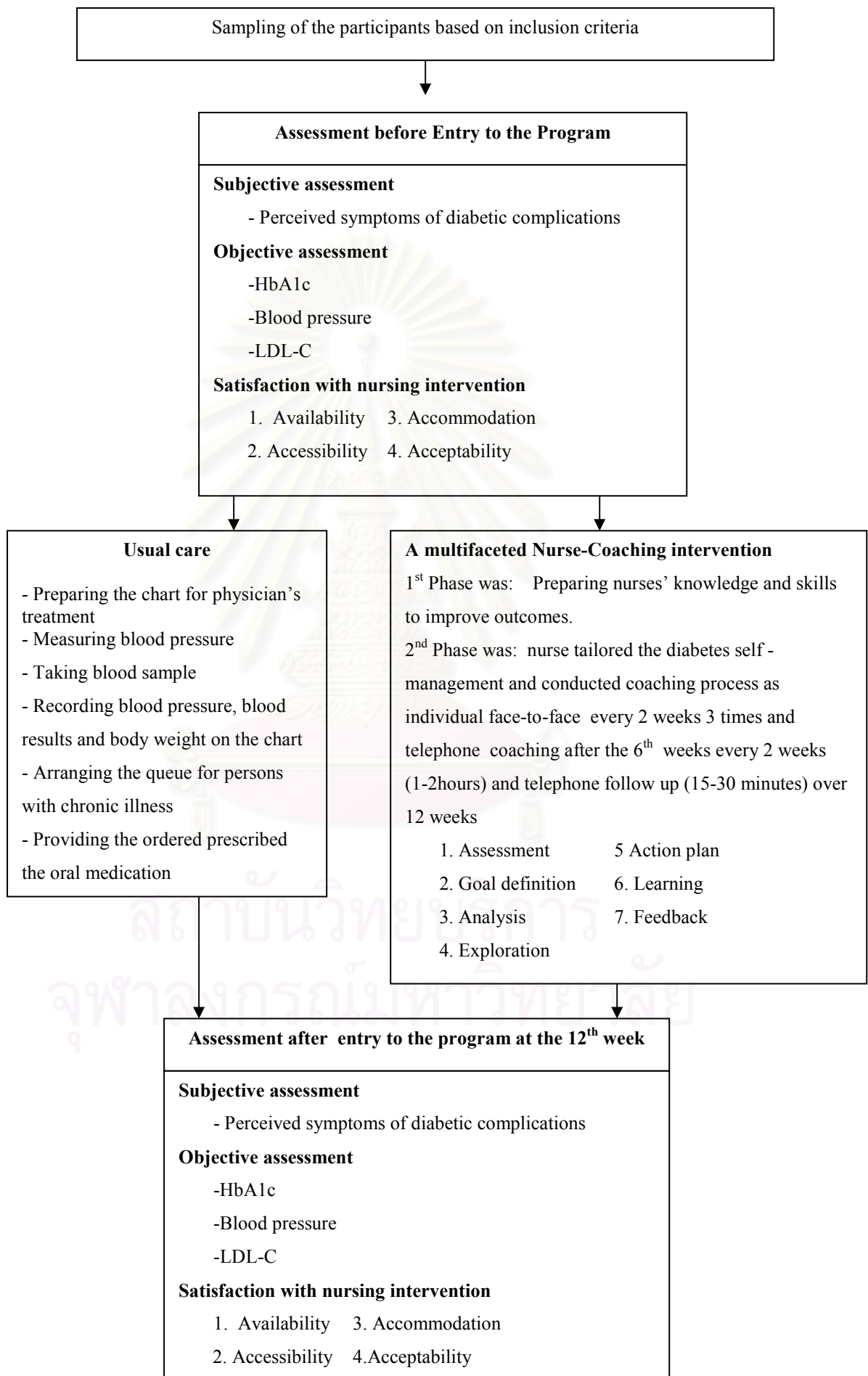
2. The statistical hypothesis testing was employed to test for mean differences between the two groups at the end of the 12th week.

2.1 Descriptive Statistics were used to describe the basic features of the demographic and personal health characteristics of the participants in this study with frequencies, percentages, the standard deviation; the range; the arithmetic mean

2.2 The inferential statistics were utilized and established the level of significance at 0.05. Intervention effects on the level of HbA_{1c}, blood pressure and LDL-C level and satisfaction, all these were evaluated by dependent sample t-test and independent t-test. A two proportion z-test of dependent and independent samples (Kanjawasee, 2007) was used for comparison of perceived symptom of diabetic complications in persons with type 2 diabetes who received the multifaceted nurse-coaching intervention and persons with type 2 diabetes who did not receive the intervention.



Summary of the Process of Conducting Intervention



CHAPTER 4

RESULTS

This quasi-experimental study was used to investigate the effects of a multifaceted nurse-coaching intervention on diabetic complications which were assessed by using perceiving symptoms of diabetic complications, HbA_{1c}, blood pressure level and LDL-C level as well as patient satisfactions with nursing service. The purpose of this chapter was to present the results of the study and the findings, presentations were organized in terms of the research hypothesis as following:

Hypothesis:

1. Persons with type 2 diabetes who received the multifaceted nurse-coaching have lower in the number of perceived symptom of diabetic complications than those who did not receive intervention.
2. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in HbA_{1c} level than those who did not receive intervention.
3. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in blood pressure (systolic and diastolic blood pressure) level than those who did not receive intervention.
4. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in LDL-C level than those who did not receive intervention.
5. Persons with type 2 diabetes who received the multifaceted nurse-coaching had higher in satisfaction score than those who did not receive intervention.

Demographic Characteristics of the Samples

The 93 persons with type 2 diabetes from the 2nd Red Cross Health Station (experimental group) and 45 persons from the 11th Red Cross Health Station (control group) who met the inclusion criteria were approached to participate in the study. The 33 subjects in the 2nd Red Cross health station agreed to participate in the study. The participants in the 11th Red Cross Health Station were selected to obtain groups comparable for age and duration of diabetes. The number of the participants could perform the match paired with the 20 subjects.

Table 3 Demographic Characteristics of Control of Group and Experimental Group

Demographic	Control Group (n ₁ =20)		Experimental Group (n ₂ =20)	
	Frequency	Percentage	Frequency	Percentage
	(n)	(%)	(n)	(%)
Education Level				
No education	2	10	0	0
Primary school	8	40	4	20
Secondary school	3	15	1	5
High school	3	15	5	25
Certificate / Bachelor	2	10	9	45
Others	2	10	1	5
Marital Status				
Single	5	25	2	10
Married	13	65	18	90
Widowed or Separated	2	10	0	0
Payment				
Government Service	13	65	14	70
Universal Health Care				
Coverage Insurance	2	10	2	10
Self-payment	5	20	4	20

Table 3 presented the demographic characteristics of participants in control group and experimental group. The education level of the participants in experimental group were mainly certified or bachelor degree (n=9). In the control group, the education level of the participants were majority in primary school (n=8). The highest percentage of payment for health care cost in experimental group (70%) and control group (65%) was paid by the government service.

Table 4 Demographic Characteristics of Control of Group and Experimental Group

Demographic	Total N=40	Control Group (n₁=20)	Experimental Group (n₂=20)	t
Age (Year)				
Mean	55.59	56.85	54.95	
SD	7.36	6.80	7.94	-.812
Maximum	69	67	69	
Minimum	42	46	42	
Duration (Year)				
Mean	6.05	6.10	6.00	
SD	4.78	5.01	4.67	.386
Maximum	17	17	16	
Minimum	1	1	1	

$p > .05$

Table 4 reveals that characteristics of control of group and experimental group. Age characteristics, the total participants' age ranged from 42-69 years ($\bar{X} = 55.59$, $SD = 7.36$). In control group, the age ranged from 46-67 years ($\bar{X} = 56.85$, $SD = 6.8$), in experimental group, the age ranged from 42-69 years ($\bar{X} = 54.95$, $SD = 7.94$). Duration of diabetes in the total participants ranged from 1-17 years ($\bar{X} = 6.05$, $SD = 4.78$). In control group, the duration ranged from 1-17 years ($\bar{X} = 6.10$, $SD = 5.01$) like the experimental group, the duration ranged from 1-17 years with mean close to the control group. ($\bar{X} = 6.00$, $SD = 4.67$).

Hypothesis 1 Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower number of perceived symptom of diabetic complications than those who did not receive intervention.

Table 5 Comparisons of Perceived Symptom within Experiment Group before and after intervention.

Time	After Intervention			Z
Before Intervention	Hyperglycemic Symptoms			
	Thirsty	Yes	No	-2.23 *
	Yes	0	5	
	No	0	15	
	Too Much Fluid intake	Yes	No	-2.23 *
	Yes	0	5	
	No	0	15	
	Fatigue	Yes	No	-2.44*
	Yes	0	6	
	No	0	14	
	Nocturnal	Yes	No	-1.88 *
	Yes	0	6	
	No	1	13	
	Itching	Yes	No	-1.00
	Yes	1	3	
	No	1	15	
	Hypoglycemic Symptoms			
	Hungry	Yes	No	0.37
	Yes	4	3	
	No	4	9	
	Headache	Yes	No	-2.64 **
	Yes	0	7	
	No	0	13	

*p ≤ .05, **p ≤ .01

Table 5 presents that the proportion of persons with type 2 diabetes in experimental group after receiving intervention had lower perceived symptoms of diabetic complication including hyperglycemic symptoms (thirsty, too much fluid intake, fatigue, and nocturnal) and hypoglycemia (headache) than before receiving intervention.

Table 5 Comparisons of Perceived Symptom within Experiment Group before and after intervention (Continued)

Time	After Intervention			Z	
Before Intervention	Ophthalmologic Symptoms				
	Blurry vision	Yes	No		
		Yes	0	3	-1.73 *
		No	0	17	
	Black Eye Spot	Yes	No		
		Yes	0	1	-1.00
		No	0	19	
	Neuropathic symptoms				
	Constipation	Yes	No		
		Yes	0	1	-1.00
		No	0	19	
	Diarrhea	Yes	No		
		Yes	0	3	-1.73*
		No	0	17	
	Impotent	Yes	No		
		Yes	2	3	-1.00
		No	1	14	
	Burn in feet	Yes	No		
		Yes	0	1	0.00
	No	1	18		
Pinprick	Yes	No			
	Yes	0	2	-1.41	
	No	0	18		

*p ≤ .05, **p ≤ .01

Table 5 (continued) presents that the proportion of persons with type 2 diabetes in experimental group after receiving intervention had lower perceived symptoms of diabetic complication including ophthalmologic symptoms (blurry vision) and neuropathic symptom (diarrhea) than before receiving intervention.

Table 5 Comparisons of Perceived Symptom within Experiment Group before and after intervention (Continued)

Time	After Intervention			Z
Before Intervention	Neuropathic symptoms			
	Numbness	Yes	No	
	Yes	1	7	-2.12*
	No	1	11	
	Cardiovascular symptoms			
	Chest pain	Yes	No	
	Yes	0	3	-1.00
	No	1	16	
	Peripheral vascular symptoms			
	Claudication	Yes	No	
	Yes	0	3	1.73*
	No	0	17	

*p ≤ .05, **p ≤ .01

Table 5 (continued) presents that the proportion of persons with type 2 diabetes in experimental group after receiving intervention had lower perceived symptoms of diabetic complication including neuropathic symptom (numbness) and peripheral vascular symptoms (claudication) than before receiving intervention.

Table 6 Comparisons of Perceived Symptom within Control Group before and after intervention.

Time	After Intervention			Z
Before Intervention	Hyperglycemic Symptoms			
	Thirsty	Yes	No	-2.12*
	Yes	2	7	
	No	1	10	
	Too Much Fluid intake	Yes	No	-1.63
	Yes	2	5	
	No	1	12	
	Fatigue	Yes	No	-2.12*
	Yes	2	7	
	No	1	10	
	Nocturnal	Yes	No	0.00
	Yes	6	2	
	No	2	10	
	Itching	Yes	No	-2.00*
	Yes	1	4	
	No	0	15	
	Hypoglycemic Symptoms			
	Hungry	Yes	No	1.50
	Yes	4	3	
	No	8	5	
Headache	Yes	No	-2.64**	
Yes	0	7		
No	0	13		

*p ≤ .05, **p ≤ .01

Table 6 presents that the proportion of persons with type 2 diabetes in control group after 12 weeks had lower perceived symptoms of diabetic complication including hyperglycemic symptoms (thirsty, fatigue, itching), and hypoglycemic symptoms (headache) than before entry to the program.

Table 6 Comparisons of Perceived Symptom within Control Group before and after intervention (Continued)

Time	After Intervention			Z
Before Intervention	Hypoglycemic Symptoms			
	Fainting	Yes	No	
	Yes	0	4	-2.00*
	No	0	16	
	Ophthalmologic Symptoms			
	Blurry vision	Yes	No	
	Yes	1	7	-2.12*
	No	1	11	
	Eyespot	Yes	No	
	Yes	1	3	1.00
	No	1	15	
	Neuropathic symptoms			
	Constipation	Yes	No	
	Yes	1	4	-1.34
	No	1	14	
	Diarrhea	Yes	No	
	Yes	1	4	-1.34
	No	1	14	
	Impotent	Yes	No	
	Yes	1	7	-2.12*
	No	1	11	
	Burn in feet	Yes	No	
	Yes	1	5	-1.63
	No	1	13	
	Pinprick	Yes	No	
	Yes	1	5	-1.63
	No	1	13	

*p ≤ .05, **p ≤ .01

Table 6 (continued) presents that the proportion of persons with type 2 diabetes in control group after 12 weeks had lower perceived symptoms of diabetic complication including hypoglycemic symptoms (fainting), ophthalmologic symptoms (blurry vision), and neuropathic symptoms (impotent) than before entry to the program.

Table 6 Comparisons of Perceived Symptom within Control Group before and after intervention (Continued)

Time	After Intervention			Z
	Neuropathic symptom			
Before Intervention	Numbness	Yes	No	
	Yes	7	3	- 0.70
	No	5	5	
	Cardiovascular symptom			
	Chest pain	Yes	No	
	Yes	0	1	- 1.00
	No	0	19	
	Peripheral vascular symptom			
	Claudication	Yes	No	
Yes	2	6	- 2.44**	
No	0	12		

*p ≤ .05, **p ≤ .01

Table 6 (continued) presents that the proportion of persons with type 2 diabetes in control group after 12 weeks had lower perceived symptoms of diabetic complication such peripheral vascular symptom (claudication) than before entry to the program.

Table 7 Comparisons of Perceived Symptoms between Control Group and Experimental Group before Intervention

Symptom experience	Control Group			Experimental Group			Z
	Total	Before		Total	Before		
		No	Yes		No	Yes	
Hyperglycemic Symptoms							
1. Frequent Thirsty	20	11	9	20	15	5	-1.32
2. Too much fluid intake	20	13	7	20	15	5	-0.69
3. Fatigue	20	11	9	20	14	6	-0.97
4.Nocturnal urination	20	12	8	20	14	6	-0.66
5. Itching	20	15	5	20	16	4	-0.37
Hypoglycemic Symptoms							
6. Hunger and shakiness	20	13	7	20	13	7	0.00
7. Headache	20	13	7	20	13	7	0.00
8. Fainting	20	16	4	20	20	0	-2.10 *

* $p \leq 0.5$, $p > 0.5$

Table 7 Comparisons of Perceived Symptoms between Control Group and Experimental Group before Intervention (Continued)

Symptom experience	Control Group			Total	Experimental Group			Z
	Total	Before			Total	Before		
		No	Yes			No	Yes	
Ophthalmological Symptoms								
9. Blurry vision	20	12	8	20	17	3	-1.77 *	
10. Black Spot in the Eye	20	16	4	20	19	1	-1.43	
Neuropathy Symptoms								
11. Constipation	20	15	5	20	19	1	-1.77*	
12. Diarrhea	20	15	5	20	17	3	-0.79	
13. Erectile dysfunction	20	12	8	20	15	5	-1.01	
14. Burning in the hands or feet	20	14	6	20	19	1	-2.08*	
16. Numbness in the hands or feet	20	14	6	20	18	2	-1.58	

* $p \leq 0.5$, $p > 0.5$

Table 7 Comparisons of Perceived Symptoms between Control Group and Experimental Group before Intervention (Continued)

Symptom experience	Control Group			Experimental Group			Z
	Total	Before		Total	Before		
		No	Yes		No	Yes	
Cardiovascular diseases Symptoms							
17.Chest pain	20	19	1	20	17	3	-1.05
18. Weakness in the arm or leg or both on the same side	20	20	0	20	20	0	0.0
Peripheral Vascular Diseases Symptoms							
19. Claudication (walking through leg pain)	20	12	8	20	17	3	-1.77*

* $p \leq 0.5$, $p > 0.5$

Table 7 showed that the proportion of 1 hypoglycemic symptoms ([fainting](#)), 1 ophthalmological symptoms (blurry vision), 2 neuropathic symptoms (constipation, burning in the hands or feet), peripheral vascular diseases symptoms ([claudication](#)) in persons who did not received the intervention was higher than persons who received the multifaceted nurse-coaching intervention before enter to the intervention.

