

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF  
PREVENTIVE SELF-CARE ON DIABETIC FOOT ULCER IN TYPE II  
DIABETIC PATIENTS, MUANG ROI-ET DISTRICT, ROI-ET PROVINCE,  
THAILAND**

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

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**บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)  
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โรคเบาหวานชนิดที่สอง อำเภอเมืองร้อยเอ็ด จังหวัดร้อยเอ็ด ประเทศไทย

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต  
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This research was a survey research with the objectives to assess the knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand. Data collection was between September to December 2009. The samples were registered diabetic type II patients at Diabetes Mellitus Clinic at Roi-Et Hospital according to their registration numbers ID (DM) for a number of 300 respondents by quota sampling. The research tool was an interview form in 4 parts. The overall reliability value was 0.758. Statistics in use by SPSS version 17 were frequency, percentage, mean, standard deviation, and Chi-square test.

The result revealed that most of the respondents were female (67.3%), aged between 55-60 years old (41.7%) (Mean age 53 years). They were married (76.0%), finished primary school (59.0%), and were agricultures (30.0%). Average number of their family members was 4. Average income was 15,682 baht monthly with 10,702 baht monthly expenses. Family members did not have diabetes mellitus history (45.3%) and never had foot ulcer unconsciously (80.3%). The respondents had their knowledge level on preventive self-care part for 66.0% (moderate level), had their attitude level on preventive self-care part for 75.3% (high level) and their practice on preventive self-care part for 50.7% (high level). Factors associated with preventive self-care part at the level of 0.05 were gender (0.021), occupation (0.005), household expense (0.008), knowledge (0.000) and attitude (0.000).

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## **LIST OF ABBREVIATIONS**

- WHO : World Health Organization  
MoPH : Ministry of Public Health  
IDF : International Diabetes Federation  
ADA : American Diabetes Association  
CMU : Central Medical care Unit  
OPD : Out Patient Department  
DM : Diabetes Mellitus  
NIDM : Non Insulin Diabetes Mellitus

# CHAPTER I

## INTRODUCTION

### 1. Background and Rationale

Through development of medical professions and modern science, methodologies for illness prevention, treatment and care have been improved to reduce incidence rate of illness among human. Some illnesses were even eradicated from the world. However, diabetes mellitus still exists and its incidence rate is increasing. Although, efficient medicines, approaches for behavioral prevention, and various knowledge have been newly invented, however; numbers of diabetic patients who have experienced diabetic lower extremity amputation are still high. Lower extremity amputation is considered a threat to quality of life of diabetic patients (Carrington AL, et al, 2009). Those diabetic patients have become a burden on their family. This is also a great loss of resource in medical professions and economy that reflects on country's budget for diabetes mellitus treatment. In several countries, studies on prevention and treatment of diabetic foot have been focused to reduce occurrence of lower extremity amputations. Diabetic foot care requires both a science and an art in examining, screening and caring of diabetic foot for diabetic patients and minder regularly. Incidence rate of lower extremity amputations can be decreased by 40-80%, if diabetic patients are educated on routine self-care of feet, types of food reducing blood glucose level and basic foot problems for wound prevention (Grunfeld C. *Adv Intern Med* 1992; 37). At the time of diagnosis of diabetes mellitus, incidence rate of diabetic wound is about 4-10% and up to 25% of individuals with diabetes mellitus will suffer from lower extremity amputation and enormous expense (Singh N, et al, 2005). "Foot" is very important part of human body as it helps human to stand, walk, run and perform any activities. In the case of damaged foot or foot dysfunction such as a foot wound and a broken bone, it will be really painful and problematic for human. Foot deformities are more likely to be occurred among diabetic patients rather than others. However, foot is a body part that is usually ignored and careless. Apart from dietary management, exercise and medication and foot care are very important for diabetes mellitus treatment. Most of doctors always pay more attention on control of blood glucose level and other obvious complications



such as diabetic retinopathy and renal failure rather than “wound at foot” of diabetic patients. Especially for the diabetic patients like farmers who do not like to wear appropriate shoes while working and stepping on soil, water or mud where germs live.

Throughout the world, one diabetic patient loses a leg every half an hour and 70% of those having lower extremity amputation are living in the developing countries. About 5% of diabetic patients have foot problems and this is a major reason for diabetic patients to be admitted to a hospital.

For developing countries, expense for diabetic foot care is very high at 40% of total expense of overall health care. Conversely, only 12-15% of overall health care expenditure is spent for diabetic foot care in America.

Approximately, US\$30,000-60,000 may be spent up for lower extremity amputation in diabetes mellitus. A foot wound is a major cause of lower extremity amputation in diabetes mellitus and one in six of diabetic patients cannot get rid of a foot wound for the rest of their life. About 4 million around the world will have diabetic foot wound every year. In fact, about 85% of patients having a foot wound and lower extremity amputation can be prevented if diabetic patients take their roles effectively and systematically in caring foot and controlling of blood glucose level. Preventive self-care information, therefore; is required to be given for diabetic patients.

By Thai culture, the foot is regarded as lowly structure. Most of people residing in rural areas do not like wearing shoes when they walk inside a house or outside to a farm as they feel uncomfortable wearing shoes. However, if they are diabetic patients, their feet will feel numb, but indeed there is a foot wound. Once, they are aware of a foot wound, their symptoms have become intense enough that a lower extremity amputation is required. About 1 million of Thai diabetic patients have toes, fingers, arms, and legs amputation each year (Dr. Narongchai Yingsakmongkol, Health, July 14, 2008).

### **Importance of Chronic Ulcer**

In 1995 WHO defined 'Diabetic foot' as a group of symptoms caused by degeneration of peripheral nerve, peripheral arterial diseases, and infection which cause a foot wound and lead to foot dysfunction or lower extremity amputation. Generally, when speaking of foot problems always include all types of foot problems of diabetic patients (Bolton, AJ.and Villeikyte, L., 2000). Foot wound is commonly found and severe. Incidence rate of diabetic foot is 15% of diabetic patients. Incidence rate of new wound is 1-1.5% per year. (American Diabetes Association, 2004). Foot wound does not end with curing, but some times it ends with lower extremity amputation. Every 30 second, a diabetic foot patient will have lower extremity amputation (International Working Group on the Diabetic Foot, 2005). Amputation also creates intensively chronic ulcer that makes patients to be admitted in the hospital for over 1 month (Stanley and Turner, 2004). This is considered an waste expense for treatment. A foot wound, therefore; is a problem affecting physical, emotional, society and economy of diabetic patients. Numbers of diabetic patients are increasing around the world. In 1995 there are approximately 135 million diabetic patients and this number is estimated to be increased up to 300 million people in 2025. The increasing rates in developed and developing countries are 42% and 170%, respectively (Boulton, AJ.and Vileikyte, L., 2000 ). Therefore, a diabetic foot and lower extremity amputation are considered key problems of Thailand in the future.

50% of diabetic patients with lower extremity amputation die within 5 years after the amputation. 15% of diabetic patients will have a foot wound, and among those, 15% will get infection at metatarsus bone. In addition, 15% of diabetic patients will have to amputate either parts of foot (Supimaros, Y,1999) and its complications give them 2- fold increase of chance for patients being admitted to the hospital and 5-fold increase of treatment cost compared to other types of patients (Bureau of Non-Communicable Diseases, Disease Control Department, Ministry of Public Health,2000). These can lead disabilities and early death and affect overall quality of life of diabetic patients including economy status at family and society levels (Suthijumrun, A, 2001).