Table 8 Comparisons of Perceived Symptom between Control Group and Experimental Group after Intervention

Symptom experience	Control Group			Experimental Group			Z
	Total	After		Total	After		
		No	Yes		No	Yes	
Hyperglycemic Symptoms							
1. Frequent Thirsty	20	17	3	20	20	0	-1.80*
2. Too much fluid intake	20	17	3	20	20	0	-1.80*
3. Fatigue	20	17	3	20	20	0	-1.80*
4. Nocturnal urination	20	12	8	20	19	1	-2.65*
5. Itching	20	19	1	20	18	2	-0.6
Hypoglycemic Symptoms							
6. Hunger and shakiness	20	8	12	20	12	8	-1.26
7. Headache	20	20	0	20	20	0	-1.45
8. Fainting	20	20	0	20	20	0	-1.45

* $p \leq 0.5$, $p > 0.5$

Table 8 Comparisons of Perceived Symptom between Control Group and Experimental Group after Intervention (Continued)

Symptom experience	Control Group			Experimental Group			Z
	Total	After		Total	After		
		No	Yes		No	Yes	
Ophthalmological diseases Symptoms							
9. Blurry vision	20	18	2	20	20	0	-1.45
10. Black Spot in the Eye	20	18	2	20	20	0	-1.45
Neuropathic Symptoms							
11. Constipation	20	18	2	20	20	0	-1.45
12. Diarrhea	20	18	2	20	20	0	-1.45
13. Erectile dysfunction	20	18	2	20	17	3	0.47
14. Burning in the hands or feet	20	18	2	20	19	1	-0.60
15. Tingling, or shooting stabbing pain in the hands or feet	20	18	2	20	20	0	1.45
16. Numbness in the hands or feet	20	10	10	20	18	2	-1.45

* $p \leq 0.5$, $p > 0.5$

Table 8 Comparisons of Perceived Symptom between Control Group and Experimental Group after Intervention (Continued)

Symptom experience	Control Group			Experimental Group			Z
	Total	After		Total	After		
		No	Yes		No	Yes	
Cardiovascular Diseases Symptoms							
17. Chest pain	20	20	0	20	19	1	1.01
18. Weakness in the arm or leg or both on the same side	20	20	0	20	20	0	0.0
Peripheral Vascular Diseases Symptoms							
19. Claudication (walking through leg pain)	20	18	2	20	20	0	1.45

* $p \leq 0.5$, $p > 0.5$

Table 8 showed that the proportion of 4 hyperglycemic symptoms (frequent thirsty, too much fluid intake, fatigue, and nocturnal urination symptoms) in persons who received the multifaceted nurse-coaching intervention was lower than persons who did not received the intervention after 12 weeks.

Table 9 Comparison of HbA_{1c}, Blood pressure, and LDL-C level at before and after intervention

Dependent variables		Control Group (N ₁ =20)		Experimental Group (N ₂ =20)		t
		\bar{X}	SD	\bar{X}	SD	
HbA_{1c} Level	Before	8.17	.99	8.60	1.41	1.16
	After	7.72	0.97	7.07	0.67	-2.23*
Blood Pressure Level						
Systolic Pressure Level	Before	133	20.87	133	10.56	.00
	After	127.4	15.3	121	10.28	-1.52
Diastolic Pressure Level	Before	85	9.46	84.5	8.87	1.17
	After	79.4	19.44	81.3	9.1	.395
LDL-C Level						
	Before	139.3	29.61	138.75	40.39	-0.49
	After	110.4	25.6	123.6	45.54	1.05

* $p \leq .05$, $p > .05$

At before the intervention, Table 9 presented the mean of HbA_{1c}, blood pressure, LDL-C level. The results presented that the mean of HbA_{1c} in persons with type 2 diabetes who received the multifaceted nurse-coaching intervention ($\bar{X} = 8.6$, SD = 1.41) had lower level than persons with type 2 diabetes who did not received the intervention ($\bar{X} = 8.17$, SD = 0.99) statistically significant.

The mean of blood pressure (systolic blood pressure) before the intervention in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 133$, $SD = 10.56$) and persons with type 2 diabetes receiving traditional care ($\bar{X} = 133$, $SD = 20.87$) was not significantly different.

The mean of blood pressure (diastolic blood pressure) before the intervention in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 84.5$, $SD = 8.87$) and persons with type 2 diabetes receiving traditional care ($\bar{X} = 85$, $SD = 9.46$) was not significantly different.

The mean of LDL-C level before the intervention in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 138.75$, $SD = 40.39$) and persons with type 2 diabetes receiving traditional care ($\bar{X} = 139.3$, $SD = 29.61$) was not significantly different.

At after intervention, the mean of HbA_{1c} level at after intervention in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 7.07$, $SD = 0.67$) had lower than persons with type 2 diabetes receiving traditional care ($\bar{X} = 7.72$, $SD = 0.97$) statistically significant

Considering about blood pressure; the mean of blood pressure level (systolic blood pressure level) in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 121$, $SD = 10.28$) had lower than persons with type 2 diabetes receiving traditional care ($\bar{X} = 127$, $SD = 15.3$) but it was not lower statistically significant.

The mean of blood pressure level (diastolic blood pressure level) in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 81.3$, $SD = 9.1$) had lower than persons with type 2 diabetes receiving traditional care ($\bar{X} = 79.4$, $SD = 19.44$) but it was not lower statistically significant.

The mean of LDL-C level in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention ($\bar{X} = 123.6$, $SD = 45.54$) had not been different in persons with type 2 diabetes receiving traditional care ($\bar{X} = 110.4$, $SD = 25.6$) statistically significant. The level of LDL-C in persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention had higher level than persons with type 2 diabetes receiving usualcare care.

Table 10 Comparison of Mean Average of Satisfaction within Persons with Type 2 Diabetes before Intervention.

Satisfaction	Control Group				t
	Before		After		
	\bar{X}	SD	\bar{X}	SD	
1. Availability	4.03	0.74	4.06	0.90	0.32
2. Accessibility	3.43	1.04	2.90	1.23	1.57
3. Accommodation	2.83	1.08	1.80	1.19	3.07**
4. Acceptability	3.05	1.03	2.02	0.85	3.66**
Total	3.34	0.53	2.69	1.03	2.79*

* $p \leq .05$, ** $p \leq .01$

The table 10 reveals that mean average of satisfaction in persons with type 2 diabetes who did not received the multifaceted nurse-coaching intervention (\bar{X} before = 3.34, SD = 0.53; \bar{X} after = 2.69, SD = 1.03). The total mean average of four dimensions before and after entry to the program had statistically significant difference. For each dimension, the mean average of two dimensions before and after entry to the program including availability and accessibility had not difference but the satisfaction of accommodation and acceptability before and after entry to the program had statistically significant difference.

Table 11 Comparison of Mean average of Satisfaction within Persons with Type 2 Diabetes after Intervention.

Satisfaction	Experimental Group				t
	Before		After		
	N ₂ = 20		N ₂ = 20		
	\bar{X}	SD	\bar{X}	SD	
1. Availability	4.03	0.75	4.94	0.18	-5.10**
2. Accessibility	3.54	1.13	4.95	0.13	-5.45**
3. Accommodation	2.38	1.47	4.93	0.17	-7.39**
4. Acceptability	2.47	1.46	4.85	0.34	-6.89**
Total	3.11	0.81	4.92	0.05	-8.27**

* $p \leq .05$, ** $p \leq .01$

The table 11 reveals that mean average of satisfaction in persons with type 2 diabetes who received the multifaceted nurse-coaching intervention (\bar{X} before = 3.11, SD = 0.81; \bar{X} after = 4.92, SD = 0.05). The total mean average of four dimensions before and after entry to the program had statistically significant difference at $\alpha = .01$. For all dimensions, the mean average of satisfaction before and after intervention had statistically significant. It implied that after receiving the intervention, the satisfaction had higher than before receiving the intervention for all dimensions.

Table 12 Comparison of Mean average of Satisfaction in Persons with Type 2 Diabetes after Intervention.

Satisfaction	Control Group		Experimental Group		t
	N ₁ = 20		N ₂ = 20		
	\bar{X}	SD	\bar{X}	SD	
1. Availability	4.06	0.90	4.94	0.18	4.25**
2. Accessibility	2.90	1.23	4.95	0.13	7.39**
3. Accommodation	1.80	1.19	4.93	0.17	11.65**
4. Acceptability	2.02	0.85	4.85	0.34	13.73**
Total	2.70	1.03	4.92	0.05	11.56*

* $p \leq .05$, ** $p \leq .01$

The result of the comparison of mean average of satisfaction presents in table 12 shows that the total mean average satisfaction of experimental group ($\bar{X} = 4.92$, $SD = 0.05$) were higher than total mean average satisfaction of control group ($\bar{X} = 2.70$, $SD = 1.03$). In conclusion, persons with type 2 diabetes receiving the multifaceted nurse-coaching intervention had higher mean average of satisfaction than persons who did not receive intervention for all dimensions.

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CHAPTER 5

CONCLUSION AND DISCUSSION

This quasi-experimental research was conducted and the purpose of this inquiry was to evaluate the effects of a multifaceted nurse-coaching for reducing diabetic complications in persons with type 2 diabetes which were measured by perceived symptoms of diabetic complications, HbA_{1c}, blood pressure and LDL-C level as well as increasing patient satisfaction with nursing intervention.

The objectives of this study are as follows:

1. To compare diabetic complications which were measured perceived symptoms of diabetic complications, HbA_{1c}, blood pressure, and LDL-C level, between persons with type 2 diabetes who received a multifaceted nurse-coaching intervention and persons with type 2 diabetes who did not receive the intervention.
2. To compare patient satisfaction with nursing service between persons with type 2 diabetes who received a multifaceted nurse-coaching intervention and those who received usual nursing care.

The hypotheses of this study are as follows:

1. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower number of perceived symptoms of diabetic complications than those with type 2 diabetes who did not receive the intervention.
2. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower HbA_{1c} level than those with type 2 diabetes and did not receive the intervention.
3. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower blood pressure (systolic and diastolic blood pressures) levels than those with type 2 diabetes and did not receive the intervention.
4. Persons with type 2 diabetes who received the multifaceted nurse-coaching had lower LDL-C level than those with type 2 diabetes and did not receive the intervention.

5. Persons with type 2 diabetes who received the multifaceted nurse-coaching had higher satisfaction score than those with type 2 diabetes and did not receive the intervention.

The research participants were divided into 2 groups, namely:

1. The community nurses at Red Cross Health Stations in Bangkok, the nurse delivered care for persons with type 2 diabetes. The researcher performed randomly the setting and assigned the 2nd Red Cross Health Station as experimental group and the 11th Red Cross Health Station as control group. There were six nurses to provide care for persons with type 2 diabetes.

2. As for the persons with type 2 diabetes, they were invited to participate in the study. All the participants were recruited from chart reviewed as the inclusion criteria, the following step was to match pair those participants with the two criteria: the group of age < 30 years and the group of age > 30 years; the group of duration of diabetes < 5 years and the group of duration of diabetes > 5 years.

The instruments used in the study were three of types, namely: 1) instruments for intervention; and, 2) instruments for data collection which included demographic information at the baseline and the signs of complications of diabetes and co-morbidities including HbA_{1c}, Blood pressure and LDL-C level, perceived symptom of diabetic complications questionnaire, and patient satisfaction with a nursing intervention questionnaire. Each instrument was performed validity and reliability using Alpha Cronbach's Coefficient and the reliability was 0.862, 0.93, respectively; 3) instruments for monitoring the intervention were the nurse's behaviors report form, the summary of diabetes self care activities measurement, and self-report for change behaviors.

The procedure for conducting the intervention was of three phases, namely:

1) phase of intervention preparation; 2) phase of the intervention conduction: the 40 persons with type 2 diabetes in both group were contacted by the community nurse but 20 persons with type 2 diabetes in experimental group received a multifaceted nurse-coaching intervention while the control group did not receive the intervention; and, 3) phase of evaluation and conclusion. In this phase, the data were collected the signs of complications of diabetes and co-morbidities including HbA_{1c}, blood pressure and LDL-C level, self perception of symptom of diabetic complications

questionnaire, and patient satisfaction with nursing service questionnaire at the 6th week and the 12th week.

Data analysis was done by Statistical Package for the Social Science version 13.0. The descriptive statistics was used for percentage describe mean, standard deviation, inferential statistics were applied to describe and explain the different mean of dependent variables including HbA_{1c}, blood pressure and LDL-C level such as dependent t-test, and independent t-test and two samples proportion z-test test was used for comparison of the occurrence of perceiving symptoms of diabetic complications.

Conclusion

The results of this study could be summarized as follows:

1. The persons with type 2 diabetes who received the multifaceted nurse-coaching had the proportion of 4 hyperglycemic symptoms statistically lower than those with type 2 diabetes who did not receive the intervention at the 12th week.
2. The persons with type 2 diabetes who received the multifaceted nurse-coaching had HbA_{1c} level lower than those with type 2 diabetes who did not receive the intervention at the 12th week.
3. There were no significant differences in mean of blood pressure (systolic and diastolic blood pressure) and LDL-C level in the persons with type 2 diabetes who received the multifaceted nurse-coaching and those with type 2 diabetes who received the usual care at baseline and at the 12th week.
4. The mean of patient satisfaction score with nursing intervention in the persons with type 2 diabetes who received the multifaceted nurse-coaching was higher than in those with type 2 diabetes who received the usual care and the difference was statistically significant after the intervention.

Discussion

The multifaceted nurse-coaching intervention was based on Coaching model (Eaton, 2001). This was a complex program in which participants who received a nurse-coaching intervention based on the program to enhance their cognitive knowledge and coaching process were compared to participants who were with type 2 diabetes and did not receive the intervention. Therefore, the discussion in this part was based on theoretical framework and methodological issues.

According to the present policy of healthcare system in Thailand, the improving quality of diabetes care might benefit the persons with chronic illness such diabetes. The healthcare providers need to improve the process of care that lead to improve outcomes (Suwattee and Lynch, 2003: 563-568). The policy of the Minister of Public Health mandated that primary health service is to be suitable delivery care. The nurses were in the position at the forefront; they could provide effective care or intervention to improve health outcomes (Boonthong, 2000). The nurses in the study were prepared to inform and activate the persons with type 2 diabetes to become an active learner and participate in their management. The nurses designed their service to deliver diabetes self-management education in combination with coaching process. They also used clinical information to support self-management in persons with type 2 diabetes. All those concepts were integrated to the participant's life. The head nurse facilitated the team to allow the community nurse training in the program. This results might occur from an important contribution in facilitating staff development (Kushnir and Ehrenfeld, 2007).

This study collected the data from the 2nd and 11th Red Cross Health Stations of the Relief and Public Health Bureau of the Thai Red Cross Society, located in the urban community and serving a primary care unit, Bangkok Thailand. The 2nd Red Cross Health Station was assigned to be a setting for experimental group and the 11th Red Cross Health Station was also assigned as control group. Three persons (3.3%) in the experimental group dropped out from the program during their 1st visit while one person (2.2%) in the control group also dropped out from the program during the 1st visit. The attrition rate was therefore low. This might have resulted from the fact that participants in the two settings were living close to the health centers and had health insurance. This might also result from the health policy.

The discussion is as follows:

1. The study found that the proportion of perceived symptom of diabetic complications (hyperglycemic symptoms) in persons with type 2 diabetes who received the multifaceted nurse-coaching lower than those who did not received the intervention. This finding was consistent with the statement of the 1st hypothesis that the persons with type 2 diabetes who received the multifaceted nurse-coaching program had lower perceived symptoms of diabetic complications than those who did not receive the intervention. This result can be explained by assuming that perceived symptoms of diabetic complications were reduced in the persons with experimental

group due to the nurse-delivered, symptom-focused teaching and counseling intervention. This finding similar to the study that utilized the nurse-delivered, symptom-focused teaching and counseling intervention which led to improvement in self-care practices, in symptom distress (frequency of symptoms related to distress) due to hyperglycemic and hypoglycemic symptoms (Skelly and Carlson, 2005: 213-220), although the result presented that the difference in between groups were not statistically significant, participants in the group of intervention showed statistically significant reducing the frequency of symptoms.