Although occurrence of a foot wound of diabetic patients receiving treatment at Roi Et hospital are decreasing as in 2007, 2008, 2009 were 1.65%, 1.06%, and 0.56%, respectively, but prevalence rate of diabetes mellitus is likely to increase continuously (Boulton, AJ. And Vileikyte L.,2000). Most of diabetic patients usually manage foot care by going to the special clinics, however; occurrence of a foot wound cause those coming for the services at the Roi Et hospital. A diabetic foot clinic at Roi Et hospital was established in 2008 and has operated since then. Now, there are 84 registered diabetic foot patients and 12 of them have experienced a foot wound and toe amputation. In addition, 2 of those 84 diabetic patients were unsuccessfully treated, as a result; their legs were amputated. The shown data is only presented a number of diabetic patients receiving reactive services at the diabetic foot clinic, however; there are still considerable numbers of diabetic patients who have not yet been diagnosed and given a treatment with conventional medicine. In addition, at the current, as changes of economy and social status have caused lifestyle of people to survive themselves and their family by saving time and money, as a results, it is found that most of them give a self-care before coming to the government services which are considered a systematic and costly system. At the male surgery ward at Roi Et hospital, average of treatment cost for a patient to receive a one-time treatment is Baht31,000 (Data from Hos xp 18 file, Finance department of Roi Et hospital, 2007-2008). Comparing to other types of patients, a treatment cost of diabetes mellitus is about 1-1.5 times higher. Under universal-coverage health security system (gold card with Baht30 per visit), eligible cost to be paid is only what is in accorded to regulation of national health security office, the other types of costs are responsible by the hospital where that card is allowed for. The hospital is also responsible for any expense occurred by any treatments provided through referring services. This system has caused a serious problem of financial management at hospital, individual, family, and minder levels. Each year International Diabetes Federation or IDF will develop a campaign theme for diabetes mellitus campaign and in 2005 a theme for Diabetes and Foot Care is 'Put Feet First: Prevent Amputations'.

Based on working experiences in nursing at the surgery patient ward, Roi Et hospital, through observation between 2007-2008, it was found diabetic patients being admitted to the hospital lacked of knowledge, understanding and awareness of preventive self-care of feet. As a result, they had a foot wound and for some cases who did not receive promptly treatment they had their body parts lost. On the other hand, when a foot wound is occurred, they could not come for a treatment on regular basis; because of increasing expense. Therefore, compiling data to be used for development of a foot wound prevention guideline should be promoted among diabetic type two patients. In addition, more than half of diabetic patients in Roi Et choose to receive treatment from other types of sources than government hospitals such as clinics, private hospitals, Thai traditional medicine doctors or Thai folk wisdom treatment. Seeking services from different types of treatment can result a difference in level of knowledge, understanding and awareness for controlling blood sugar level including prevention of diabetes mellitus complications. From a research found that provision of normal treatment cannot give enough result in increasing level of awareness, perception to change lifestyles of diabetic patients. However, along with provision of normal treatment, systematic health promotion activities increasing knowledge and on-going preventive self-care behaviors should be provided at community service point and family level. Such health promotion will enable diabetic patients to change their lifestyles for preventive self-care at home. Since, coming for the treatment services as scheduled every time, it does not indicate that diabetic patients will increase level of knowledge and awareness about diabetes mellitus complications, because services provided at the clinics are not only focused on giving diabetes related knowledge, but there are other types of services provided for other diseases. To reduce risk factors of occurrence of toe or foot amputation and to develop a life quality among diabetic patients, they should be equipped with correct knowledge and guidelines for preventive self-care. In addition, service providers can use the same guidelines to perform any activities for the purpose of increase of awareness and preventive self-care among diabetic patients. Factors influencing incidence rate of diabetes mellitus and its complication have been discussed and reviewed among diabetic patients, medical professions and all types of related experts from all sectors. The most important factor preventing related risks is diabetic patients

themselves as they need to change their lifestyles to be appropriate for surviving with diabetes mellitus and preventing from its complications. However, if knowledge and suggestion relating to preventive self-care is not given sufficiently to diabetic patients; related problems of diabetes mellitus can occur. When complications occur, diabetic patients do not have appropriate knowledge and understanding in preventive self-care, so they cannot perform appropriate self-care behaviors. An inappropriate knowledge and understanding in preventive self-care can be caused by different factors as follows:

1. Individual perception is different and suggestion given by medical officials may be too difficult to understand or not applicable to follow in real life.

2. Diabetic patients may not be clear about goal of disease control and preventive self-care.

3. Each medical official may give knowledge and suggestion according to different guidelines or provide incomplete and unclear information. Techniques used to motivate patients are not good enough to change behaviors of patients in preventive self-care.

Disease Management Program is a method to develop a continual diabetes mellitus treatment. The program consists of systematic database which can control effectiveness of diabetes complications management caused by multiple disabilities and also control overall expense of public health sector of the country. This is collaboration between Department of Disease controls, Ministry of Public Health as part of Disease Management Program: Diabetes Mellitus for fiscal year 2007 to 2009 and National Security Office. The National Security Office is responsible in covering service costs occurred by screening for diabetes mellitus among risky groups and for its complications. The costs covered also include development of a care program for diabetic patients entitled to universal-coverage health security system (Gold card) and also procurement of essential equipments for a smoother provision of treatment. Through collaboration with variety types of professional association including civil sectors, networking and referral system for diabetic patients are also developed following the agreed criteria (Moonsaeng, C., 2007). Base on the current situation of diabetes mellitus, many people have focused on studying about factors influencing preventive self-care of feet among diabetic type two patients in order to standardize

knowledge, improve awareness and promote positive attitude towards preventive self-care for those diabetic type two patients.

### **Importance of foot care among diabetic patients**

Walking by feet is an important activity being performed at least 4 - 6 hours a day. Among diabetic patients, leading factors to a foot wound are thrombosis in a foot and leg peripheral artery. For diabetic patients suffering diabetes mellitus for a long period of time, degeneration of peripheral nerve can increase a chance in having a foot wound. The most dangerous thing about this type of foot wound is that a diabetic patient feels no ache, so a foot wound can be wide-spread and severe enough that leg amputation is required at the end. Among all diabetic patients, 15% of them had a foot wound and 14-24% among these had to have leg amputation. Preventing a foot wound can help reducing occurrence of leg amputations and also increasing individual's quality of life. In addition, a burden on family in expense of medicine and treatment can be reduced in a long term-period (Wichaiyut Journal, 35<sup>th</sup> ed., September – December 2006).

### **How diabetes mellitus and foot care are related?**

Chronic Hyperglycemia may cause damaged tissues and parts of body (like body being preserved with syrup). Therefore; diabetic patients who do not control their blood glucose well enough, their peripheral nerve in foot will be at risk for being damaged (Neuropathy). There may also create a problem related to blood vessels in foot reducing blood flow through foot (Ischemia). If peripheral nerve is damaged, its sensation system will be lost. As a result, diabetic patients cannot recognize if there is a foot wound and this can cause leg amputations. In addition, diabetic patients may soak their feet in extreme hot water without feeling its heat, so their feet will get swollen which is very difficult to cure it. Since quantity of blood flowing through feet is reduced or blood vessels are constricted. Likewise, blood cannot flow passing constricted blood vessels in heart, so ischemic heart disease occurs or if constricted blood vessels occurs in brain, it can cause a paralysis. For peripheral arterial blood, a doctor can diagnose by suing Ankle Brachial Index (ABI). Degeneration of peripheral nerve in foot and thrombosis of arterial blood are major factors leading a 'foot ulcer'

easily, consequently; foot ulcer will become infected and severe enough that a leg amputation is required (DiChan Magazine, August 18, 2009, 02:53:10 pm)

Utilization of knowledge relating to the above incidence rates for developing a preventive self-care guideline among medical professions, family and diabetic patients can help increasing awareness and concentration on preventive self-care among diabetic patients. In addition, it can decrease incidence rate of a foot wound and reduce economic burden on family.

## **1.2 Research questions**

2.1 What are the distribution of socio-demographic characteristics, knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients?

2.2 What factors are associated with practice of preventive self-care on diabetic foot ulcer in type II diabetic patients?

## **1.3 Research objectives**

3.1 To assess the distribution of socio-demographic characteristics, knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients.

3.2 To know the factors that are associated with practice of preventive self-care on diabetic foot ulcer in type II diabetic patients.

## **1.4. Expected benefits**

4.1 Research data can be utilized for improving related strategies to promote a correct behavior and implementing relevant approaches to reduce incidence of foot wound in the future.

4.2 Effective and appropriate methods for health education and diabetes treatment can be developed to promote a happy life and healthy condition including prevention of any complications among diabetic patients.

4.3 Research data can be publicized to increase public awareness on importance of self-care and diabetic foot wound prevention rather than treatment as well as seeking health services on regular basis.

4.4. Other researches relating to different aspects of diabetes mellitus can be identified.

### 1.5 Conceptual frameworks

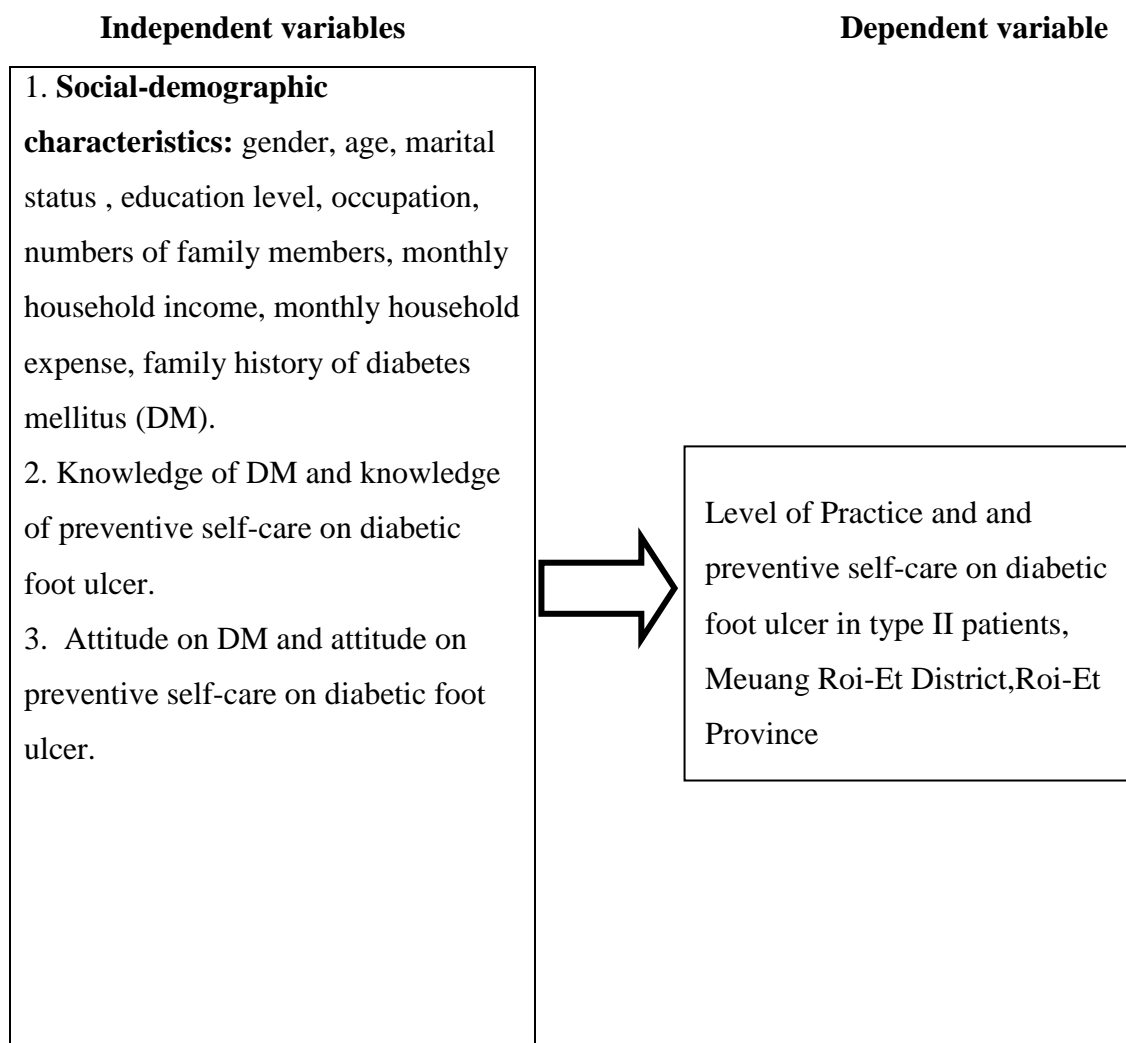


Figure 1: Conceptual framework

### 1.6 Operational definitions:

1.6.1 Diabetic patients – a patient who has been medical diagnosed with non-insulin dependent or insulin dependent diabetes mellitus and having blood glucose level at higher level than normal (normal level is 70-120 mg%). This high level of blood glucose is considered having a type two diabetes mellitus that has its plasma glucose level at two hours before meal is higher 200 mg %.



6.2. Diabetic wound – a group of symptoms caused by degeneration of peripheral nerve, thrombosis of peripheral artery and infection. These cause a diabetic wound leading a dysfunction or amputation of particular diabetic wound. In general, diabetic wound is always recognized as diabetic foot wound including all kinds of foot problems of diabetic patients.

1.6.3 Diabetic foot clinic – a place where provides treatment, care, solving an abnormal foot. The clinic is managed by health team who are surgeon, physician, registered nurse, nurse practitioner, nutritionist, dietitian and therapist.

1.6.4. Self-care behaviors of diabetic patients – daily performance that is conducted continuously and deliberately by diabetic patients to maintain a healthy and well-being life that can be evaluated through interview questionnaire. The questionnaires used for other similar researches were revised for developing this research questionnaire.

1.6.5 Self-care of diabetic patients – diabetic patients perform self-care in performing any activities to maintain a life, controlling and preventing any complications as well as to enable diabetic patients to face an illness themselves.

1.6.6. Self-care requisites of diabetic patients – things that have an influence towards self-care.

1.6.7. Knowledge on diabetes mellitus - knowledge and understanding about DM such as definition, cause, symptoms, treatments, self-performance of diabetic patients. DM knowledge questionnaire revised and developed by the researcher can be used to evaluate.

1.6.8. Attitude towards diabetes mellitus – comment, feeling, belief of diabetic patients towards diabetes medication, self-care, exercise, dietary and self-care behaviors.

## **CHAPTER II**

### **LITERATURE REVIEW**

Assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand, requires the study of the textbooks and research articles and documents, related research in both domestic and international topics.

#### 2.1 Diabetes Mellitus

##### 2.1.1 Definition of diabetes

##### 2.1.2 Diabetes Mellitus Type II

- Causes and risks

#### 2.2 Self care

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## 2.1 Diabetes mellitus

Diabetes mellitus, often called diabetes, is a condition that makes it hard for the body to control the level of glucose in the blood. This means it is hard for the body to convert food into the energy that the body needs to work. Glucose is the main form of sugar in the body. The pancreas, a long, thin organ located behind the stomach, makes insulin. In most people, the pancreas makes extra insulin when they eat. It is then released into the bloodstream. Insulin helps move glucose that is in the bloodstream to the inside of cells in the body. Glucose is a key source of energy for the body. In a person with diabetes, the pancreas cannot make enough insulin to keep up with the body's demand. So glucose cannot be moved into the cells and used. In some types of diabetes, the body cells resist the insulin. As a result, glucose builds up in the blood. And that leads to a high blood glucose level, called hyperglycemia.

Some 17 million Americans have diabetes, according to the American Diabetic Association, also known as ADA. There are three main types of diabetes.