2. There were a significant difference in the mean level of HbA_{1c} tests in the persons with type 2 diabetes receiving the multifaceted nurse-coaching and the persons with type 2 diabetes receiving usual care at the 12th week. The finding from this study was consistent to the 2nd hypothesis which was stated that after persons with type 2 diabetes who received the multifaceted nurse-coaching intervention they would have greater reduction in HbA_{1c} than the group receiving usual care. This result was similar to the study of Saco et al. (2004). However, the result was not relevant to Whittemore (2004) who used the nurse coaching to reduce HbA_{1c}, BMI, but her results of HbA_{1c} and BMI in both groups were no different.

Basically in primary healthcare services, HbA_{1c} testing was not included in the process of care as a clinical information (Nitiyanant and Chettakul, 2007: 65-71). Actually this testing was a measurement of standard of care (American Diabetes Association, 2007: S4-41), when the researcher offered this test to the setting and the persons with type 2 diabetes, this testing could assess the adherence of self management in persons with type 2 diabetes in 6-12 weeks (Rohlfing and Wiedmeyer, 2002: 275-278). The nurse coach could assess their adherence of diabetes self management that and the testing of HbA_{1c} could reflect self management in the past 6-12 weeks. This strategy made the nurse have high concern about their management. Finally the head nurse and the community nurses had committed to provide this test in the setting. This intervention could increase process of care and lead to improve HbA_{1c} level.

Due to the nature of the intervention, the nurse in the community received the coaching program before the implementation. They were prepared to perform the coaching process including assessment, goal setting, exploring, analyzing, action planning, learning, and evaluation. This process was applied to individuals through

face-to-face and telephone coaching. The nurse used this process and integrated with the diabetes self-management that was tailored to individual needs.

Along with this process, the nurses in the setting could encourage each person to change their behaviors. They offered their time in the afternoon and made appointment with the persons at the setting the nurse used the opened question to motivate each person to understand their diabetes management and gave the documents to help the persons with type 2 diabetes. The nurse and persons with type 2 diabetes interacted to each other and made relationship and the person trusted the nurse who coached them. Then the nurse was able to assess variety of factors that made the barriers to improve the self management. The nurse could explore and analyze the strength and weakness of their behavior on the nursing care plan which the persons could see the all of their barriers and behavior in daily living. They could talk and discuss their action plan that directed to the goal behavior in a short time and long-term. Finally, the nurse allowed the person to act as the agreement of the plan and the process of this coaching was consistent with the study of Whittemore (2004). She suggested that the intention of the timing of the intervention to follow diabetes education using coaching process was to enhance the behavior changing efforts that were initiated during the diabetes education and to provide ongoing emotional support (Whittemore and Melkus, 2004: 795-804) that affected on reducing the HbA_{1c} and improving the hyperglycemic symptoms in the 1st hypothesis.

The important finding of the study was the reduction of HbA_{1c} which was of greater benefit to persons with type 2 diabetes for reducing diabetic complications. The mean reduction of .96% in HbA_{1c} is outstanding when compared to the control condition with the decrease of .45%. All participants in the intervention group had lower level of HbA_{1c} at the end of the intervention whereas 13 control persons showed reduction. Besides being statistically significant, the scale of the reduction of HbA_{1c}, if sustained, could significantly affect the persons with type 2 diabetes, i.e., in terms of mortality and morbidity. The DCCT (Diabetes Control and Complications Trial Research Group, 1993) suggested that 1% decrease of HbA_{1c} is associated with 30–35% reduction of microvascular complications of diabetes (e.g., retinopathy, nephropathy). A reduction of 1% of HbA_{1c} has also been associated with 28% decrease in mortality independent of age, blood pressure, serum cholesterol, body mass index and cigarette smoking. Although the mean reduction of HbA_{1c} was not 1%, the .965% was almost the same as that suggested by the DCCT (Diabetes Control

and Complications Trial Research Group, 1993). Finally, along with the need for replication, future research should investigate whether the positive effect of the multifaceted nurse-coaching intervention tolerate after the intervention has concluded.

3. The statement of hypothesis was established that persons with type 2 diabetes who received the multifaceted nurse-coaching had lower blood pressure (systolic and diastolic blood pressures) level than persons with type 2 diabetes who did not receive intervention. The results showed that there were no significant differences in mean of blood pressure (systolic and diastolic blood pressures) at the baseline, at the 12th week. This result was not consistent with the statement of hypothesis which stressed that after persons with type 2 diabetes who received the multifaceted nurse-coaching intervention they would had greater reduction in blood pressure level than the group receiving usual care. Although the means of the blood pressure level in persons who received the intervention had lower average of mean blood pressure level in persons who did not receive the intervention after intervention, but it was not significantly different.

The results of this study are consistent with the results of a random control trial Specialist Nurse-led Intervention to Treat and Control Hypertension and hyperlipidemia in Diabetes (SPLINT) (New and Mason, 2003: 2250-2255). Although the study applied a specialist nurse delivered the process of care. The differences in the results achieved between specialist nurse-led hypertension and lipid clinics were no found. The other study was designed to manage uncontrolled hypertension in a nurse-led clinics compared to usual care for the patients with type 2 diabetes. The results found that there were no significant differences in the reduction of diastolic BP at six months. (Denver and Barnard, 2003: 2256-2260). However, both recommendations of the study were still concerned to use nurses to reduce blood pressure level.

Basically, hypertension or high blood pressure was an atherosclerosis disease which has the stiffness of vessels and the blood flow problems. The disease is associated with cardiovascular and microvascular diseases. These diseases often develop early before diabetes (D'Agostino and Hamman, 2004: 2234-2240). Moreover, the majority of persons with type 2 diabetes in this study had mild hypertension with a wide age range and period of diabetic onsets. Therefore, the research participants in both the experimental and control groups might not be physically the same. Besides, they did not even receive the same medication and

treatment. This might be an extraneous variable that could limit the effect of the result in this study. Moreover, the improvement did not occur in this study, this might happen from the method of the study. The researcher assumed that the learning session was provided based on the needs of the participants; however, when the researcher checked the self-reports of behavior change and learning session, all were provided according to the persons' requirement. but the main topic of their concerns was about the diet control of blood sugar, and exercise to reduce blood sugar level. Improvement of hypertension need many factors to reduce the level of blood pressure such as reducing salty food, high fat diet, and stress release, besides the adherence to their regular medication. Therefore, the future study should be focused on the self management for controlling blood pressure as far as it can be.

4. There were no significant differences in mean of LDL-C level at before enter to intervention and at the 12th week. This result did not consistent with the hypothesis as mentioned that persons with type 2 diabetes who received the multifaceted nurse-coaching had lower in LDL-C level than persons with type 2 diabetes who did not receive the intervention. The results of LDL-C in the experimental group showed higher than the control groups. This result is consistent with a controlled trial of population management diabetes mellitus: putting evidence into practice (DM-PEP) (Grant and Cagliero, 2004: 2299-2305). The study was designed to apply a nurse practitioner using novel clinical software (PopMan) to identify patients on a weekly basis with outlying values for visit and testing intervals and last measured levels of HbA_{1c}, LDL cholesterol and blood pressure. The intervention population had greater increases in proportion of persons with HbA_{1c} and LDL cholesterol testing.

There were several factors that may have reduced the impact of the intervention. This might occur that the persons choose the topic of session and focusing on the blood sugar level that is linked to the hyperglycemia level more than LDL-C level. LDL-C is associated with atherosclerosis and there is no symptoms when higher LDL-C level until the vessels are occluded (Assmann, 2006: F40-46). Although, this study used that matched pair to reduce the error and reduce the extraneous variables that the researcher could not control. LDL-C is a risk factor levels may have been a consequence of the "ceiling effect" of the generally excellent levels of control at baseline. However, even in our exploratory "on treatment" analysis of the outliers identified by the nurse, we found similar improvements in the

matched group of control persons, revealing a strong temporal trend of better care among all participants in the study.

Effective process care consists of two important steps:

1) Organization of clinical information at the community level; and,

2) Translation of the clinical information into changes in care. The main "translation step" in this intervention was to summarize and forward evidence-based suggestions to the nurse. The relatively weak impact of the intervention might be a shorter time of nurse training.

5. After the intervention the overall mean of patient satisfaction scores with nursing service in the experimental group was significantly higher than in the control group ($p < .05$). This research finding is also consistent with the statement of hypothesis that the persons with type 2 diabetes who receive the multifaceted nurse-coaching intervention improve patient satisfaction more than the group receiving usual care. This finding was similar to the study of Whittemore (2004) who stated that participants in nurse-coaching intervention reported significantly higher degree of satisfaction than those in the control group at 3 months and 6 months.

Taking consideration the items in the questionnaire, it appears that the average score of every item was higher after the intervention, this means that the persons with type 2 diabetes were satisfied with the nursing intervention, the easily access to utilize the service, the acceptance of the process of coaching and the information of diabetes self-management and the available of document that they received. Basically, patient satisfaction is a major indicator of quality care (O'Connell and Young, 1999: 72-77) because it was used by healthcare providers as a measure of healthcare quality (Alazri and Neal, 2003: 486-490). To improve the outcome, providing the quality of care by nurses could increase patient satisfaction because many factors showed significant positive correlations including continuity of care, trust, access, receptionists, interpersonal care, communication skills, knowledge of patient about the doctor, technical care and nursing practices (Alazri, 2003: 486-490). These factors could be used to expand the nurse role and their competency to increase patient satisfaction (Randles Moscato and Valanis, 2007: 119-137).

Recommendations and Implications

From the finding results presented that applying the multifaceted nurse-coaching intervention could reduce perceived symptoms of diabetic complications, HbA1_c, improved patient satisfaction with nursing service but did not reduce level of blood pressure and LDL-C. Therefore, the researcher would like to suggest the following:

1. The provision of the multifaceted nurse-coaching intervention in the community, nurses should be prepared to increase their knowledge, self confidence and skills of information processing, coaching and diabetes management. The preparation of the intervention could promote nurses to deliver patient-centered services and the holistic care to the persons during their interaction.

2. Delivery of the multifaceted nurse-coaching intervention in the Red Cross Health Stations in the urban community was of great benefit to the person with chronic illness such diabetes type 2. This intervention could improve health outcomes, and the intervention should be promoted to deliver care for other persons with chronic illness such as persons with dyslipidemia, hypertension, gout and asthma in the similar context or other health stations in the community

3. The multifaceted nurse-coaching intervention could improve patient satisfaction with the nursing service. Therefore, this diabetic education program should be put into service to increase patient satisfaction with nursing services provided by the nurse. The intervention should provide longer time that may affect blood pressure and LDL-C level.

4. Finally, along with the need for replication, future research should be done with randomized control trial and follow-ups the person with diabetes type 2 in one year to find out whether the positive effects of the multifaceted nurse-coaching intervention are tolerated after the intervention is over and investigate the theoretical mechanisms underlying the effects of this intervention.

Implication for Nursing Practice

The finding of this study provides knowledge for quality improvement of care service especially the delivery of diabetes self-management education service. The multifaceted nurse-coaching intervention should be implemented in community care or in primary care services in Thailand. Persons with type 2 diabetes who received the multifaceted nurse-coaching intervention were given to the experimental group

while persons with type 2 diabetes did not receive the intervention was control group. The results show that the outcomes of the perceived symptoms of diabetic complications and HbA_{1c} level and patient satisfaction were better for the experimental group. Although the outcomes of blood pressure and LDL-C were no different between both groups, the level of blood pressure seems to decline, but LDL-C level was increasing. This program should be implemented as a section of scope of practice in primary care to reduce macrovascular complications but the intervention time should be longer.

The multifaceted nurse-coaching intervention was based on the system model, chronic care model and coaching. This intervention focused on patient centered services. The strategies of this intervention used many concepts of chronic care model such as deliver system design, self-management support, decision support, clinical information, the content of diabetes management for persons with type 2 diabetes was derived from the standard care of American Diabetes Association (2007) while the coaching process was utilized as a process to achieve outcomes. Although a large body of research literature demonstrates the utility of coaching as a method to help individuals achieve their health outcomes, fewer researches have reported the use of the multifaceted nurse-coaching as a method to help nurse provide this method to persons develop new healthy behaviors such as being engaged in physical activities or changing of diet. This intervention shows only small improvement in the health outcomes after three months. However, it demonstrates that the nurse-delivered multifaceted nurse-coaching, primarily through the use of telephone and e-mail have future as a clinical nursing approach to promote health in persons with type 2 diabetes.

Implication for Healthcare System

Moreover, the finding of this study provides insight into potential areas that could reducing diabetic complications which were measured by perceived symptoms of diabetic complications,, HbA_{1c}, Blood pressure and LDL-C level. On a diabetes day, the diabetes care clinic is run in the morning on the day of the family physician visit, the persons with type 2 diabetes normally wait for the laboratory testing results and then visit the physician. After having visited the physician, they will have to wait for the delivery of prescribed medication from the nurse. The lecture diabetes self-management education for the group may not be ready to be effective because the

environment is not favorable for any one to learn in such as a limited place which is noisy and crowded. Although the diabetes self-management education service is not well established, the new model could be designed in the service. Proactive team of nurses could design a service to help persons access to the diabetes self-management education.

While the persons with type 2 diabetes are waiting for those activities, the nurses could assess the symptoms of diabetic complications in persons with type 2 diabetes. This assessment could make them be more aware of their disease.

The clinical information from the registry on the record of them were assessed; the nurses could set up inclusion criteria as an evidence guideline to invite a person who has poorly controlled their blood sugar level and high risk factors to develop diabetic complications such as high blood pressure, high level of blood lipid (LDL-C level). As for the routine engagement in diabetes self-management education service, the nurse could make an appointment to provide coaching process and diabetes self-management education for individuals with type 2 diabetes on the day of diabetes follow up or in the afternoon or the day while the physicians are away or not present. According to the different characteristics of persons with type 2 diabetes and their various basic needs and problems, this intervention was delivered to each person focusing on the individual face-to-face meeting and telephone contacts.

It is significant to every community care or primary care service to accept the new model for persons with type 2 diabetes, the nurse could improve process of care by training in coaching process and diabetes self-management education to assure successful outcomes. The nurse manager should assign a nurse to be responsible for delivery of the education on diabetes day or responsible for caring each person with type 2 diabetes. This model could help the persons with type 2 diabetes learn to solve their problems, assess the problem by themselves, establish their goals, analysis what their situations, explore the options aiming at obtaining the goals, identify and commit action plans, learn to implement the action plan and feedback themselves what they have learned. These processes could help persons with type 2 diabetes change their behavior. These change benefits from perceived symptoms of diabetic complications which are related to self management. The other benefit of the intervention is ability to reduce HbA_{1c}, and it might benefit to reduce blood pressure, LDL-C level and subsequently to reduce the diabetic complications in the future.