Editor Krimore (July 2549: 16) has the meaning of diabetes as a symptom of the disorder in the application of sugar in the body. Obtained from the eaten food to energy, which causes diabetes, high blood sugar levels than normal. If uncontrolled blood sugar levels. Will cause high sugar levels and more. And contamination with urine. The urine of patients with diabetes have a sweet taste.

Orawan Bumrung (2550: online), said that the diabetes. A condition in which the body has elevated blood sugar levels than normal. Occurs because the body cannot take your blood sugar from food that is normal. This may be caused by a pancreatic hormone insulin, cannot come out enough, or not at all created. Or create the action of insulin, but not great. These disorders are all caused the body to the sugar is not good. Resulting in blood sugar is left open a lot and was higher than normal (normal in the morning before eating your blood sugar level about 70 -110 mg / dl. And then 2 hours after meal glucose levels less than 140

Urai Sikaew (2538: 123) discusses diabetes As a syndrome with high blood sugar. And the incidence of cardiovascular complications than normal. Due to lack of insulin

and / or effectiveness of insulin reduced if severe it cannot control the situation ketoacidosis.

**2.1.2 Type 2 diabetes mellitus**, more often known as type 2 diabetes, is the most common type of diabetes. Unlike in type 1 diabetes, people with type 2 diabetes may make healthy or even high levels of insulin. But, their body cells do not use insulin effectively. This resistance to insulin is often caused by obesity. Insulin is a hormone that helps control the level of glucose in the blood. Glucose is the main form of sugar in the body. When the body cannot control the level of glucose, it has a hard time converting food into the energy that the body needs to work. There are other forms of diabetes as well.

The pancreas, a long, thin organ located behind the stomach, makes insulin. In healthy people, the pancreas makes extra insulin when a person eats. Insulin moves glucose from the bloodstream into the body cells. The cells use glucose as their main energy source.

In a person with type 2 diabetes, however, even though the pancreas may make enough insulin, the body cells are resistant to the effects of insulin. So they don't receive enough glucose and the blood glucose level rises too high. This causes a condition called hyperglycemia, and it can cause damage to the body, if left untreated.

### **Causes and risks**

Obesity is the main cause of type 2 diabetes in both adults and children. A recent study showed a 33% increase in the number of Americans with type 2 diabetes during the past 8 years. The increase was 70% in people who were 30 to 39 years of age.

Type 2 diabetes accounts for about 90% to 95% of the cases of diabetes in the US. Type 2 diabetes used to be rare in children, but is now diagnosed in 20% of the children who have diabetes. Of the children diagnosed with type 2 diabetes, 85% are obese. At this time, most children diagnosed with type 2 diabetes are 10 years of age or older. Researchers believe there will be an increase in type 2 diabetes in younger children who become obese.

Type 2 diabetes is more common in people with a family history of the disease. It's also more common among African Americans, Hispanic Americans, Pacific Islanders, Asian Americans, and Native Americans.

Other risk factors for the development of type 2 diabetes include:

- Age of 45 or older
- An HDL, the so-called good cholesterol, level equal to or less than 35 mg/dL (milligrams per deciliter)
- High blood pressure, defined as a reading of 140/90 mmHg or higher
- A history of gestational diabetes or of having babies that weighed more than 9 pounds at birth
- Lack of physical activity
- A triglyceride level equal to or more than 250 mg/dL

A recent study of 16,000 American women between the ages of 40 and 65 years showed that diabetes was listed as one of the top six diagnoses. A long-term study is under way to see if menopause and changes in hormone levels are factors in developing type 2 diabetes.

Almost all people who develop type 2 diabetes have a condition called prediabetes first. This condition used to be known as impaired glucose tolerance or impaired fasting glucose, and the ADA estimates that almost 16 million people over the age of 40 have it. This condition occurs when blood glucose levels are higher than healthy levels but too low to be diagnosed as diabetes. Without lifestyle changes, most people who have prediabetes will progress to type 2 diabetes within 10 years.

## 2.2 Self-care

**Self-care theory** – self-care is accepted and received with attention as it play significant role in personal health. Since self-care is about responsibility towards an individual and facing problems towards an individual, family and community which can lead to a reformation of health system according to the Ninth National Economic and Social Development Plan: 2001-2006 (Chachiwant Srikeaw). The plan has launched a self-care policy to promote an appropriate health behavior among populations. Self-care agency, therefore; is promoted among populations not to

depend on medical personnel, but on themselves instead. Currently, numbers of patients with chronic diseases are increasing, therefore; health system is now transformed from nursing to self-care. Additionally, populations have now become aware that medical treatment only cannot provide them a complete healthy life. A healthy life rely on life style, relation between economic and environment of an individual. Additionally, health knowledge can be learned via media, so populations are more aware of their rights to protect their health and life by participating in health care process.

Self-care is consisted of 'care' and 'self', according to the 1982 Royal Institute Dictionary (1995) 'self-care' means paying attention, protecting, administering oneself. Several academicians defined self-care as:

**Pender** (1987) defined self-care as activities that an individual initiates aiming to benefit oneself in living or having a health life. For that reason, self-care is a process to be practiced by an individual and family to take responsibility in developing an efficient self-care. Apart from that, self-care is also implied as any activities a patient performs to reduce numbers of health problems and any processes to benefit oneself in health promotion, prevention and diseases diagnosis and treatment.

**World Health Organization** defined self-care as any health related activities performed by an individual, family, neighbors, colleagues and community who collaboratively bright an idea and make joint decision on health issues including health maintenance, disease diagnosis, disease treatment, medication and after-service performance (Primary health care committee, 1992).

**Chanin Chareonkul** defined self-care as any health related acts and any decision making of an individual, family, neighbor and colleague on health maintenance, disease prevention, self- treatment including self-medication and follow-up after receiving a health service. There is no concrete plan for these types of acts to be followed (Primary health care committee, 1992).

**Somphong Rakpow** defined self-care as performing any positive health care related activities of an individual, family and community. Such performance includes decision making on health issues such as health promotion, disease prevention, and health recovery to a normal condition of normal life after occurrence of illness or disability (Primary health care committee, 1992).

From above-mentioned definitions, self-care is a health related process that people are able to act or behave. Each individual, therefore; choose to perform any activities that are appropriate to oneself according to his/her needs related to health promotion, disease prevention, disease treatment and health recovery.

**Orem**, a consultant and professor on nursing at Catholic university in United States of America was a first person who initiated a self-care concept for nursing. His self-care concept (1985) in general was consisted of two theories: Theory of self-care deficit and Theory of self-care. These theories have been still used and improved for the current health system. Additionally, his theories are in parallel with one concept of a current health system enabling populations to rely on themselves (Somchit Hanuchareonkul, 1997) as described in the following chart (Orem, 1985).

Orem in 1985 defined self-care as a performance that an individual initiates and acts to keep healthy life and happiness of oneself. Therefore, self-care must be performed at either normal or illness time. Self-care is considered a deliberate action and its objectives are:

- 1) to foster a life related process as well as to promote a normal functioning of body
- 2) to maintain a life growth and improve it to normal level
- 3) to prevent a negative change on health and to relieve symptoms of disease
- 4) to prevent from a disability that may happen or compensate for a disability that have already happened
- 5) to promote a health life being

### **Self-care theory by Orem**

Self-care concept is about deliberate and target behaviors that can be divided into two stages as follows:

Stage 1 – it is a stage of considering and making decision that will lead to an action. An individual who can take a good self-care of oneself must be prepared with knowledge about oneself and an enabling environment to help them decide to perform any most appropriate behaviors that can result in a required healthy condition. Therefore, to perform a self-care, knowledge regarding internal and external circumstances that can help an individual to observe and decide is required. ‘Observe’

is referred as to perceive about association between circumstance and behaviors that will perform, so each individual can decide whether what behaviors they should perform.

Stage 2 it is a stage of performing a self-care behavior. Such self-care behaviors must be performed with full attention and along use of beneficial resource/environment.

Few points including correctness of self-care, efficacy of self-care, period of self-care, other supports for self-care of oneself should be considered and decided to perform at this stage (Somchit Hanuchareonkul, 1999:24).

Self-care leading a healthy condition is called 'Therapeutic self-care', its positive results are explained below:

- 1) Maintain life being, health and body's functioning to a normal level
- 2) Promote a growth and development of adulthood
- 3) Prevent, control and cure of disease and injury
- 4) Prevent or compensate for disability
- 5) Promote ability and happiness of an individual

Self-care demand is defined as all types of self-care activities that an individual should perform in a period of time. This self-care demand is consisted of three self-care requisites as follows

1). Universal self-care requisites is a self-care to promote and maintain a healthy condition of an individual. Such self-care is necessary for everyone at all age, but it must be adjusted appropriate to respond to each individual at different age. Those necessary self-care are:

) 1.1 to consume enough food, water, air for body to function normally and to change internally and externally

1.2 to maintain durability of structure and functioning of related organs

1.3 to enjoy from breathing, drinking and eating without having

disadvantages

2) Maintaining a normal excretory system

2.1 to manage oneself and environment that can enable a excretory system



2.2 to manage a excretory system including maintaining a normal structure and functioning and vanishing sewerage 's waste from excretion

1.2.3) to look after of environment to be sanitized

3) Maintaining a balance between performing activities and taking a rest

3.1 to choose appropriate activities that respond to a movement/exercise of body, emotional and intellectual needs and interaction with others

3.2 to perceive and pay attention on resting and exercise of oneself

3.3 to employ ability, interest, value and traditional regulations to develop a pattern of resting and performing activities of oneself

3.4 Maintaining a balance of time for personal matter and interaction with others

4) to maintain a quality and balance that can be necessary for making friendship with others. This is to facilitate oneself to function properly by seeking support from networks when needed

4.1 to perform any behaviors in making a good relationship, giving love and fondness with surrounding people for interdependence

4.2 to promote 'yourself' and group belonging

4.3 to prevent any hazards towards life, body functioning and welfare

4.4 to pay attention and perceive about types of hazards that my happen

4.5 to prevent from any harmful circumstance

4.6 to avoid or protect oneself from any hazards

4.7 to control or eradicate any circumstances that may be harmful to life and welfare

5. Promoting body functioning and development to reach a highest position of its level under social system and self-ability

5.1 to develop and maintain self-concept

5.2 to perform any activities promoting a development of oneself

5.3 to perform any activities promoting and maintain a structure and body functioning of oneself

5.4 to search and pay attention for any dysfunctions of structure and body functioning

6. Developmental self – care requisites is a self-care developed through life development at different stages such as pregnancy, delivery, growth into different age of life and any circumstance that may be harmful and obstacle to life such as loss in life partner or father and mother. Necessary self-care are divided into two types:

6.1 Develop and maintain a life being that facilitate a life process and growth development into different age starting from pregnancy, delivery, infant, baby, childhood, adulthood and old age

6.2. Prevent any disadvantages that may be harmful to development by easing stress or overcoming any affects caused by lack of education such as social adjustment, loss in cousins, illness, disability, final stage of illness and death

As above, developmental self-care is very important matter in the current society where its structure and economic is changed rapidly. Therefore, self-care is essential for young people to prevent from drug or sexual abuse. In addition, such self-care also enables young people going through older life properly in order to maintain a healthy condition and self-value.

6.3 Health deviation self–care requisites is a self-care developed from congenital disability (abnormal and body dysfunction) such as illness caused by diagnosis and treatment. The necessary self-care is:

6.3.1 to seek for support from trustable person such as health official

6.3.2 to perceive, pay attention and monitor effects of sickness including influence on self-development

6.3.3 to perform any behaviors following treatment, diagnosis and recovery plans and to prevent any complications efficiently

6.3.4 to perceive, pay attention, care and prevent any unwell condition that may be caused from treatment or disease

6.3.5 to adjust oneself to fit in changes that may happen from illness and to maintain a good self-concept and image of oneself such as adjusting roles of oneself to be appropriate in self-development and to interact with others

6.3.6 to learn to live with a effects of sickness including diagnosis and treatment in a way of promoting a best self-development according to ability of oneself. To perform this type of self-care, an individual must be able to integrate several self-care needs together to manage an entire self-care system aiming

prevention from any obstacles or relieving effects arisen from sickness and self-care deficit as explained in the table 1

**Table 1. Conceptual framework on self-care by Orem**

<b>Conceptual framework on self-care by Orem</b>		
<b>Self-care demands</b>	<b>Self-care demands</b>	<b>Self-care demands</b>
<b>In general</b>	<b>According to development</b>	<b>According to health deviation</b>
<ul style="list-style-type: none"> <li>* Air, water, food</li> <li>* Performing activities and resting</li> <li>* Privacy and social ability</li> <li>* Life and health protection from any hazards</li> <li>* Living happily and normally</li> </ul>	<ul style="list-style-type: none"> <li>* Maintain any conditions supporting a life process at different age</li> <li>* Promote a developmental process and maturity at different stage of development</li> <li>* Prevent any hazards or complications that may arise from social development related problems of each individual such as uneducated or delinquent, poor persons.</li> </ul>	<ul style="list-style-type: none"> <li>* Seek for an appropriate treatment</li> <li>* Become aware of effects of illness towards life and body</li> <li>* Efficiently perform actions according to a doctor</li> <li>* Become aware and self-care in preventing from complications correctly</li> <li>* Adjust self-concept to live and accept such disease</li> <li>* Able to live according to limitation of illness and manage treatment</li> </ul>

Source: Supawan Manosunthorn (1999: 106)

To promote health and prevent from a disease, an individual must perform any activities to respond to a self-care requisite in general and to the developmental stages of life and whenever illness is found. At the same time, an individual must be able to adjust forms of self-care requisites in general and to the developmental stages of life to be in line with sickness. This adjustment can facilitate a good maintenance of normal body function and structure and promote a development and body recovery.

7. Self – care agency is about strength of an individual to perform self-care (Orem, 1985:129). Besides, such strength can be adjusted according to different circumstances. It is a performance conducted based on a concrete theory that can be explained and understood. In addition to that, such performance can lead a skill in performing activities. Self-care agency can be divided into three levels (Somchit Hanuchareonkul, 1997: 31 -36)

**8.** Capabilities for self – care operations is a necessary ability for an immediate self-care which consists of three components:

8.1 Estimation – ability to examine circumstance and component of oneself and environment that can be important for self-care as well as needs in adjusting self-care.

8.2 Transitional – ability to make a decision about behaviors that should be performed to respond to self-care demand.

8.3 Production operation – ability to perform any activities to respond to self-care demand

**9.**Ten power components is a middle portion that links between human perception and behaviors, but particular on deliberate behavior aiming for self-care. Ten power components are (Orem. 1985:37 – 71

9.1The ability to maintain attention, self-care as self-care agent and internal and external factors affecting self-care.

9.2 The ability to control physical energy to be sufficient for initialization and performance of self-care continuously.

9.3 The ability to control parts of body for essential movement in initiating or performing self-care continuously and successfully.

9.4 The ability to reason for self-care

9.5 Motivation to perform self-care in order to accomplish set goal in accord with

its characteristic and meaning for life, health and well-being.

9.6 Skills in making decision about self-care and put this decision into action.

9.7 The ability to acquire knowledge about self-care from appropriate and reliable sources, to memorize it and to put it into action

9.8. Skills in thinking cognitively and perceptually, in managing, operating, communicating, and building a relationship with others for self-care performance.

9.9. The ability to manage self-care system

9.10. The ability to perform self-care continuously and to integrate them into a major part of lifestyle.

**10.** Foundational capabilities and dispositions is ability necessary for human to perceive and perform deliberate action, the following components are consisted of foundational capabilities and dispositions.