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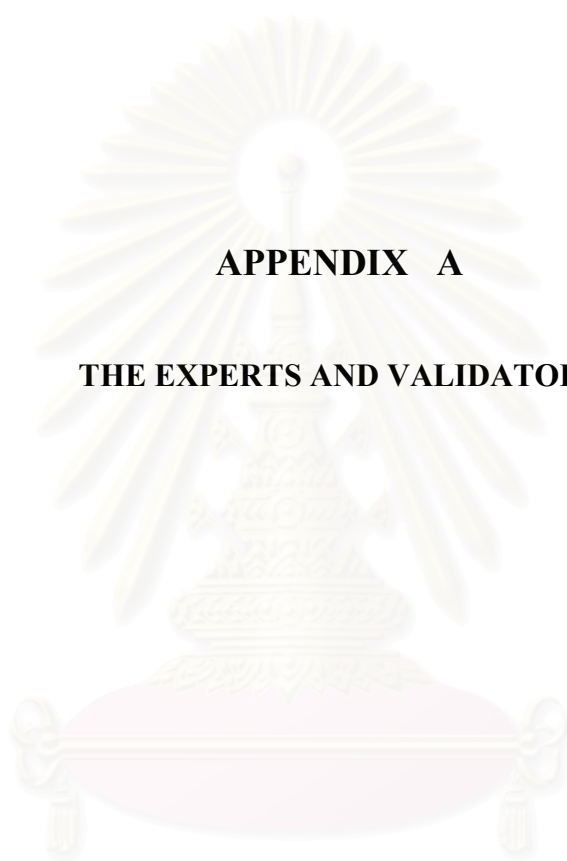
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APPENDICES

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX A

THE EXPERTS AND VALIDATORS

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX A

The Name of Experts and Validators

- | | | |
|---|-----------------|---|
| 1. Assist. Prof. Dr. Surin | Assawawitoontip | A Family Physician
King Chulalongkorn
Memorial Hospital |
| 2. Assoc. Prof. Dr. Gunyada | Prachusilp | Faculty of Nursing
Chulalongkorn
University |
| 3. Assoc. Prof. Dr. Punyarat | Lapvongwatana | Faculty of Public Health
Mahidol University |
| 4. Assist. Prof. Dr. Pawana | Keeratiyutawong | Faculty of Nursing
Burapa University |
| 5. Assoc. Prof. Police Major. Dr. Paungphen | Choonhapran | Faculty of Nursing
Narasuen University |

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX B
HUMAN SUBJECTS APPROVAL DOCUMENT

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



No. 709/2007
REC. No. 364/50

Certificate of Approval

The Institutional Review Board of the Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, has approved the following study which is to be carried out in compliance with the ICH/GCP according to the protocol of the principal investigator

The Institutional Review Board of the Faculty of Medicine, Chulalongkorn University reviewed the protocol based on the international guidelines for human research protection and ICH-GCP


Study Title : Effect of a multifaceted nurse-coaching intervention on diabetic complications in persons with type 2 diabetes.

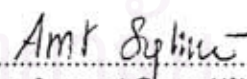
Study Code :

Center : Chulalongkorn University

Principal Investigator : Mrs. Rungrawee Navichareern

Document Reviewed :

Signature: 
(Emeritus Professor Anek Aribarg, M.D.)
Chairman of
The Institutional Review Board

Signature: 
(Professor Areerat Suputtitada, M.D.)
Committee and Secretary of
The Institutional Review Board

Date of Approval : October 4, 2007

Approval Expire Date : October 4, 2008

Approval is granted subject to the following conditions: (see back of this Certificate)



APPENDIX C
CONSENT FORM

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

**ใบยินยอมของประชากรกลุ่มตัวอย่างหรือผู้มีส่วนร่วมในการวิจัย
(Informed Consent Form)**

ชื่อผู้วิจัย รุ่งระวี นาวีเจริญ **นิติบรรณานุกรม** สาขาการพยาบาล

ชื่อโครงการ ผลของระบบการพยาบาลที่เน้นแบบหลากหลายต่อภาวะแทรกซ้อนเบาหวาน
ใน ผู้ที่เป็นเบาหวานชนิดที่ 2

วัตถุประสงค์ และวิธีการศึกษา เพื่อศึกษาผลของโปรแกรมระบบการพยาบาลที่เน้นแบบหลากหลายต่อภาวะแทรกซ้อนในผู้ป่วยเบาหวานชนิดที่ 2 โดยจัดให้มีระบบการการพยาบาลที่เน้นแบบหลากหลายในผู้รับบริการ ประเมินผลจากการสอบถามการรับรู้อาการที่เกี่ยวข้องกับภาวะแทรกซ้อน ตรวจหาค่าระดับ HbA1c, Blood pressure และ LDL-C และสอบถามความพึงพอใจในผู้ที่เป็นเบาหวานชนิดที่ 2 ซึ่งมารับบริการที่สถานีกาชาด สำนักงานบรรเทาทุกข์และประชานามัยพิทักษ์ สภากาชาดไทย ในกรุงเทพมหานคร

เหตุผลที่เชิญท่านเข้าร่วมโครงการ เนื่องจากท่านมีคุณสมบัติตรงกับกลุ่มผู้ที่เป็นเบาหวานที่ต้องการการศึกษา คือ เป็นโรคเบาหวานชนิดที่ 2 ที่รักษาด้วยยาชนิดรับประทาน และมีระดับน้ำตาลในเลือดมากกว่า 130 มิลลิกรัม เปอร์เซ็นต์ ติดต่อกัน ไม่นต่ำกว่า 2 ครั้ง

ประโยชน์ที่ท่านจะได้รับเมื่อท่านเข้าร่วมโครงการนี้ ท่านจะได้เข้ากลุ่มโปรแกรมการพยาบาลที่เน้นแบบหลากหลาย และได้รับการประเมินผลโดยการติดตามเยี่ยมบ้าน ซึ่งท่านและพยาบาลจะร่วมกันทำขั้นตอนต่อไปนี้

1. พยาบาลประเมินความรู้ความเข้าใจและปัญหาเกี่ยวกับเบาหวานและภาวะแทรกซ้อน
2. กำหนดเป้าหมายร่วมกัน
3. วิเคราะห์ปัญหา
4. การสำรวจทางเลือก
5. การวางแผนการปฏิบัติ ท่านและพยาบาลจะร่วมกันกำหนดแผนปฏิบัติโดยที่ท่านจะเป็นผู้เลือกหัวข้อตามที่คิดว่าต้องการดังต่อไปนี้ 1 เรื่อง
 - 5.1 การเลือกอาหาร การกำหนดอาหาร
 - 5.2 การออกกำลังกาย
 - 5.3 การเข้ายา
 - 5.4 การฝึกเทคนิคผ่อนคลาย
 - 5.5 การเฝ้าระวังตนเอง โดยใช้อาการและการใช้เครื่องตรวจวัดระดับน้ำตาล

5.6 การรักษาสุขอนามัยและการดูแลเท้า

เมื่อท่านเลือกได้ตามที่ท่านต้องการพยาบาลและท่านจะร่วมกันกำหนดพฤติกรรมที่จะทำให้ท่านบรรลุเป้าหมายโดยกำหนดจากการวิเคราะห์ปัญหาและการสำรวจทางเลือก

6. การเรียนรู้ หลังจากเลือกแผนปฏิบัติแล้วพยาบาลจะให้ข้อมูลแก่ท่านในเรื่องที่ท่านต้องการตามแผนการปฏิบัติที่ได้ตกลงกันได้ และท่านจะมีเวลาในการปฏิบัติตามเรื่องต่างๆ ตามที่ได้ตกลงเป้าหมายร่วมกับพยาบาลในข้อที่ 5 เป็นระยะเวลา 2 สัปดาห์

7. ติดตามประเมินผลและให้การดูแลที่แนะนำต่อเนื่อง เพื่อเป็นการประเมินผลเกี่ยวกับการปฏิบัติเพื่อป้องกันภาวะแทรกซ้อน โดยจะมีพยาบาลผู้ที่ทำหน้าที่ชี้แนะประเมินเป้าหมายและแผนปฏิบัติ ในกิจกรรมการฝึกปฏิบัติ ตามข้อ 1-5 ถ้าพบว่าผู้ที่เป็นเบาหวานยังมีข้อสงสัยและคิดว่ายังปฏิบัติไม่ได้ พยาบาลพร้อมจะช่วยเหลือปัญหาหรือให้ข้อมูลที่ช่วยส่งเสริมการคิดและส่งเสริมการแก้ไขปัญหาซึ่งท่านจะเป็นผู้กำหนดวันและระยะเวลาตามที่ท่านสะดวกเป็นระยะเวลา ประมาณครั้งละ 30 นาที - 1 ชั่วโมง ทุก 2 สัปดาห์ เป็นจำนวน 3 ครั้ง ในระหว่างการติดตามประเมินผลท่านจะได้รับการตรวจเลือดที่ปลายนิ้วด้วยเครื่องกลูโคมิเตอร์

เมื่อสิ้นสุดการชี้แนะแบบรายบุคคล 3 ครั้งในระยะเวลา 6 สัปดาห์ พยาบาลจะติดตามท่านอีก ทุก 2 สัปดาห์ อีก 2 ครั้ง โดยการโทรศัพท์ซึ่งท่านจะเป็นผู้ให้ข้อมูลเกี่ยวกับเวลาที่สะดวกในการติดต่อ

ความเสี่ยงหรือความไม่สุขสบายที่อาจเกิดขึ้น การศึกษาดังกล่าวไม่ก่อให้เกิดอันตรายหรือความเสียหายใด ๆ แก่ท่าน แต่ในช่วงก่อน และหลังโครงการ ท่านจะได้รับการเจาะเลือดที่ข้อพับแขน 3 ครั้ง คือ เริ่มสัปดาห์แรก และ สิ้นสุดสัปดาห์ที่ 6 และ สัปดาห์ที่ 12 ที่สถานีกาชาดที่ 2 ซึ่งจะเป็นไปตามการตรวจเลือดตามปกติของการรักษาของแพทย์ และจากปลายนิ้ว 5 ครั้ง (เริ่มสัปดาห์แรก และ สิ้นสุดสัปดาห์ที่ 12) รวมทั้งตอบแบบสอบถามความรู้และติดตามประเมินการปฏิบัติตัว ภายหลังจากที่ท่านได้รับความรู้แล้ว ถ้าท่านไม่สะดวกที่จะได้รับโปรแกรมการชี้แนะในเวลาที่นัดหมายกับพยาบาลแล้ว พยาบาลจะขอทำการนัดหมายใหม่ในช่วงเวลาที่ท่านสะดวก ท่านสามารถสอบถามในสิ่งที่ท่านสงสัยหรือเป็นปัญหาที่เกี่ยวข้องกับโรคเบาหวานและภาวะแทรกซ้อน แต่ถ้าท่านไม่สะดวกจะพูดคุยในเรื่องดังกล่าวหรือเวลาดังกล่าว ท่านสามารถบอกเลิกการสนทนาได้ทุกเมื่อ และไม่กระทบกับผลการรักษาของท่าน หรือกิจกรรมใด ๆ ที่ท่านได้รับจากระบบการรักษาในสถานพยาบาลดังกล่าว

การรักษาความลับ ข้อมูลที่ได้จากการสอบถาม แบบสอบถาม และผลการตรวจทางห้องทดลอง จะเป็นความลับ ไม่เปิดเผยชื่อจริงของท่าน และไม่ระบุชื่อของท่านในรายงานวิจัย

สิทธิในการเข้าร่วม หรือถอนตัวจากการศึกษา เมื่อท่านเข้าร่วมงานวิจัย ท่านจะได้รับการตรวจระดับน้ำตาลที่ปลายนิ้ว การตรวจระดับน้ำตาลสะสม ระดับไขมันในเลือด การตรวจวัดความดัน โดย

ท่านไม่เสียค่าใช้จ่ายใด ๆ ทั้งสิ้น และท่านสามารถยกเลิกการเข้าร่วมโครงการได้ตลอดเวลาโดยไม่มีผลใด ๆ กับการรักษาของท่าน

ประโยชน์ที่จะได้รับจากการศึกษาคือ จากการศึกษาดังกล่าวคาดว่าจะ พัฒนาระบบการพยาบาลที่ก่อให้เกิดกระบวนการจัดการดูแลผู้ป่วยเบาหวานชนิดที่ 2 ได้อย่างมีประสิทธิภาพ และเพื่อให้ผู้ที่เป็นเบาหวานชนิดที่ 2 สามารถจัดการกับตนเองได้ถูกต้อง สามารถควบคุมระดับน้ำตาล ความดันโลหิต ระดับไขมัน รับรู้อาการภาวะแทรกซ้อนเบาหวาน

ที่อยู่ที่สามารถติดต่อผู้วิจัยได้

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

โทรศัพท์ที่ติดต่อได้ 02-511-0944 หรือ 089-453-1492

ที่อยู่ที่สามารถติดต่อกับอาจารย์ที่ปรึกษา

รศ. ร.ตอ.หญิง ดร. ยุพิน อังสุโรจน์ และ

รศ. ดร.สุรีพร ธนศิลป์

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

โทรศัพท์ที่ติดต่อได้ 02 -2189800

ที่อยู่ที่สามารถติดต่อกับคณะกรรมการพิจารณาจริยธรรมการวิจัย

สำนักงานคณะกรรมการพิจารณาจริยธรรมการวิจัย

ฝ่ายวิจัย คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

โทรศัพท์ที่ติดต่อได้ 02-256-4455 ต่อ 14, 15

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

ใบยินยอม เข้าร่วมการวิจัย

ชื่อโครงการ ผลของระบบการพยาบาลที่เน้นแบบหลากหลายต่อภาวะแทรกซ้อนในผู้ป่วยที่เป็น
เบาหวานชนิดที่ 2

ข้าพเจ้าชื่อ.....นามสกุล.....ได้รับทราบรายละเอียด
ของการศึกษาในโครงการวิจัยเรื่อง “ ผลของระบบการพยาบาลที่เน้นแบบหลากหลายต่อภาวะแทรกซ้อน
ในผู้ป่วยเบาหวานชนิดที่ 2” จาก นางรุ่งระวี นาวิเจริญ โดยที่ข้าพเจ้าจะได้รับโปรแกรมระบบการ
พยาบาลที่เน้นแบบหลากหลายเพื่อป้องกันภาวะแทรกซ้อนที่คลินิกเบาหวานแบบรายบุคคลและจากการ
ติดต่อทางโทรศัพท์

ข้าพเจ้าเข้าใจวัตถุประสงค์ของการวิจัยดังกล่าว ตลอดจนประสิทธิภาพและความปลอดภัยของ
การศึกษเป็นอย่างดี ข้าพเจ้ามีความยินดีที่จะเข้าร่วมงานวิจัย แต่อย่างไรก็ตามข้าพเจ้ามีสิทธิที่จะบอก
เลิกไม่เข้าร่วมงานวิจัยและออกจากงานวิจัยเมื่อใดก็ได้ การบอกเลิกดังกล่าวจะไม่ส่งผลกระทบใด ๆ กับ
การรักษาดังกล่าวของข้าพเจ้า

หากข้าพเจ้ามีข้อสงสัยสิ่งใด ข้าพเจ้าสามารถติดต่อกับอาจารย์ที่ปรึกษาของ นิสิตปริญญาเอก
ได้ตามที่อยู่ที่ให้ไว้

ทั้งนี้ ข้าพเจ้าได้ซักถามข้อสงสัยต่างๆ ก่อนที่ข้าพเจ้าจะเข้าร่วมงานวิจัยดังกล่าวจนหมดข้อสงสัย
แล้ว และยินดีเข้าร่วมในการศึกษาวิจัยดังกล่าว พร้อมกันนี้ข้าพเจ้าได้ลงชื่อเป็นลายลักษณ์อักษรต่อ
หน้าพยาน

ลงชื่อ

(ผู้ยินยอม)

วัน...../เดือน.....ปี.....

ลงชื่อ.....

(ผู้วิจัย)

วัน...../เดือน.....ปี.....

ลงชื่อ.....

(พยาน)

วัน...../เดือน.....ปี.....



APPENDIX D
INSTRUMENTS FOR DATA COLLECTION

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

แบบสอบถาม Participant's No.....

ครั้งที่สอบถาม () Pre -test

() Post- test

คำชี้แจง

แบบสอบถามนี้เป็นส่วนหนึ่งของวิทยานิพนธ์ เรื่อง ผลของระบบการพยาบาลชี้แนะแบบหลากหลายต่อภาวะแทรกซ้อนในผู้ป่วยเบาหวานชนิดที่ 2
แบบสอบถามชุดนี้ประกอบด้วยแบบสอบถาม 3 ชุด

ชุดที่ 1 แบบบันทึกข้อมูลทั่วไป

ชุดที่ 2 แบบสอบถามการรับรู้อาการภาวะแทรกซ้อนในผู้ที่เป็นเบาหวานชนิดที่ 2

ชุดที่ 3 แบบสอบถามความพึงพอใจในการใช้บริการพยาบาลสำหรับผู้ที่เป็นเบาหวาน

เพื่อจะได้ข้อมูลที่เป็นจริงขอความกรุณาท่านตอบด้วยความคิดเห็นของท่านตามความเป็นจริงทั้งนี้เพื่อใช้ในการปรับปรุงการบริการเพื่อดูแลผู้ที่เป็นเบาหวานให้มีความเหมาะสมมากยิ่งขึ้นคำตอบนี้จะไม่ผลใด ๆ ต่อการรักษาและการรับบริการของท่าน และผู้วิจัยจะถือคำตอบของท่านเป็นความลับ ซึ่งจะเสนอผลงานวิจัยในภาพรวมแต่จะไม่เสนอเป็นรายบุคคล

ขอขอบพระคุณอย่างสูง

รุ่งระวี นาวิเจริญ

นิติตปริญาเอก สาขาพยาบาลศาสตร์

คณะพยาบาลศาสตร์

จุฬาลงกรณ์

สถาบันนวัตกรรมการ
จุฬาลงกรณ์มหาวิทยาลัย

ชุดที่ 1 แบบบันทึกข้อมูลทั่วไป

คำชี้แจง ทำเครื่องหมาย \surd ลงในวงเล็บ () หน้าข้อความที่ตรงกับความเป็นจริงของท่านเพียงข้อเดียวในแต่ละข้อ และเติมคำลงในช่องว่างให้ตรงกับข้อมูลที่เป็นจริง

1. เพศ () หญิง () ชาย
2. อายุ.....ปี
3. สถานภาพการสมรส
() โสด () คู่ () หม้าย/หย่า/แยก
4. นับถือศาสนา
() พุทธ () คริสต์
() อิสลาม () อื่นๆ โปรดระบุ.....
5. ระดับการศึกษา
() ไม่ได้เรียนหนังสือ () ประถม 1-6
() มัธยมศึกษาปี 1 -3 () มัธยมศึกษา4-6 หรือ ป.ว.ช
() ป.ว.ส หรือ อนุปริญญา ปริญญาตรี () สูงกว่าปริญญาตรี
() อื่นๆ โปรดระบุ.....
6. อาชีพ
() รับจ้าง () ค้าขาย
() แม่บ้าน/พ่อบ้าน () รับราชการ/รัฐวิสาหกิจ
() อื่นๆ โปรดระบุ.....
7. รายได้ต่อเดือน
() น้อยกว่าหรือเท่ากับ 5,000 บาท () 5,001-10,000 บาท
() 10,001-20,000 บาท () 20,001-3,0000 บาท
() > 3,0000 บาท
8. ค่ารักษาพยาบาล
() เบิกได้ () ชำระค่ารักษาพยาบาลด้วยตนเอง
() โครงการ 30 บาท () ประกันสังคม
() อื่นๆ โปรดระบุ.....
10. ท่านสูบบุหรี่หรือไม่
() ไม่สูบ () สูบจำนวน.....มวนต่อวัน
11. ท่านเป็นเบาหวานเมื่ออายุ.....ปี

การตรวจร่างกายและห้องทดลอง (จากเวชระเบียน)

Outcomes	ผลการตรวจ
1. HbA1c $\leq 7\%$ (ควบคุมได้) > 7.0 (ควบคุมไม่ดี)	
2. ความดันเลือด (mmHg) 120/80 mmHg (ควบคุมได้) $> 120/80$ mmHg (ควบคุมไม่ดี)	
3. ระดับไขมัน LDL < 100 mg/dl (ควบคุมได้) > 100 mg/dl (ควบคุมไม่ดี)	

ชุดที่ 2 แบบสอบถามอาการภาวะแทรกซ้อนตามการรับรู้ของผู้ที่เป็นเบาหวานชนิดที่ 2

คำชี้แจง แบบสอบถามนี้เป็นแบบสอบถามเกี่ยวกับอาการภาวะแทรกซ้อนตามการรับรู้ซึ่งสอบถามการรับรู้อาการ ความถี่ที่เกิดขึ้นของอาการ และความทุกข์ทรมานในผู้ที่เป็นเบาหวานชนิดที่ 2 มีข้อคำถามทั้งหมด 20 ข้อ

โปรดทำเครื่องหมาย ✓ หน้าข้อรายการเมื่อมีอาการและในช่องระดับความถี่และระดับความทุกข์ทรมานที่ตรงกับความคิดเห็นของผู้ที่เป็นเบาหวานเพียงคำตอบเดียว โดยมีเกณฑ์การตอบดังนี้

ระดับความถี่

3	หมายถึง	ท่านมีอาการนั้นทุก วัน
2	หมายถึง	ท่านมีอาการ 1 ครั้ง หรือมากกว่าใน 1 สัปดาห์
1	หมายถึง	ท่านมีอาการ 1 ครั้ง หรือมากกว่าใน 1 เดือน

ระดับความทุกข์ทรมาน

0	หมายถึง	รู้สึกไม่ทรมานหรือรำคาญ สามารถทำกิจวัตรประจำวันได้ตามปกติ
1	หมายถึง	รู้สึกทรมานหรือรำคาญเล็กน้อย ไม่รบกวนชีวิตประจำวัน
2	หมายถึง	รู้สึกทรมานหรือรำคาญปานกลาง และรบกวนชีวิตประจำวัน
3	หมายถึง	รู้สึกทรมานหรือรำคาญมาก จนทนไม่ไหว

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

แบบสอบถามอาการภาวะแทรกซ้อนตามการรับรู้ของผู้ที่เป็นเบาหวานชนิดที่ 2

อาการภาวะแทรกซ้อน	ความถี่			ระดับความทุกข์ทรมาน			
	ท่านมีอาการ ทุก วัน (3)	ท่านมีอาการ 1 ครั้ง หรือ มากกว่านั้น ใน 1 สัปดาห์ (2)	ท่านมีอาการ 1 ครั้ง หรือ มากกว่า ใน 1 เดือน (1)	รู้สึกไม่ ทรมานหรือ รำคาญ (0)	รู้สึกทรมานหรือ รำคาญเล็กน้อย ไม่รบกวน ชีวิตประจำวัน (1)	รู้สึกทรมานหรือ รำคาญปานกลาง และรบกวน ชีวิตประจำวัน (2)	รู้สึกทรมาน หรือ รำคาญ มาก จนทนไม่ได้ (3)
.....1. หิวน้ำ(กระหายน้ำ)มาก							
.....2. ตื่นน้ำมาก							
.....3. อ่อนเพลีย							
.....4. ปัสสาวะบ่อยตอนกลางวัน							
.....5. คันในร่มผ้า							
.....6. หิวแล้วใจสั่นมือสั่น							
.....7. ปวดศีรษะ							
.....8. เป็นลมหมดสติ							
..... 9. ตาพร่ามัว							
.....10 มีจุดดำลอยไปมา							
.....11. ท้องผูก ถ่ายลำบาก							

3 แบบสอบถามความพึงพอใจในการใช้บริการพยาบาลสำหรับผู้ที่เป็นเบาหวาน

คำชี้แจง แบบสอบถามนี้ เป็นแบบสอบถามถึงความรู้สึกด้านบวกเกี่ยวกับการได้รับบริการพยาบาล

แบบสอบถามมี 22 ข้อ

โปรดทำเครื่องหมาย \surd ลงในช่องด้านขวามือที่ตรงกับความคิดเห็นของท่านเพียงคำตอบเดียวมี

เกณฑ์การให้คะแนน ดังนี้

5	=	พึงพอใจมากที่สุด	ท่านเห็นด้วยกับข้อความนั้น ร้อยละ 81 - 100
4	=	พึงพอใจมาก	ท่านเห็นด้วยกับข้อความนั้น ร้อยละ 61 - 80
3	=	พึงพอใจปานกลาง	เห็นด้วยกับข้อความนั้น ร้อยละ 41 - 60
2	=	พึงพอใจน้อย	ท่านเห็นด้วยกับข้อความนั้น ร้อยละ 21 - 40
1	=	พึงพอใจน้อยที่สุด	ท่านเห็นด้วยกับข้อความนั้น ร้อยละ 0 - 2

ข้อคำถาม	ระดับความคิดเห็น				
	เห็นด้วยมากที่สุด (5)	เห็นด้วยมาก (4)	เห็นด้วยปานกลาง (3)	เห็นด้วยน้อย (2)	เห็นด้วยน้อยที่สุด (1)
1. มีความสะดวกในการใช้สิทธิบัตรทองหรือการเบิกจ่ายค่ารักษาพยาบาลตามสิทธิของท่าน					
2. มีพยาบาลให้บริการสะดวกรวดเร็วทันใจ					
3. มีทีมพยาบาลพร้อมให้บริการตลอดเวลาทำการ					
4. มีพยาบาลอธิบายความหมายของค่าระดับน้ำตาล ความดันและระดับไขมัน					
5. มีพยาบาลแนะนำให้เข้ารับการอบรมความรู้โรคเบาหวาน					
6. มีพยาบาลชี้แนะการดูแลตนเองให้แก่ท่าน					
7. มีพยาบาลติดตามท่านอย่างต่อเนื่องเมื่อท่านควบคุม ระดับน้ำตาล หรือ ระดับความดัน หรือ ระดับไขมันไม่ได้					



APPENDIX E
INSTRUMENTS FOR INTERVENTION

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

โปรแกรมการพยาบาลที่เน้นแบบหลากหลาย
ในผู้ที่เป็นเบาหวาน ชนิดที่ 2

**THE MANUAL OF THE MULTIFACETED NURSE-COACHING
PROGRAM**

โดย

นางรุ่งระวี นาวีเจริญ

นิสิต หลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต
คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คู่มือนี้เป็นส่วนหนึ่งของวิทยานิพนธ์ปริญญาพยาบาลศาสตรดุษฎีบัณฑิต
สาขาพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2550

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คำนำ

ในระบบการให้บริการสุขภาพ สำหรับคลินิกโรคเรื้อรังในปัจจุบันยังพบอุปสรรคมากมาย จากสภาพการณ์ปัจจุบันพบว่าการดูแลผู้ที่เป็นเบาหวาน โดยเฉพาะบุคลากรพยาบาลยังขาดความรู้ความเข้าใจในการดูแลผู้ที่เป็นเบาหวาน เนื่องจากโรคเบาหวาน เป็นโรคที่มีความซับซ้อนทั้งตัวโรคเองและวิธีการรักษา ด้วยลักษณะดังกล่าวจึงจำเป็นต้องให้การดูแลอย่างต่อเนื่อง คงไว้ซึ่งการจัดการดูแลตนเอง ที่ถูกต้องเหมาะสมเพื่อชะลอหรือป้องกันภาวะแทรกซ้อน รวมทั้งการมีคุณภาพชีวิตที่ดี จำเป็นต้องมีระบบติดตามอย่างต่อเนื่อง

พยาบาลเป็นผู้หนึ่งในทีมสุขภาพ มีบทบาทหน้าที่ให้บริการดูแลแบบองค์รวม มีความเป็นผู้นำในทีมสุขภาพ สามารถประสานงาน กับบุคลากรในทีมสุขภาพ และสามารถทำหน้าที่ชี้แนะให้แก่ทีม เป็นที่ปรึกษา ให้ความรู้ ชี้แนะและจัดการให้ผู้ที่เป็นเบาหวานสามารถจัดการดูแลตนเองเพื่อให้ควบคุมระดับน้ำตาล ชะลอการเกิดภาวะแทรกซ้อนให้ได้มากที่สุด ดังนั้นผู้วิจัยจึงออกแบบระบบการพยาบาลชี้แนะแบบหลากหลาย โดยเริ่มตั้งแต่การเตรียมความพร้อมให้กับทีมพยาบาล เพื่อให้เกิดการเปลี่ยนแปลงในระบบบริการสุขภาพและนำไปสู่เป้าหมายที่ต้องการ ระบบการพยาบาลชี้แนะแบบหลากหลาย ที่ใช้แนวคิด ผสมผสานระหว่าง แบบจำลองการดูแลผู้ที่เป็นโรคเรื้อรัง ของ Wagner (1998) ซึ่งประกอบด้วย 6 องค์ประกอบ เพื่อปรับปรุงคุณภาพการดูแลผู้ที่เป็นเบาหวาน ได้แก่ ระบบการบริหารองค์กรสุขภาพ (Health Care Organization) การออกแบบการดูแลสำหรับผู้ที่เป็นเบาหวานชนิดที่ 2 (Delivery System Design) ระบบข้อมูลเทคโนโลยีสารสนเทศ (Clinical Information Systems) การสนับสนุนจัดการดูแลตนเอง (Self-management Support) ระบบการตัดสินใจหรือแนวทางการดูแล (Decision Support) และแหล่งสนับสนุนจากชุมชน (Community Resources and Policies) ร่วมกับ เทคนิคการชี้แนะ (Coaching method) ของ Eaton and Johnson (2001) ซึ่งมี 6 ขั้นตอน ได้แก่ การกำหนดเป้าหมาย การวิเคราะห์สถานการณ์ การกำหนดทางเลือก การปฏิบัติ การเรียนรู้พร้อมกับการปฏิบัติ และการประเมินผลโดยใช้ข้อมูลเป็นหลักฐานป้อนกลับ

คู่มือระบบการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2 นี้เป็นส่วนหนึ่งของการดำเนินงานวิจัย เรื่อง ผลของระบบการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2 วิทยานิพนธ์ระดับปริญญาดุษฎีบัณฑิต หลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต สาขาพยาบาลศาสตรศาสตราจารย์ จุฬาลงกรณ์มหาวิทยาลัย จัดทำขึ้นจากการศึกษาค้นคว้า ตำรา วารสาร และเอกสารทางวิชาการ รวมทั้งข้อเสนอนะจากพยาบาลในหน่วยงานที่ดูแลผู้ที่เป็นเบาหวาน ภายใต้คำแนะนำของอาจารย์ที่ปรึกษาวิทยานิพนธ์ และผู้ทรงคุณวุฒิในแต่ละสาขา โดยได้รับความร่วมมือในการศึกษาวิจัยดียิ่งจาก บุคลากรทางสุขภาพ สถานีกาชาดที่ 2 (แพรงภูธร) และสถานีกาชาดที่ 11 (บางแค) สภากาชาดไทย ดังนั้นเพื่อให้การดำเนินงานวิจัย เป็นไปได้ด้วยความเรียบร้อย ถูกต้องตามกระบวนการวิจัย และเกิดประโยชน์กับผู้ที่เป็นเบาหวานชนิดที่ 2 ผู้วิจัยจึงได้ทำเอกสารฉบับนี้โดยมี

เนื้อหาสาระเกี่ยวกับโปรแกรมการพยาบาลชี้แนะแบบหลากหลายนำมาผสมผสาน เพื่อให้พยาบาลได้เห็นบทบาทของตนเองในการทำงานแบบทีมเพื่อสนับสนุนให้ผู้ที่เป็นเบาหวานสามารถมีพฤติกรรมการดูแลตนเองอันจะนำไปสู่การชะลอหรือป้องกันการเกิดภาวะแทรกซ้อน ตามขั้นตอนกระบวนการต่างๆ ซึ่งจะก่อให้เกิดประโยชน์สูงสุดต่อผู้รับบริการ ผู้ให้บริการและหน่วยงาน

นางรุ่งระวี นาวิเจริญ

ผู้วิจัย



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

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สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

วัตถุประสงค์ ภายหลังจากใช้คู่มือนี้แล้ว ผู้เข้าร่วมประชุมสามารถ

1. เข้าใจและผสมผสานแนวคิดแบบจำลองการดูแลผู้ที่เป็นโรคเรื้อรังกับการชี้แนะอย่างหลากหลายเพื่อป้องกันและลดภาวะแทรกซ้อนเบาหวานในผู้ที่เป็นเบาหวานชนิดที่ 2
2. อธิบายและปฏิบัติตามแนวทางการดูแลแก่ผู้ที่เป็นเบาหวานชนิดที่ 2
3. เข้าใจและประยุกต์ใช้กระบวนการชี้แนะกับผู้ที่เป็นเบาหวานได้
4. มีการร่วมมือการทำงานแบบเป็นทีม
5. บุคลากรในทีมสุขภาพมีการพัฒนาวิชาชีพ
6. สามารถให้บริการชี้แนะแก่ผู้ที่เป็นเบาหวานจนสามารถควบคุมอาการภาวะแทรกซ้อน ลดระดับน้ำตาลสะสม ระดับความดันและไขมันชนิดไม่ดีได้
7. สามารถให้บริการแก่ผู้ที่เป็นเบาหวานชนิดที่ 2 และก่อให้เกิดมีความพึงพอใจภายหลังจากได้รับบริการชี้แนะ

คำชี้แจงการใช้คู่มือ

1. ขอให้ท่านที่เข้าร่วมประชุมอ่านเนื้อหาในคู่มือทั้งหมดให้เข้าใจก่อนนำไปใช้
2. ท่านสามารถปรึกษาผู้วิจัยได้ตลอดเวลาเมื่อต้องการความชัดเจน หรือมีข้อสงสัย ในการใช้คู่มือ
3. คู่มือนี้จัดทำขึ้นเพื่อให้พยาบาลสามารถใช้เป็นแนวทางในการให้การดูแลผู้ที่เป็นเบาหวานชนิดที่ 2