10.1 Knowing and ability in doing both physically and psychologicemotional perception and memorization

10.2 Qualification and factors having an influence on searching a goal of action, fundamental ability and qualification are described below:

: Ability and skills in learning such as memory, reading, writing, counting and in indentifying about cause and its effects

: Sensation for seeing, hearing, smelling and tasting

: Perception on any circumstances both internal and external of oneself

: Awareness of self-value

: Habit

: Determination

: Self-understanding

: Self-concern

: Self-acceptance

: Prioritize and time management for performing activities

: Management ability

If an individual lack of above fundamental capabilities and qualifications, it will cause them lacking abilities in performing deliberate actions and not being able to develop an ability to respond to self-care demand. This means that they will lack of strength in self-care (Somchit Hanuchareonkul, 1997: 33).

**11.** Association between fundamental factors and self-care of diabetic patients is a unique factor influencing towards all self-care agent and demand. Such association is not related to each other in a way of cause and effect, but it is explained that to consider about self-care agent and demands must be jointly done with the following factors (Orem. 1985: 203).

- 1) Age
- 2) Sex
- 3) Developmental stage
- 4) Traditional culture
- 5) Living condition
- 6) Family
- 7) Lifestyle
- 8) Health condition
- 9) Factors relating to health system management
- 10) Beneficial resource
- 11) Importance life's experience

Self-care is a normal action that human must learn by interacting with others and must perform deliberately. Generally, self-care may not vary upon age, sex developmental condition of each individual. Therefore, to evaluate above-mentioned factors can enable an individual to aware of their self-care agent and demand.

**12.** Level of self-care, according to health condition it can be divided into four levels as follows (Mukda Samnuanglang, 1991: 23-36).

1) Self-care – is performed in a period of having normal health condition to promote a health focusing a self-care in daily life and to prevent from sickness.

2) Self-care – is performed in a period of having risky state towards health leading a sickness. An individual with risky state is defined as a person who lives in a condition or environment easily causing any diseases such as a person with beginning

stages of illness, chronic disease, disability, final stage of illness. This also includes a person living in non-hygiene environment.

3) Self-care – is performed in a period of having insignificant illness. It is a period that an individual evaluate oneself as having indications/signs of illness. If they do not perform self-care, such indication may lead a symptoms/severe disease. However, at this period, there is no diagnosis by conventional medicine involved.

4) Self-care – is performed in a period of having chronic illness or final stage of illness. Such illness is indicated as having an obvious symptom or indication of illness that an individual cannot perform self-care for oneself. At this period, diagnosis by conventional medicine is involved.

### **Self-care of diabetic patient**

Diabetes mellitus is a chronic disease that has a significant effect on physical, mental, and emotional, social, and economic status as well as roles in family of diabetic patients. Therefore, self-care among these patients is necessary to reduce a burden towards family and society as well as increase self-value of patients to live happily. Several self-care essential for diabetic patients are:

- 1) Enable patients to perform activities for life being
- 2) Control and prevent disease complications
- 3) Facilitate patients to face a problem caused by diabetes mellitus by themselves

As a result, enabling patients to become full-responsible towards their diabetes mellitus is a key of treatment. This is to support diabetic patients to live happily in the society, although they are ill with diabetes mellitus. Self-care of diabetic patients is to prevent complications that can cause a death to life.

## **2.3 Knowledge**

Knowledge related to self-care of feet of diabetic type two patients foot self-examination.

1. Provision of variety types of foot related knowledge

Diabetic patients should take a special care of their feet as following examples and must be cautious of wound prevention or inflammation that may cause a severely rotten feet and toe and leg amputation:

**:Clean feet** with water and soap and dry it, especially on the covered areas of feet, but do not rub it strongly.

**:Toe nails** should always be **cut straight** across and not *cut* into the corners. Do not **cut** the **nail** beyond the edge of the **nail** groove.

:Do not walk with bare feet while going outside or stepping on dirty floor. Be careful of stepping on sharp objects, prickles, or hot object (such as hot coal) as it may cause rotten wound.

:If wart occurs, do not remove it yourself, but should seek helps from a doctor

: If vesicles, wound or feet inflammation occurs, should seek helps from a doctor. Do not use needle to pick it off (vesicles) or use thijeriodine or hydrogenperdoxle, but should wash it with water and soap and cover it with sterilized bandage and soft-plaster (like microspore). Do not cover it with general plaster.

:If numbness is found in feet, should see a doctor immediately. Since, it may be caused by damaged or constricted peripheral nerve and peripheral blood vessel.

:Foot skin must not be colored or green. Hard skin should not be allowed to occur at feet as it may cause a foot wound later.

:Appropriate shoes should be soft, proper for walking inside and outside the house and right-fit the feet. Shoes should be made of corium and should not be too tight to wear as blood cannot flow through properly. If feet get numb, diabetic patients should wear dress-shoes 1-2 hours a day until getting use to it, and later it should be wear regularly.

:Choosing food to eat and to avoid



## 2.4 Behavior

Behavior patterns affecting diabetic patients, family and health condition of diabetic patients.

In 1987, Pender studied and found the following three factors that influence individual to perform continuous health promotion activities and turn those activities into their lifestyle are:

1. Cognitive perceptual factors – such as importance of health, perception of self-capacity, definition of health, health awareness, perception of advantages of health promotion, perception of obstacles that may be occurred.

2. Modifying factors – such as demographic factors, biological factors, and influence among individual, situation and behaviors.

3. Cue to action

In 1996, Pender developed health promoting behavior forms by adding some factors and regrouping them according to principle agreement of health promotion as follows:

1. Individual attempts to adjust lifestyle to be convenient for themselves to survive with a perfect healthy.

2. Individual has capacity to be aware of self-perception including capacity in self-evaluation.

3. Individual perceives value of development in positive ways and try to adjust themselves to balance changing and certain statuses.

4. Individual has ability to control self-behaviors.

5. Individual comprises of bio-organic and society being communicated with environment all the time. Therefore, individual always adjust themselves to fit in the environment and adjust environment to fit in them.

6. Individual in a health team is a part of environment including adjustment in environment into a relationship form between individual's influences towards individual for a whole life.

Malee Chamvijitraveth (2006) studied and found that behaviors in prevention and control of disease are low and the least area of behaviors is about food consumption. Such low prevention and control is major cause of foot complications.

Somsak Kaethanyamongkol and a team (1997) revealed that factor influencing behaviors in controlling glucose level is 'being equipped with good knowledge, but not be able to control glucose level' at significance level (p-value=0.02).

## **2.5 Attitude**

These different definitions can be seen that there is a common key.

1. Feelings.

2. With a tendency to behave in any way. Therefore, it can be concluded that the attitude is the relationship between feelings and beliefs overlap or know the person. With the potential to be. Interactive behavior. In any way towards the goal of such attitudes.

In summary, the attitude that this is a matter of mental attitude to emotions. And inclination of the individual. With information. And exposure. Filter the results obtained, which is both positive and negative attitudes affect the behavior it is evident that the attitude of thinking that influences mood. And feel it. Out the behavioral components of attitudes from the meaning of the attitude of the Simba Property and A. B. Sen (Zimbardo and Ebbesen, 1970, referred to in Pornthip I Nipat, 2531: 49) can be a component of attitudes has three aspects. is.

0. Elements of knowledge (The Cognitive Component) is a person's beliefs. With

respect to any material that is both like and dislike, if the person has knowledge. Or what is often a good attitude towards it. If there is to know first what is not good to have a bad attitude towards it.

0. An element of feeling (The Affective Component) is associated with mood-related materials, which vary according to your personality that is characterized by the values of the individual.

0. The behavior (The Behavioral Component) is an expression of what one person. Or a person. That result from Elements of knowledge, ideas and feelings can be seen. The attitude towards anything different. Because of. I have a feeling a person has a different idea itself.