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

โปรแกรมการพยาบาลที่เนะแบบหลากหลาย ในผู้ที่เป็นเบาหวาน ชนิดที่ 2

THE MANUAL OF THE MULTIFACETED NURSE-COACHING PROGRAM

ปัญหา

เบาหวานและภาวะแทรกซ้อนโรคเบาหวานเป็นปัญหาสำคัญทางสาธารณสุขของทั่วโลกและประเทศไทย มีรายงานว่าในช่วง 10 ปีที่ผ่านมา พบว่ามีอุบัติการณ์และอัตราความชุกของโรคเบาหวานสูงขึ้นอย่างมาก โดยเฉพาะอย่างยิ่ง โรคเบาหวานชนิดที่ 2 เป็นโรคที่พบบ่อยในประเทศไทย (Nitiyanant 2007: 65-71) โรคนี้เกิดจากความผิดปกติของร่างกายที่มีการผลิตฮอร์โมนอินซูลิน (Insulin) ไม่เพียงพอหรือผลิตได้ แต่การทำงานของฮอร์โมนไม่มีประสิทธิภาพในการทำงาน ถ้าผู้ที่เป็นเบาหวานที่ได้รับการรักษาไม่ถูกต้องและขาดความร่วมมือเอาใจใส่ในตนเอง มีพฤติกรรมที่ไม่ถูกต้อง เช่นการรับประทานอาหาร การเคลื่อนไหวและออกกำลังกายไม่ถูกต้อง สัม รับประทานยา ส่งผลให้การเผาผลาญผิดปกติ ทำให้ระดับน้ำตาลในกระแสเลือดสูงเกินกว่าปกติไขมันในเลือดผิดปกติและอาจมีภาวะความดันโลหิตสูงร่วมด้วย ปัจจัยดังกล่าวสัมพันธ์กับการเกิดความผิดปกติของหลอดเลือดแดงทั่วร่างกาย (Atherosclerosis) และเกิดภาวะแทรกซ้อน ได้แก่ โรคหัวใจและหลอดเลือด โรคหลอดเลือดสมองตีบ ไตวาย ภาวะแทรกซ้อนทางระบบประสาท จอประสาทตาเสื่อม (Kendall and Bergenstal, 2001: S327-S343) จากการทบทวนสถิติที่เกี่ยวข้องกับภาวะแทรกซ้อนเบาหวานในประเทศไทยพบว่ามีอัตราเพิ่มสูงขึ้น (Rawdaree 2006: S1-9) ส่งผลกระทบทั้งด้านร่างกายผู้ที่เป็นเบาหวานและระบบสาธารณสุข

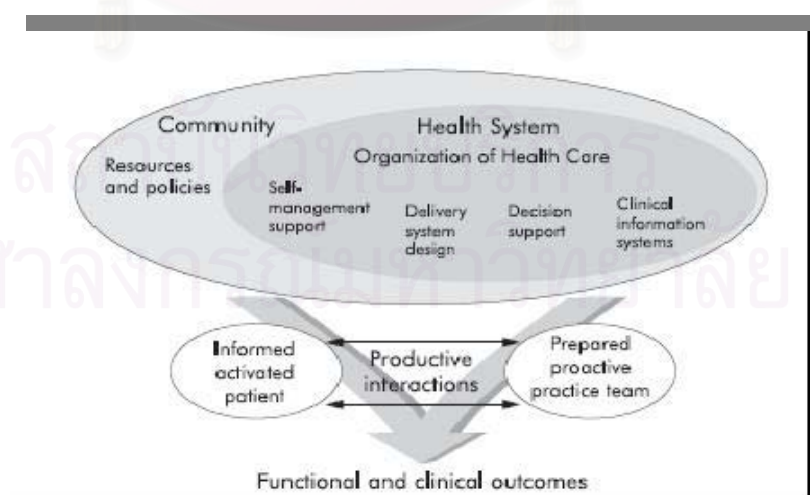
เบาหวานและภาวะแทรกซ้อนก่อให้เกิดผลกระทบทางด้านร่างกายและจิตใจ เช่น การเกิดอาการทุกข์ทรมาน (symptom distress) ที่เกิดจาก ภาวะน้ำตาลในเลือดสูง เช่น ปัสสาวะบ่อย หิวง่าย กระหายน้ำ น้ำหนักลด อ่อนเพลีย หรือ อาการที่เกิดจากภาวะน้ำตาลในเลือดต่ำ ที่เกี่ยวเนื่องกับการรักษาทางยา เช่น อาการ หงุดหงิดง่ายก่อนมื้ออาหาร เหงื่อออก หัวใจสั่นมือสั่น สับสน มึนงง ปวดศีรษะ เป็นลมหมดสติ อาการที่เกิดจากมีการทำลายเนื้อเยื่อและหลอดเลือดได้แก่ โรคหัวใจและหลอดเลือด ทำให้มีอาการเจ็บหน้าอก โรคหลอดเลือดสมองตีบซึ่งจะมีอาการ ปวดหัวอย่างรุนแรง รู้สึกมึนงง พูดออกเสียงลำบาก สูญเสียการทรงตัว ก่อให้เกิดอัมพฤกษ์ อัมพาตเป็นสาเหตุการตายที่สำคัญในผู้ป่วยเบาหวาน ภาวะแทรกซ้อนทางไต ทำให้ปัสสาวะลดลง ทำให้เกิดไตวาย ภาวะแทรกซ้อนทางตาจะมีอาการเห็นภาพไม่ชัดอย่างที่เคยเป็น เห็นภาพซ้อน มีจุดดำลอยไปมา ภาวะแทรกซ้อนทางระบบประสาทส่วนปลาย จะมีอาการมือชาและเท้าหรือปวดอย่างรุนแรง ปวดน่อง แสบร้อนน่องและปลายเท้า รู้สึกแปลบๆที่มือและเท้า ชาที่น่องและปลายมือปลายเท้า เพิ่มความเสี่ยงในการเกิดแผลที่เท้าและถูกตัดขา หรือมีภาวะแทรกซ้อนทางระบบประสาทอัตโนมัติ ก่อให้เกิดมีอาการ ปวดท้อง คลื่นไส้ อาเจียน ท้องผูก ถ่ายลำบาก กลั้นอุจจาระไม่อยู่ ท้องเสียหลายสัปดาห์ หย่อนสมรรถภาพทางเพศ จากอาการ

ของเบาหวานและภาวะแทรกซ้อนดังกล่าวส่งผลกระทบต่อการใช้ชีวิตและสูญเสียค่าใช้จ่ายจากการรักษาทั้งทางตรงและทางอ้อมของผู้ที่เป็นเบาหวาน และระบบบริการสาธารณสุข

ถึงแม้โรคเบาหวานเป็นโรคเรื้อรังและรักษาไม่หายแต่กระนั้นภาวะแทรกซ้อนและอาการที่กล่าวมาข้างต้น สามารถป้องกันหรือชะลอได้ โดยส่งเสริมให้ผู้ที่เป็นเบาหวานเกิดความร่วมมือในการจัดการตนเอง อย่างไรก็ตามการขาดความร่วมมือในผู้ที่เป็นเบาหวานนับเป็นอุปสรรคอย่างหนึ่งในระบบบริการสุขภาพการดูแลผู้ที่เป็นเบาหวาน จากการศึกษางานวิจัยมากมายพบว่า ผู้ที่เป็นเบาหวานขาดความร่วมมือหรือการดูแลตนเองไม่ถูกต้อง เนื่องจากมีอุปสรรคภายในตนเอง ภายนอกตน อุปสรรคต่างๆ ได้แก่ การขาดความรู้ ขาดการยอมรับว่าโรคเบาหวานเป็นโรคที่มีความรุนแรง การจัดการตนเองไม่เหมาะสม ขาดการสนับสนุนทางสังคม มาตามแพทย์นัด รายได้น้อย ภาวะแทรกซ้อนของโรคเบาหวานที่เพิ่มขึ้นของโรค ความไม่พึงพอใจต่อระบบบริการ (Rhee 2005: 240-250; Rittichu, 2002) การจัดการระบวงการดูแลผู้ที่เป็นเบาหวานยังไม่มีดี (Nitiyanant 2007: 65-71; Rawdaree 2006: S1-9)

จากความเป็นมาดังกล่าวพยาบาลมีส่วนสำคัญในระบบการดูแลสุขภาพที่จะส่งเสริมทำให้ผู้รับบริการสามารถดูแลตนเองได้ สามารถป้องกันหรือลดภาวะแทรกซ้อนได้ แต่การดูแลดังกล่าวที่จะช่วยส่งเสริมให้ผู้รับบริการสามารถดูแลตนเองได้ต้องมีองค์ประกอบมากมายที่พยาบาลต้องมีความรู้และทักษะในการจัดให้มีบริการใช้วิธีการที่จะช่วยให้บรรลุผลลัพธ์ของการดูแล องค์ประกอบที่สำคัญ ได้แก่ การใช้หลักแนวคิด ของ Wagner และคณะ (1996) ร่วมกับการใช้รูปแบบการชี้แนะ ซึ่งมีรายละเอียดดังนี้

ส่วนที่ 1 แบบจำลองการดูแลผู้ป่วยเรื้อรัง (Chronic care model)



ภาพแสดงที่ 1 Chronic Care Model (Wagner 1996: 511-544)

ส่วนที่ 2 แผนการสอนและชี้แนะให้แก่ผู้ที่เป็นเบาหวานชนิดที่ 2

เรื่อง	โรคเบาหวาน (Diabetes)
วิธีสอน	แบบบรรยาย และการสาธิต
ผู้สอน	พยาบาลประจำสถานีกาชาด 2
ผู้เรียน	ผู้ที่เป็นเบาหวานชนิดที่ 2

วัตถุประสงค์ทั่วไป

เพื่อให้ผู้ที่เป็นเบาหวานชนิดที่ 2 มีความรู้ ความเข้าใจในการดูแลตนเองเพื่อป้องกันภาวะแทรกซ้อน (Educate the patient / family about living with and managing their diabetes)

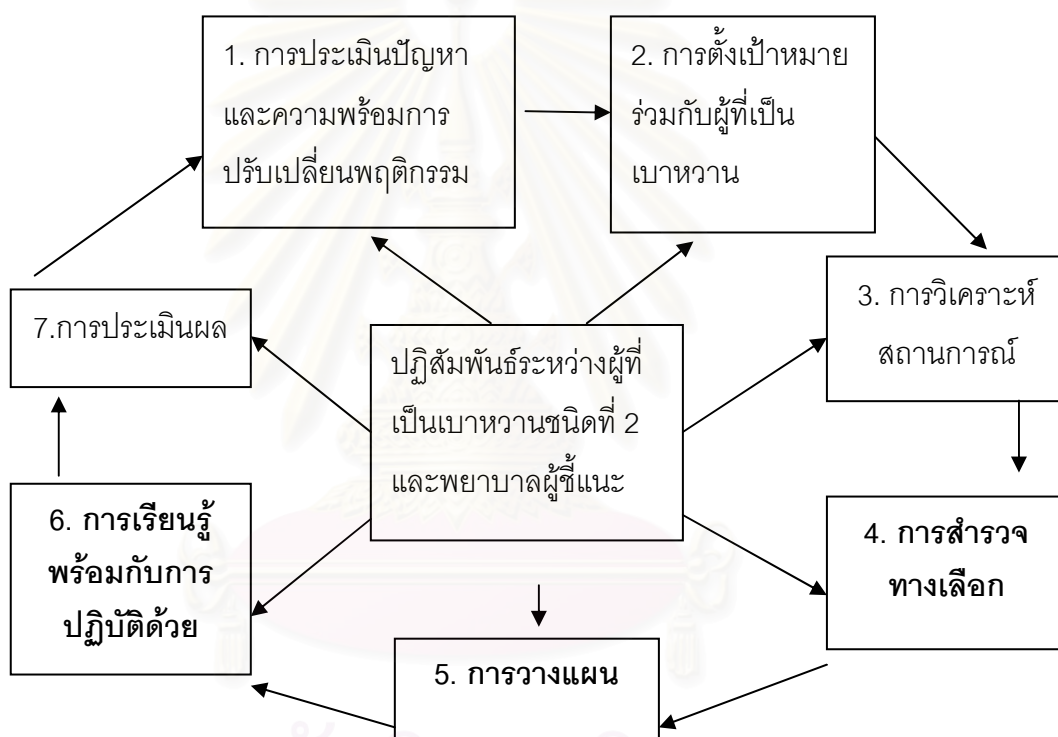
วัตถุประสงค์ย่อย

1. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้เบื้องต้นเกี่ยวกับโรคเบาหวาน
2. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ และเข้าใจ เกี่ยวกับภาวะแทรกซ้อนโรคเบาหวาน
3. ผู้ที่เป็นเบาหวานมีความเข้าใจเกี่ยวกับจุดประสงค์ของการรักษาและการปฏิบัติเกี่ยวกับการจัดการตนเอง
4. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมีทักษะ เกี่ยวกับ แนวทางการบริโภคอาหารเพื่อสุขภาพที่ดี
5. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมีทักษะเกี่ยวกับการเคลื่อนไหวและการออกกำลังกาย
6. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมีทักษะเกี่ยวกับการใช้ยาเบาหวานได้ถูกต้อง
7. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมีทักษะการเฝ้าระวังตนเอง
8. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมีทักษะ การป้องกันภาวะแทรกซ้อน เช่น การรักษาสุขอนามัยและการดูแลเท้า
9. เพื่อให้ผู้ที่เป็นเบาหวานมีความรู้ เข้าใจ และมี ทักษะในการปรับเปลี่ยนพฤติกรรม

วัตถุประสงค์เชิงพฤติกรรม	เนื้อหา	กิจกรรมการเรียนรู้การสอน	สื่อการสอน	เกณฑ์การประเมินผล
เมื่อสิ้นสุดการเรียนการสอนแล้ว ผู้ที่เป็นเบาหวาน มีความรู้เบื้องต้นเกี่ยวกับโรคเบาหวาน	<p>1. ความรู้เบื้องต้นเกี่ยวกับโรคเบาหวาน</p> <p>โรคเบาหวานเป็นโรคที่ถูกเรียกว่า “เพชมาตเจียบ” มีสาเหตุและกลไกที่ซับซ้อนสามารถแบ่งได้เป็น 2 ชนิด มีปัจจัยหลายประการที่ทำให้เสี่ยงต่อการเป็นโรคเบาหวานซึ่ง การวินิจฉัยโรคสามารถประเมินได้จากอาการและการตรวจทางห้องทดลองได้ จนเมื่อเกิดภาวะแทรกซ้อนของเบาหวานแล้ว ผู้ที่เป็นเบาหวานจึงมาพบแพทย์ มีการประมาณการว่าร้อยละ 50 ของผู้ที่เป็นเบาหวาน ไม่ทราบมาก่อนเลยว่าตนเองเป็นจนกว่าจะมีอาการหรือมาด้วยโรคร่วมอื่น ๆ</p> <p>1.1 สาเหตุและกลไก</p> <p>เซลล์ในตับอ่อนชื่อเบต้าเซลล์เป็นตัวสร้างฮอร์โมน อินซูลิน ซึ่งเป็นตัวนำน้ำตาลกลูโคสเข้าเซลล์เพื่อใช้เป็นพลังงาน เมื่อเกิด การขาดฮอร์โมนอินซูลิน หรือประสิทธิภาพของอินซูลินลดลงเนื่องจากภาวะดื้อต่ออินซูลินทำให้น้ำตาลในเลือดสูงขึ้น และเมื่อเกิดภาวะนี้ เป็นเวลานานจะเกิดโรคแทรกซ้อนต่ออวัยวะต่างๆ เช่น ตา ไต และระบบประสาท สาเหตุหลัก ได้แก่ อ้วน รับประทานอาหารมากเกินไป ขาดการออกกำลังกาย กรรมพันธุ์</p> <p>1.2 ชนิดของโรคเบาหวาน</p> <p>1.2.1 ชนิดที่ 1 ต้องพึ่งอินซูลิน มักพบในคนอายุน้อย เด็กและวัยรุ่น ในผู้ใหญ่พบได้บ้างต้องรักษาด้วยการฉีดอินซูลินทุกวัน ถ้าขาดยาอาจเกิดโรคแทรกซ้อนรุนแรงถึงตายได้ เกิดจากเซลล์สร้างอินซูลินในตับอ่อนถูกทำลายด้วยสาเหตุที่ยังไม่ทราบ</p>	<p>ผู้สอนสร้างสัมพันธภาพ โดยแนะนำตนเอง ชื่อตนเองกับผู้ที่เป็นเบาหวาน</p> <p>ผู้สอนใช้คำถามว่า เบาหวานคืออะไร อินซูลิน คือ อะไร อินซูลินมีฤทธิ์ต่อร่างกายอย่างไร</p> <p>ผู้สอนถามว่า “ ท่านทราบหรือไม่ ว่าเบาหวานมีกี่ชนิด”</p>	<p>- PowerPoint แสดงภาพ ที่ตั้งของตำแหน่งตับอ่อน</p> <p>- ภาพแสดงกลไกการเกิดโรคเบาหวาน</p> <p>- PowerPoint แสดงภาพชนิดที่ 1 ของเบาหวาน</p>	<p>ผู้ที่เป็นเบาหวานระบุสาเหตุชนิดเบาหวาน ปัจจัยเสี่ยงที่ทำให้เกิดเบาหวานได้ถูกต้อง</p>