As part of the idea or knowledge that it represents a fundamental component of this component is related to attitudes and feelings of individuals. May come in different forms, both positive and negative, depending on experience and learning.

### **The attitude (Attitude Formation).**

Gordon, dual port (Gordon Allport, 1975) has attitudes that may be caused by something as follows.

0. Of learning. Newborn child will be trained to teach about the culture and traditions of their parents. Both directly and indirectly through the actions of parents have seen it. Received the next.

0. The ability to distinguish what is a very bad example to young adults will have been done differently.

0. The experience of the individual. These differences, as some people have bad attitudes towards their teachers, because I used to criticize, but few people have the same positive attitude towards teachers. I always used to fondle her.

0. Of imitating or adopting the attitude of others as their own, such child may be the attitude of parents or teachers they admire the attitude of their TV channel and Rutherford Ranch Field (Krech. and Crutchfield, 1948) has commented that the attitude may be caused.

0. To meet the needs of individuals, that is, what their needs are. He has a good attitude towards it. If anything, their needs are not that person has a bad attitude towards it.

0. To learn the truth as I could by reading or hearsay by others, so some people may have a bad attitude toward others. To listen to anyone tell them <sup>Ti</sup>in time.

0. Being a member. Or under one of the groups. Most people agree that the attitude of the group is their attitude if they do not conflict with their attitudes, too.

0 . Attitude, a vital part of the personality of a person with a personality who is often far more optimistic. The most difficult attitude adjustment, the opposite is often seen as someone with heartburn. Or other evil to it.

□ Prapa Pen Gold (2520: 64 - 65) mentioned that the attitude is the attitude of learning (Learning) from a point source (Source of Attitude) and at abundant. And attitudes of the people are important.

□ 1 . Experience only (Specific Experience) when an individual has some experiences in a way that anything good or bad. Attitude that will make him a good or bad in a way that will cause attitude in the direction that he had ever experienced before.

2. The communication of others. (Communication from others) will be positive news from the recognition of others, such as children being taught the attitudes of adults to act as it was recognized that different.

3. What a role model (Models) to imitate the attitudes of others and respect as children obey their parents. I like to imitate the show. Or do not like what one of them.

4. Relevant to the institution. (Institutional Factors) due to the attitude many people associated with institutions such as families, schools or departments, etc.

Santi Chai Wong, 2539: 166-167) noted that attitude formation occurs. And change. It is due to several factors.

1. Incentive Physical (Biological Motivation) attitude occurs when a particular person. Are working to meet demand. Or physical force. Individuals to create positive attitudes towards people or objects. That can help them to meet their needs.

2. Information. (Information) attitude is based on the type and size of messages received, as well as the source of information on the mechanism of selective vision and understanding of issues (Selective Perception) information part. Into that person. To make them keep going and build up a positive attitude.

3. Get involved with a group (Group Affiliation), some attitudes may come from different groups. The individuals involved in both direct and indirect, such as the family temple of colleagues, groups, and sports groups and other groups are not the only source of value differences, but also to convey information to individuals. group This attitude makes it possible to build up a family and colleagues. Is the most important (Primary Group) is the source of the attitude of the individual.

4. Experience (Experience) people's experiences with objects. It is important to hit the other person what he has. Experience into an attitude.

5. Gestures (Personality), many gestures are an indirect role in creating a positive attitude to the person.

Factors in the formation of attitudes, as mentioned above. In fact It is not the sort of attention in any way at all. Because of these factors, each of which will be critical to the formation of attitudes, more or less, but they'll also build a positive attitude towards such things. Which factors are associated with most

### **Type of attitude.**

People can point out three different types.

1. Attitude, positive attitude, induced a person to express feelings or emotions of the mind. The stories are good for one person or any one story. Including organizations, institutions and operations of other organizations such as the farmers have a positive attitude or a feeling of good agricultural cooperatives. And the cooperation with to become a member. And engage in activities regularly and so on.

2. The attitude is negative or bad attitude in a way that creates a sense of deterioration. Can not be trusted, or trust may have a suspicion suspi1.2 Facts about diabetes

3. The third type is the type of attitude that people do not comment on the story or cion. As well as hatred towards any one person, one story or problems. Organizations or agencies, institutions, and the operation of the Organization and other authorities, such as some people may have a negative attitude to the company. Causing the bias. In his mind he tried to behave and act against. We are always rules, problems to the person or agency, institution, organization, and so completely, as some students may have a passive attitude, no opinion.

A controversial issue. The regulations. The uniforms of the students.

The third person perspective, this might be the sole or several time. Depending on the security perceptions, beliefs, values, or other personal items, actions or situations.

Daniel Katz of Daniel (Daniel Katz, 1960: 163 - 191) describes the mechanism of the attitude of duty or at the following four reasons.

1. To apply for adjustment (Adjustment) means the person everyone is taking a positive attitude. For adjusting their behavior to be in a way that will bring benefits to their highest. And to have minimal negative effect on the attitude to be a mechanism to reflect the desirable and undesirable for them. And with these things yourself.

That the trend of behavior in a way that is most desirable.

2. To defend themselves (Ego - Defensive), usually in a while. People often tend not to accept the truth. In a manner inconsistent with their thoughts (Self - Image) can be reflected into the attitudes. Mechanisms that prevent the expression of feelings.

Cynical tin gossip or someone else. And at the same time. I will rise higher than with the attitude that they are superior to others.

The formation was the attitude in this manner will look different from the attitude as a tool to adjust the already mentioned above, the attitudes are not developed from the experience with them. directly if it's something that happens from within the person itself. And what it is. The goal of the attitudes expressed, it is just what he is. I just

used to. Drainage was only

3. To show the meaning of the values (Value Expressive) attitude is part of the values are different, and this attitude is to be used for reflecting the values are different in terms of specificity even more so the attitude. can be used to amplify and express the values are different.

4. Is organized knowledge (Knowledge) is the standard attitude is that the person will be assessed. And understand the environment around him. With such a mechanism. That a person can know. And understand the system. And regulations of the things that are around him.

### **Changes in attitude (Attitude Change).**

Hershey's Rich intimate Clemente Man (Herbert C. Kelman, Compliance, 1967: 469) describes the change in attitude by the belief that the same attitude. May occur in individuals with different ways. Herbert's idea of Spirit is divided into three main process of changing attitudes.

#### 1. Consent (Compliance).

Consent is when. People accept what has influenced him. And is intended to gain sympathy from people or groups that influence them. The actions according to what I want him to do it. Not because people disagree with that. But because he expected to receive awards or recognition from others to see and act upon the satisfaction received from the settlement, according to the result of influence or social influences that cause. birth. Recognition that they dealt with that by now. Changing attitudes is a process which will allow a person to act as the driving force behind more or less. Depending on the number or the intensity of reward and punishment.

#### 2.Emulators(Identification).

Imitation occurs when the stimuli. Or stimuli. This recognition is a result of that a person needs a good relationship. Between themselves or with others. Or others. Imitation of a person's attitude will change more or less depending on the stimuli to be imitated, said that imitation is the driving force behind the process of changing attitudes. Achieve this change. Is more or less depending on their persuasion of the individual stimuli. Imitation depends on the power (Power) of the message people will take the role of others as their own. The role of mutual exchange. People will believe what it imitates, but does not include the content and details on how to imitate a person's attitude will change dramatically. Or less dependent. Stimuli that cause. Changes.

#### 3.Need to /be replaced. (Internalization). Process.

That occurs when a person accepts the influence over the values which meet the requirements of his behavior changed. This is consistent with the values that the person is satisfied that it is up to. Content details. Such changes of behavior that the thoughts, feelings and behaviors that are affected. Be in any level. Will affect the total change of attitude.

## **2.6 Research**

This research is to study about some factors influencing a preventive self-care of foot wound among diabetic type two patients in Meuang District, Roi-Et, Roi-Et province. The researcher's expectation about factors influencing a preventive self-care of foot wound can be described in the following Thai and international researches.