ส่วนที่ 3 โปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวานชนิดที่ 2

โปรแกรมการพยาบาลชี้แนะแบบหลากหลายเพื่อป้องกันภาวะแทรกซ้อนในผู้ที่เป็นเบาหวานชนิดที่ 2 เป็นโปรแกรมการพยาบาลที่ส่งเสริมให้แก่ผู้ที่เป็นเบาหวานชนิดที่ 2 มีความรู้และทักษะในการดำเนินชีวิตหรือสามารถจัดการดูแลตนเองได้ พยาบาลผู้ทำหน้าที่ชี้แนะจะทำหน้าที่โน้มน้าวผู้ที่เป็นเบาหวานให้ไปสู่จุดที่พร้อมกับการเปลี่ยนแปลง และช่วยให้เกิดการเปลี่ยนรูปแบบความคิดและส่งเสริมการปรับเปลี่ยนพฤติกรรมตนเอง



ภาพที่ 2 รูปแบบจำลองการพยาบาลชี้แนะแบบหลากหลายเพื่อป้องกันภาวะแทรกซ้อน ในผู้ที่เป็นเบาหวาน ชนิดที่ 2

แบบการรายงานตนเองสำหรับการเปลี่ยนแปลงพฤติกรรมของผู้ที่เป็นเบาหวาน
(Self-Rport for Changing Behaviors)

Code No.....วันที่-เดือน-ปี..... เวลาที่เริ่ม.....ถึง.....น. จำนวน.....ช.ม

การประเมินสภาพร่างกาย จิตใจ และความพร้อมการปรับเปลี่ยนพฤติกรรม (Assessment)	การตั้งเป้าหมาย ร่วมกับผู้ที่เป็นเบาหวาน (Goal definition)	การวิเคราะห์สถานการณ์ (Analysis)	สำรวจทางเลือก (Explore)

(Self-Rport for Changing Behaviors)
การวางแผน

คำถาม ท่านจะทำอะไร ท่านจะทำอย่างไร บ่อยแค่ไหน เมื่อไหร่จะเริ่มต้น
ท่านจะทบทวนกระบวนการเมื่อไหร่

เป้าหมายของสัปดาห์นี้ คือ.1: _____

ขั้นตอนการปฏิบัติ	เมื่อปฏิบัติได้สำเร็จ ทำเครื่องหมายถูก
1. _____	<input type="checkbox"/>
2. _____	<input type="checkbox"/>
3. _____	<input type="checkbox"/>
4. _____	<input type="checkbox"/>
5. _____	<input type="checkbox"/>
6. _____	<input type="checkbox"/>

ท่าน คิดว่าเป้าหมายที่เลือกมีความสำคัญที่ระดับเท่าใด

(สำคัญน้อย) 1 2 3 4 5 6 7 8 9 10 (สำคัญมาก)

ท่านมีความเชื่อมั่นที่จะบรรลุเป้าหมายนี้เท่าไร

(ไม่มั่นใจ) 1 2 3 4 5 6 7 8 9 10 (มั่นใจมาก)

การประเมินผล.....

(Self-Rport for Changing Behaviors)
การวางแผน

คำถาม ท่านจะทำอะไร ท่านจะทำอย่างไร บ่อยแค่ไหน เมื่อไหร่จะเริ่มต้น
ท่านจะทบทวนกระบวนการเมื่อไหร่

เป้าหมายของสัปดาห์นี้ คือ.2: _____

ขั้นตอนการปฏิบัติ	เมื่อปฏิบัติได้สำเร็จ ทำเครื่องหมายถูก
1. _____	<input type="checkbox"/>
2. _____	<input type="checkbox"/>
3. _____	<input type="checkbox"/>
4. _____	<input type="checkbox"/>
5. _____	<input type="checkbox"/>
6. _____	<input type="checkbox"/>

ท่าน คิดว่าเป้าหมายที่เลือกมีความสำคัญที่ระดับเท่าใด

(สำคัญน้อย) 1 2 3 4 5 6 7 8 9 10 (สำคัญมาก)

ท่านมีความเชื่อมั่นที่จะบรรลุเป้าหมายนี้เท่าไร

(ไม่มั่นใจ) 1 2 3 4 5 6 7 8 9 10 (มั่นใจมาก)

การประเมินผล.....

โครงการจัดอบรมสำหรับพยาบาล
โปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2
สำหรับพยาบาล

หลักการและเหตุผล

ในสภาพสิ่งแวดล้อมเศรษฐกิจปัจจุบันที่มีการเปลี่ยนแปลงอย่างรวดเร็ว ทำให้ระบบการสาธารณสุข สุขและการดูแลผู้ที่เป็นโรคเรื้อรังต้องมีการปรับเปลี่ยนระบบบริการเพื่อให้มีมาตรฐานการ มีการจัดระบบบริการพยาบาลที่เน้นผู้ป่วยเป็นศูนย์กลาง มีกระบวนการพยาบาลและการดูแลที่ผสมผสานการดูแลอย่างเหมาะสมแก่ผู้ที่เป็นโรคเรื้อรัง โดยเฉพาะผู้ที่เป็นเบาหวานเพื่อให้ได้รับการบริการพยาบาลที่รวดเร็วมีความต่อเนื่องและตอบสนองตามความต้องการ ส่งผลให้เกิดผลลัพธ์คุณภาพการดูแลที่น่าพึงพอใจและเป็นທີ່ประทับใจแก่ผู้รับบริการ

พยาบาลเป็นผู้หนึ่งที่อยู่ในทีมสุขภาพ มีความเป็นผู้นำในทีมสุขภาพ และมีความสามารถในการปรับเปลี่ยนองค์กรให้เกิดการบริการที่มีคุณภาพ นำไปสู่ผลลัพธ์ที่เป็นไปตามเป้าหมาย ให้เกิดขึ้นในระบบบริการผู้ที่เป็นโรคเรื้อรัง เช่น เบาหวาน ความดันโลหิตสูง นอกจากนี้พยาบาลเป็นผู้ที่ให้การดูแลทั้งทางตรงและทางอ้อมแก่ผู้ที่เป็นเบาหวาน โดยใช้แหล่งข้อมูลและระบบเทคโนโลยีให้เกิดการผสมผสานที่สามารถดูแลผู้ที่เป็นเบาหวานได้อย่างต่อเนื่อง แนวทางการดูแลผู้ป่วยที่สอดคล้องกับแนวทางการรักษาและป้องกันการเกิดภาวะแทรกซ้อนได้ เมื่อเกิดภาวะฉุกเฉินหรือซับซ้อน สามารถชี้แนะและส่งต่อไปยังผู้ชำนาญการด้านการรักษาและการดูแลผู้ป่วยเบาหวาน พยาบาลและผู้ที่เป็นเบาหวานมีความสัมพันธ์ในเชิงบำบัด มีการแลกเปลี่ยนข้อมูล ลักษณะการพยาบาลชี้แนะแบบผสมผสานหลายรูปแบบในผู้ที่เป็นเบาหวาน เป็นลักษณะที่เน้นความร่วมมือ การจัดการการให้ข้อมูลแก่ผู้ที่เป็นเบาหวานมีการกำหนดเป้าหมายการดูแลตนเอง เน้นการแก้ไขปัญหาตามสถานการณ์จากชีวิตจริง การกระทำกิจกรรมที่ดูแลตนเองได้ เพื่อให้สามารถพึ่งพาตนเองได้ การพยาบาลจะมุ่งเน้นให้การช่วยเหลือผู้ที่เป็นเบาหวาน ปฏิบัติกิจกรรมการดูแลรักษาตนเองได้อย่างต่อเนื่องมีคุณภาพ ป้องกันภาวะแทรกซ้อนที่อาจเกิดขึ้นได้ที่จะช่วยให้มีสุขภาพดียิ่งขึ้นต่อไป

วัตถุประสงค์

1. เพื่อให้พยาบาลมีความรู้ความเข้าใจเกี่ยวกับการจัดบริการสุขภาพและโปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2
2. เพื่อให้ผู้เข้าร่วมประชุมเกิดความตระหนักในการจัดบริการสุขภาพ โดยใช้โปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2 เพื่อป้องกันภาวะแทรกซ้อน
3. เพื่อให้ผู้เข้าร่วมประชุมสามารถปฏิบัติกิจกรรมในโปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2 เพื่อป้องกันภาวะแทรกซ้อนได้

ผู้รับผิดชอบโครงการ

นางรุ่งระวี นาวีเจริญ นิสิตปริญญาเอก หลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต
คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

รูปแบบการประชุม

การบรรยาย การสัมมนา

ผู้เข้าร่วมประชุม

พยาบาลประจำการที่ให้การดูแลผู้ที่เป็นเบาหวาน 6 คน

งบประมาณ

1. ค่าอาหารว่างผู้เข้าประชุม	4,000 บาท
2. ค่าตรวจระดับน้ำตาลสะสม ระดับไขมันชนิดไม่ดี x 30 คน x 3 ครั้ง	10,000 บาท
3. ค่าถ่ายเอกสาร	2,000 บาท
4. ค่าวัสดุสำนักงาน	500 บาท
5. ค่ากระดาษพิมพ์ดีด 10 รีม ๆ ละ 120 บาท	1,200 บาท
6. ค่าหมึกพิมพ์ 1 ตลับ	2,400 บาท
7. เครื่องวัดระดับน้ำตาลที่ปลายนิ้วพร้อมเข็มและแถบวัด	3,400 บาท
7. ค่าเดินทาง	3,000 บาท
8. ค่าผู้ช่วยวิจัย	10,000 บาท
รวม	36,500 บาท

ประโยชน์ที่คาดว่าจะได้

1. เกิดการพัฒนากระบวนการดูแลผู้ที่เป็นโรคเบาหวานชนิดที่ 2
2. พัฒนาบุคลากรให้มีความรู้และทักษะในการดูแลผู้ที่เป็นเบาหวานชนิดที่ 2
3. ผู้รับบริการเกิดความพึงพอใจที่ได้รับการบริการจากพยาบาล
4. ภาวะแทรกซ้อนที่รับรู้ได้จากผู้ที่เป็นเบาหวานลดลง

กำหนดการอบรม

โปรแกรมการพยาบาลชี้แนะแบบหลากหลายในผู้ที่เป็นเบาหวาน ชนิดที่ 2

6 – 11 พฤศจิกายน 2550

สัปดาห์ที่ 1

ครั้งที่ 1

6 พฤศจิกายน 2550

- 14.00 -15.00 น. - Pre-test
 15.00 -16.00 น. - บรรยายการดูแลผู้ที่เป็นเบาหวานชนิดที่ 2

ครั้งที่ 2

7 พฤศจิกายน 2550

- 14.00 -14.30 น. - บรรยายแบบจำลองการดูแลผู้ป่วยเรื้อรัง (Chronic Care Model)
 14.30 -16.00 น. - บรรยายโปรแกรมการพยาบาลชี้แนะแบบหลากหลาย
 - แผนการสอนและชี้แนะให้แก่ผู้ที่เป็นเบาหวานชนิดที่ 2

ครั้งที่ 3

8 พฤศจิกายน 2550

- 14.00 -16.00 น. - Case study
 - ฝึกปฏิบัติ

สัปดาห์ที่ 2

ครั้งที่ 4

11 พฤศจิกายน 2550

- 14.00 -16.00 น. - ฝึกปฏิบัติ Case study
 - Post test and evaluation

INSTRUMENTS FOR INTERVENTION

แบบประเมินความรู้พยาบาลผู้ดูแลผู้ที่เป็นเบาหวานชนิดที่ 2

พยาบาลเลขที่.....

คำชี้แจง กรุณาทำเครื่องหมาย X ลงบนข้อ ก ข ค หรือ ง ที่ท่านคิดว่าถูกต้องที่สุดเพียง 1 ข้อ

<p>1. เกณฑ์การวินิจฉัยโรคเบาหวานคือข้อใด</p> <p>ก. Fasting blood sugar 70-100 mg/dl</p> <p>ข. Fasting blood sugar 100-125 mg/dl</p> <p>ค. Fasting blood sugar > 126 mg/dl</p> <p>ง. HbA1c 5.5%</p>	<p>5. สาเหตุการตายอันดับแรกของผู้ที่เป็นเบาหวานชนิดที่ 2 คือข้อใด</p> <p>ก. โรคไตวาย</p> <p>ข. โรคหลอดเลือดหัวใจ</p> <p>ค. โรคหลอดเลือดสมอง</p> <p>ง. โรคปลายประสาทเสื่อม</p>
<p>2. ข้อใดต่อไปนี้เป็นข้อที่ต้องเกี่ยวกับ อินซูลิน</p> <p>ก. อินซูลินจะสกัดน้ำตาลไม่ให้เข้าสู่เซลล์</p> <p>ข. ลดการสร้างเนื้อเยื่อต่างๆ ในร่างกาย</p> <p>ค. สร้างจากเบต้าเซลล์ของตับอ่อน</p> <p>ง. ลดการสร้างไขมัน</p>	<p>6. ข้อใด ไม่ถูกต้อง เกี่ยวกับสาเหตุการเกิดโรคเบาหวาน</p> <p>ก. พ่อและแม่เป็นเบาหวานลูกมีโอกาสเป็นเบาหวานสูง</p> <p>ข. ความอ้วน ทำให้เนื้อเยื่อของร่างกายตอบสนองต่ออินซูลินได้ดี</p> <p>ค. การออกกำลังกาย ทำให้เนื้อเยื่อของร่างกายตอบสนองต่ออินซูลินได้ดี</p> <p>ง. การได้รับยาบางชนิด เช่น สเตียรอยด์ ยาขับปัสสาวะ ยาคุมกำเนิด กระตุ้นให้เกิดเบาหวาน</p>
<p>3. กลุ่มความผิดปกติของ เมตาโบลิค มีลักษณะของระดับไขมัน เป็นเช่นใด</p> <p>ก. ระดับ HDL สูง triglyceride ต่ำ</p> <p>ข. ระดับ HDL สูง triglyceride สูง</p> <p>ค. ระดับ HDL ต่ำ triglyceride ต่ำ</p> <p>ง. ระดับ HDL ต่ำ triglyceride สูง</p>	<p>7. อาการของเลือดไหลเวียนลดลงของผู้ที่เป็นเบาหวานเกิดจากสาเหตุใด</p> <p>ก. เลือดมีความหนืด อัตราการไหลช้าลง ในขณะที่ระดับน้ำตาลในเลือดสูงขึ้น</p> <p>ข. เม็ดเลือดขาวมีการจับกลุ่มในหลอดเลือด</p> <p>ค. เกิดเลือดไม่จับตัวตกตะกอน</p> <p>ง. เส้นเลือดมีการขยายตัวมาก</p>
<p>4. ข้อใดต่อไปนี้เป็นสัญญาณถึงเกิดภาวะ nephropathy</p> <p>ก. ระดับ HbA1c < 6%</p> <p>ข. มีปริมาณ albumin ในปัสสาวะลดลง</p> <p>ค. มีปริมาณ albumin ในปัสสาวะเพิ่มขึ้น</p> <p>ง. Glomerular filtration rate ลดลงจากเดิมประมาณร้อยละ 20-40</p>	<p>8. ข้อใดเป็นอาการแสดงเริ่มแรกของภาวะที่มีระดับน้ำตาลในเลือดสูงมาก</p> <p>ก. มือสั่น</p> <p>ข. เหงื่อออก</p> <p>ค. เจ็บหน้าอก</p> <p>ง. ปัสสาวะบ่อย</p>

3.2 แบบบันทึกการสังเกตการพยาบาลชี้แนะแบบหลากหลายต่อภาวะแทรกซ้อนเบาหวาน
ในผู้ที่เป็นเบาหวานชนิดที่ 2

พยาบาลเลขที่.....

ผู้ที่เป็นเบาหวานเลขที่.....

กิจกรรมการใช้ขั้นตอนการชี้แนะ	ปฏิบัติ	ไม่ปฏิบัติ	หมายเหตุ
1. การประเมินสภาพร่างกาย จิตใจ และความพร้อมการปรับเปลี่ยนพฤติกรรม			
1.1 สร้างสัมพันธภาพแนะนำชื่อของตนเองกล่าวทักทายกับ ผู้ที่เป็นเบาหวานและสอบถามชื่อ			
1.2 การประเมินสภาพร่างกายและสรีรวิทยา			
1.3 การประเมินความเชื่อ วัฒนธรรม ของผู้ที่เป็น เบาหวานและคนในครอบครัว			
1.4 ประเมินความรู้และทักษะผู้ที่เป็นเบาหวาน			
1.5 ประเมินแหล่งสนับสนุน/แหล่งประโยชน์			
1.6 บันทึกเกี่ยวกับปัญหาสภาพร่างกายจิตใจและสังคมที่ เกี่ยวข้องกับเบาหวานและการรักษา			
2. การตั้งเป้าหมายร่วมกับผู้ที่เป็นเบาหวานชนิดที่ 2			
2.1 พยาบาลให้ข้อมูลที่เกี่ยวข้องกับเป้าหมายของการรักษา และเกี่ยวข้องกับพฤติกรรม			
2.2 อธิบายถึงผลดีของการตั้งเป้าหมายในการปรับเปลี่ยน พฤติกรรม			
2.3 เปิดโอกาสให้ผู้ที่เป็นเบาหวานตั้งเป้าหมายด้วยตนเอง			
2.4 ส่งเสริมการกำหนดพฤติกรรมที่มีลักษณะเฉพาะเหมาะ สมกับตนเอง			
2.5 ส่งเสริมการกำหนดพฤติกรรมที่สามารถวัดได้			
2.6 ร่วมการกำหนดพฤติกรรมที่สำเร็จได้ง่าย			
2.7 ร่วมการกำหนดพฤติกรรมที่มีความสอดคล้องกับปัญหา			
2.8 ร่วมกำหนดระยะเวลาของความสำเร็จ			
2.9 บันทึกการตั้งเป้าหมายในแผนการพยาบาล			

ชุดที่ 1 แบบสอบถามความรู้เรื่อง โรคเบาหวาน สำหรับผู้ที่เป็นเบาหวานชนิดที่ 2

**The diabetes self-management's knowledge
for persons with type 2 diabetes questionnaire**

แบบสอบถาม Participant's No.....

ครั้งที่สอบถาม

() Pre -test () Post- test

โปรดใส่เครื่องหมาย ✓ หน้าข้อที่ท่านคิดว่า “ถูก” และใส่เครื่องหมาย ✕ หน้าข้อที่ท่านคิดว่า “ผิด”

-1. โรคเบาหวาน คือ โรคเรื้อรังที่ ต้องการการรักษาและดูแลตนเองอย่างต่อเนื่อง
-2. อาการปัสสาวะบ่อยและดื่มน้ำมาก เป็นอาการเด่นชัดของระดับน้ำตาลในเลือดสูงของผู้ที่เป็นโรคเบาหวาน
-3. ผู้ที่เริ่มเป็นเบาหวานยังไม่ต้องสนใจเรื่องโรคแทรกซ้อนเพราะยังไม่เกิดขึ้นขณะนี้
-4. อาการของภาวะน้ำตาลในเลือดต่ำคือ เหงื่อออกมากผิดปกติ ปวดศีรษะ หิวจัด หงุดหงิด หัวใจเต้นแรง มือสั่นใจสั่น
-5. การช่วยเหลือตนเองเมื่อภาวะน้ำตาลในเลือดต่ำขณะที่รู้สึกตัว คือ รับประทานอาหารดื่มหรือของหวานหรืออมลูกอมทันที
-6. ผู้ที่เป็นเบาหวานที่มีระดับน้ำตาลในเลือดสูงอยู่เป็นเวลานาน ไม่มีผลกระทบต่อเส้นเลือดทั้งขนาดเล็กหรือขนาดใหญ่
-7. ผู้ที่เป็นเบาหวานที่มีระดับน้ำตาลในเลือดสูงอาจมีอาการตาพร่ามองเห็นไม่ชัด
-8. ผู้ที่เป็นเบาหวานที่มีระดับน้ำตาลในเลือดสูงอาจมีอาการมือเท้าชาซึ่งเกิดจากระบบประสาทส่วนปลายเสื่อม
-9. ผู้ที่เป็นเบาหวานควรขอตรวจการทำงานของไต ตรวจตา ตรวจระดับไขมันในเลือด อย่างน้อยปีละ 1 ครั้ง แม้ยังไม่มีอาการ
-10. อาหารเป็นเรื่องจำเป็นที่ผู้ป่วยเบาหวานทุกคนต้องเรียนรู้
-11. แป้ง/ข้าวน้ำตาลและผลไม้หลังรับประทานแล้วจะดูดซึมเข้าสู่ร่างกายได้รวดเร็วกว่าเนื้อสัตว์
-12. ข้าวกล้องคืออาหารที่มีกากมากช่วยลดการดูดซึมน้ำตาลและไขมันเข้าสู่ร่างกาย
-13. ผักบุง ผักกาดขาว คือ ผักที่รับประทานได้ตามต้องการ
-14. น้ำมันหมูหรือน้ำมันไก่ซึ่งเจียวใหม่ๆ เหมาะต่อการนำมาปรุงอาหาร
-15. ผู้ป่วยเบาหวานควรเลือกรับประทานเครื่องในสัตว์เพราะมีไขมันน้อย
-
-27. อาการชาที่ เท้าทำให้ มีโอกาสเกิดแผลที่เท้าได้ง่ายขึ้น
-28. ถ้ามีบาดแผล ควรรีบใส่ยาทิงเจอร์ไอ โอดีน

ชุดที่ 2 แบบวัดกิจกรรมการดูแลตนเองในผู้เป็นเบาหวานชนิดที่ 2

The Summary of Diabetes Self Care Activities Measure (SDSCA)

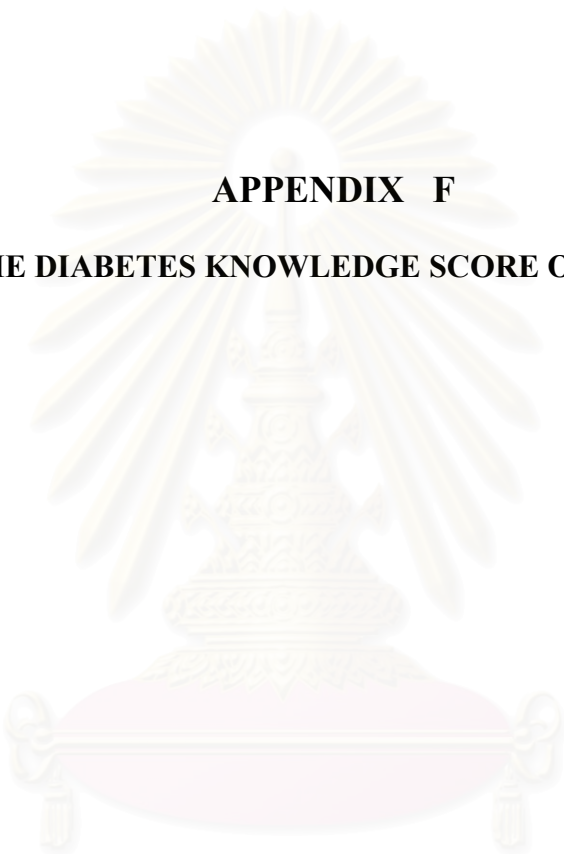
Participant No.....

() Pre - test

() Post- test

ข้อคำถามต่อไปนี้ถามท่านเกี่ยวกับกิจกรรมการดูแลตนเองในช่วง 7 วันที่ผ่านมา ถ้าในช่วง 7 วันที่ผ่านมาท่านเจ็บป่วย ให้นึกย้อนหลังไปอีก 7 วันก่อนช่วงที่ท่านเจ็บป่วย กรุณาใส่เครื่องหมายวงกลม (X) ลงในหมายเลขที่ตรงกับจำนวนวันที่ท่านดูแลตนเอง

1. ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารในปริมาณที่เหมาะสมกับผู้เป็นเบาหวาน และเหมาะกับการใช้แรงงานประจำวันของท่านกี่วัน
0 1 2 3 4 5 6 7
2. ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารจิบจิบระหว่างมื้อ กี่วัน
0 1 2 3 4 5 6 7
3. ในช่วง 7 วันที่ผ่านมาท่านกินอาหารที่มีน้ำตาลมาก เช่น น้ำหวาน หวานเย็น ผลไม้รสหวานจัด เช่น ทุเรียน มะม่วง ลำไย ลิ้นจี่ ละมุด โดยไม่คำนึงถึงปริมาณที่กินได้ กี่วัน
0 1 2 3 4 5 6 7
4. ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารไขมันสูง เช่น หมูสามชั้น ขาหมู หนังเป็ด หนังไก่ กะทิ อาหารทอดต่างๆ ไข่แดง หอยนางรม ปลาหมึก กี่วัน
0 1 2 3 4 5 6 7
5. ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารตรงเวลาคرب 3 มื้อ กี่วัน
0 1 2 3 4 5 6 7
6. ในช่วง 7 วันที่ผ่านมา ท่านใช้หลักการแลกเปลี่ยนอาหารในการกินอาหาร ได้กี่วัน (การแลกเปลี่ยนอาหาร เช่น กินข้าวโพด 1 ฝัก แทนการกินข้าว 2 ทัพพี กินข้าวเหนียว 1 ปั้นเท่าไข่ไก่ แทนการกินข้าว 1 ทัพพี เป็นต้น)
0 1 2 3 4 5 6 7
7. ในช่วง 7 วันที่ผ่านมา ท่านดื่มเครื่องดื่มที่มีแอลกอฮอล์ เช่น เหล้ามากกว่า 2 เบ็ก เบียร์มากกว่า 1 กระป๋อง ไวน์ มากกว่าครึ่งแก้ว กี่วัน
0 1 2 3 4 5 6 7



APPENDIX F
THE DIABETES KNOWLEDGE SCORE OF NURSE

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Table 13 Knowledge Score of Nurses at Red Cross Health Station in Experimental group

Nurse participants No.	Pre-intervention		Post-intervention	
	Score (30)	Percentage (%)	Score (30)	Percentage (%)
1	25	78.0	29	90.6
2	22	68.7	30	93.7
3	29	90.6	30	93.7
4	19	60.0	29	90.6
5	22	68.0	27	84.3
6	25	78.0	29	90.6

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APPENDIX G
NURSE'S BEHAVIORS SCORE

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**คะแนนปฏิบัติการพยาบาลชี้แนะแบบหลากหลายต่อภาวะแทรกซ้อนเบาหวาน
ในผู้ที่เป็นเบาหวานชนิดที่ 2**

กิจกรรมการชี้แนะ	ปฏิบัติ	ไม่ปฏิบัติ	หมายเหตุ
1. การประเมินสภาพร่างกาย จิตใจและความพร้อมการปรับเปลี่ยนพฤติกรรม	100%	-	
2. การตั้งเป้าหมายร่วมกับผู้ที่เป็นเบาหวานชนิดที่ 2	100%	-	
2.1 พยาบาลให้ข้อมูลที่เกี่ยวข้องกับเป้าหมายของการรักษาและเกี่ยวข้องกับพฤติกรรม	100%	-	
2.2 อธิบายถึงผลดีของการตั้งเป้าหมายในการปรับเปลี่ยนพฤติกรรม	100%	-	
2.2 เปิดโอกาสให้ผู้ที่เป็นเบาหวานตั้งเป้าหมายด้วยตนเอง	100%	-	
2.3 ส่งเสริมการกำหนดพฤติกรรมที่มีลักษณะเฉพาะเหมาะสมกับตนเอง	100%	-	
2.4 ส่งเสริมการกำหนดพฤติกรรมที่สามารถวัดได้	100%	-	
2.5 ร่วมการกำหนดพฤติกรรมที่สำเร็จได้ง่าย	100%	-	
2.6 ร่วมการกำหนดพฤติกรรมที่มีความสอดคล้องกับปัญหา	100%	-	
2.7 ร่วมกำหนดระยะเวลาของความสำเร็จ	100%	-	
2.8 บันทึกการตั้งเป้าหมายในแผนการพยาบาล	100%	-	
3. การการวิเคราะห์สถานการณ์	100%	-	
3.1 นำข้อมูลที่ได้จากแบบสอบถามวิเคราะห์ข้อมูลร่วมกับผู้ที่เป็นเบาหวาน	100%	-	
3.2 สอบถามจุดเด่นที่ทำให้คงไว้ซึ่งพฤติกรรมสุขภาพด้านต่างๆ ที่ดีของผู้ที่เป็นเบาหวาน	100%	-	
3.3 สอบถามจุดด้อยเกี่ยวกับพฤติกรรมด้านต่างๆ ของผู้ที่เป็นเบาหวาน	100%	-	
3.4 สอบถามอุปสรรคที่ทำให้ไม่สามารถคงไว้ซึ่งพฤติกรรมสุขภาพด้านต่างๆ ที่ดีของผู้ที่เป็นเบาหวานได้	100%	-	
4. สสำรวจทางเลือก	100%	-	
4.1 ร่วมกับผู้ที่เป็นเบาหวาน สสำรวจทางเลือก และหาทางเลือกหลายๆ ทาง	100%	-	
4.2 สอบถามประโยชน์ที่จะได้รับจากแนวทางที่เลือก	100%	-	
4.3 สอบถามผลเสียที่จะเกิดขึ้นถ้าไม่ปฏิบัติตามแผน	100%	-	
4.4 แนะนำให้ผู้ที่เป็นเบาหวานเลือกทางแก้ที่ดีที่สุดสำหรับตนเอง	100%	-	
4.5 ให้ข้อมูลเพิ่มเติมที่มีความจำเพาะเจาะจงเพื่อช่วยในการตัดสินใจ	100%	-	



APPENDIX H

Characteristics of Samples Matched Pair Criteria

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Table 14 Characteristics of Samples Matched Pair Criteria: Sex, Age, and Duration.

Pair No.	Experimental group			Control group		
	Sex	Age	Duration	Sex	Age	Duration
1	F(1e)	55	8	F (4c)	62	6
2	M(2e)	55	10	M (34c)	50	10
3	F(4e)	50	16	F(9c)	60	11
4	M(5e)	47	4	M(21c)	48	2
5	F(7e)	47	1	F(50c)	47	1
6	M(9e)	67	2	M(39c)	65	5
7	F(10e)	56	7	F(11c)	64	8
8	M(11e)	66	2	M(5c)	62	4
9	F(17e)	55	10	F(28c)	57	17
10	M(13e)	65	7	M(35c)	67	7
11	M(14e)	42	7	F(30c)	47	6
12	M(15e)	45	1	M(6c)	53	1
13	M(16e)	57	12	M(43c)	57	12
14	M(18e)	69	12	M(47c)	67	12
15	F(19e)	44	1	M(2c)	46	1
16	F(20e)	61	1	F(8c)	64	2
17	M(21e)	61	11	M(37c)	61	7
18	F(22e)	52	1	F(12c)	50	1
19	F(25e)	57	1	F(17c)	56	3
20	M(26e)	50	6	M(18c)	49	6

BIOGRAPHY

Rungrawee Navicharern was born in 1962. She received a BSN from Nursing College of Thai Red Cross Society in 1984, and Bachelor of Health Administration from Sukhothaimatiraj University in 1991, A Master Science of Nursing (Adult Nursing) from Mahidol University in 1999. Rungrawee had 1 year of clinical experience in community care, and 20 years of clinical experience in acute care nursing, Adult Nursing, pre and post-surgical nursing care. She has also experiences in peri-operative nursing care. She had worked in the Relief and Health Bureau, King Chulalongkorn Memorial Hospital, and Thai Red Cross Nursing College, Thai Red Cross Society of Thailand. She had received the scholarship from the Chulalongkorn University to study in Philosophy of Nursing Program at Faculty of Nursing since 2003-2008.



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