### **2.6.1 International researches**

Lukkarinen and others in 1997 (pp.259-304) conducted a study on self-care and related factors among 250 cardiovascular patients, it was revealed that:

2.6.1. Evaluation on health promotion and decision making of the patients are associated with knowledge, motivation and physical factors.

2.6.2. Most important thing for self-care is self-satisfaction and self-motivation.

2.6.3. Related factors to self-care of the patients are age, gender, social status, an income, health behavior such as smoking, alcohol drinking and sickness such as diabetes mellitus. However, sexual satisfaction is less related to.

Sehaefer and others in 1986 (p.185) studied a relationship of receiving and not receiving a support from a family of diabetic patient under an education plan and disease control among 54 insulin-dependent diabetic patients. 19 of them were aged below 19 years. From the study, it was indicated that young diabetic patient with an unenthusiastic relationship in a family did not have a good control of blood glucose level. Likewise, for the adult who did not receive a family support could not completely follow a treatment plan and could not well-control a blood glucose level.

Muhlenkamp and Sayles in 1988 (pp.333-334) found that a social support can result in a good self-care leading a healthy life. It was explained that there was a relationship among perception on social support, self-value and self-care practice of 98 adults residing in a apartment.



### 2.6.2 Thai researches

Bussara Kernpeangpracha (2534) studied on concept of DM framework and life situation of a diabetic patient by conducting 20 in-dept interviews along with observation during a home visit with diabetic patients. It was revealed that all diabetic patients had a DM framework concept based on the current conventional medicine, however; only few patients could follow self-care practices prescribed by a doctor's suggestion. For those who could not follow the doctor's suggestion, they had a server symptoms and economic issue by not being able to feed his/her family at the same time. In addition, they did not have a spouse to take care. While those who could follow the doctor's suggestion, they had an opposite conditions from the above group. Besides, obstacle towards self-care of diabetic patients was low socio-economic background. In addition, if they were not supported by a family, especially from a spouse when illness is occurred, a diabetic patient had to choose between valuing an illness or other demands existing in life.

Wanida Chuklin (1991:76-82) studied on an effect of a health counseli towards a Sel f-care ability of diabetic patients in Rajavithi hospital. A purposive sampling was used to recruit 70 samples and divided them half into two groups: experimental and control group. The interview questionnaire and a disease control form were used. Dependent and independent T-test was used to analyze the data. The results showed that after the experiment; mean of knowledge and DM practice of two groups had difference in mean value at significance level of .01. In addition, a group control showed a better result in mean with statistical difference in mean value at level of 0.1.

Kanchana Prasarnpran (1992:65) studied a relationship between self-care agency and self-care behaviors on dietary among 100 diabetic patients by using interview questionnaires. It was found that self-care agency showed a positive relationship with self-care behaviors on dietary at a significance level of .001. Although basic factors of samples were different (sex, age, education level, marital status, monthly household's income and period of suffering from disease), but they all have the same level of self-care behaviors on dietary.

Pathumpan Manoekulanan (1990) studied on self-care behaviors of diabetic patients by use of in-dept interview and participatory observation at home. It was found that health related motivation, belief towards medical diagnosis and social

support from family members were considered factors determining self-care behaviors on dietary and medication. Female diabetic patients could perform a better practice on strictly reducing sweet consumption and continuous and correctly taking medicine rather than male. For an exercise, it was shown that both male and female did not do any exercise, except working out as part of their occupations only. This was due to lack of awareness on exercise that can promote a prevention of DM complications.

Pornpit Chevikumnuan (1992:62) found that sex was relevant to blood glucose level. Blood glucose level of male was lower than female with statistically significance difference. Diabetic patients who had a spouse and daily disturbance would have a social support rather than those who did have with statistically significance difference. In addition, a positive relationship with statistically significance difference between social support and monthly household's income was found. Moreover, daily disturbance, social support and age were variables to forecast health condition of diabetic patients with statistically significance difference, while sex could anticipate level of blood glucose.

Duanthip Siriwongwilachat (1993:101-108) studied on a relationship between image acceptance and self-care behavior among leukemia patients who were treated with chemo therapy at Rajavithi and Pramongkulkhao hospitals. From the study, it was revealed that education level, age, sex, monthly household's income, period of suffering from DM were associated with self-care behaviors of these leukemia patients.

Pakamas Ngampraditkul (1993:96-109) studied on influencing factors towards control of blood glucose level of 250 non-insulin dependent diabetic patients. It was found that social support from an external source, DM knowledge and an exercise were associated with control of blood glucose level. Dietary and medication among those controlling blood glucose level had statistical difference in mean value at significance level ( $P < .001$  and  $< .002$ ) rather than those who did not control blood glucose level. For other factors including sex, age, education level, marital status, occurrence of complications did not show any relationship with the control of disease.

Rattanaporn Siriwatchaiporn (1993:44) studied on an association between basic factors and perception of self-efficacy in self-care of 200 non-insulin dependent

diabetic patients. The study presented that male diabetic patients were aware of their self-care agency better than female diabetic patients. In addition, diabetic patients with higher education level would have a better perception of self-efficacy in self-care. Moreover, difference of suffering period from DM, difference on perception of self-efficacy in self-care.

Jeeranut Somchok (1997:72) studied on a quality of life of elderly diabetic patients. The study found that those whose marital status was married had a good quality of life, on the other hand; those with widowed, divorced and separated status had a poor quality of life.

Sopapan Wimolrat (1994:264-265) studied on health condition of elders in elderly club, Samut Sakhon province. The study showed that elders with marital status who lived with a spouse had a better health condition than elders with single, widow, divorce or separate statuses with statistic significance difference at level of 0.05.

From the above-mentioned Thai and international researches, the researcher found that there are many researchers studying on self-care behavior of diabetic patients. However, a study on some factors influencing preventive self-care of foot wound of diabetic type two patients in Meuang District, Roi-Et, Roi-Et province has never been conducted before. In addition to that, as long experience on public health of the researcher, therefore; the research has paid attention on factors influencing preventive self-care of diabetic patients in Meuang District, Roi-Et, Roi-Et province. Several variables were analyzed including sex, age, occupation, education level, family status and DM knowledge, DM attitude, history of diabetic wound. Such research result can be utilized to develop an approachable health education plan in Meuang District, Roi-Et, Roi-Et province.

## **2.7 DM foot**

### **2.7.1 Definition**

An ulcer is defined as a breakdown in the skin that may extend to involve the subcutaneous tissue or even to the level of muscle or bone. These lesions are common, particularly on the lower extremities. Leg and foot ulcers have many causes that may further define their character.

In 1995, WHO defined 'Diabetic foot' as a group of symptoms caused by degeneration of peripheral nerve, peripheral arterial diseases, and infection which cause a foot wound and lead to foot dysfunction or lower extremity amputation. Generally, when speaking of foot problems always include all types of foot problems of diabetic patients. Therefore, foot wound is a cause for diabetic patients to see a doctor and be admitted in the hospital. Thus, preventive self-care of feet among diabetic patients is very important to reduce a wound foot and foot amputation.

A multicenter study attributed 63% of diabetic foot ulcers to the critical triad of deformity (Reiber et al.,1999).

Many of risk factors for foot ulcer are also predisposing factors for amputation, because ulcers are primary causes leading to amputation (Pecoraro et al.,et al;1999)

**Diabetic wound care** – means caring a foot wound with intense infection caused by hyperglycemia. Diabetic patients should first clean a wound, see a specialist, taking penicillin and perform self-care behaviors correctly. Nails should be cut **straight** across and not too deep as it can easily cause a wound. Corner areas of nails should not be picked out. In the past, about 14,000 diabetic patients had foot amputation each year and in 2010 numbers of diabetic patients with foot amputation will be increased up to 30,000 in Thailand. Foot amputation is not a safety treatment, because about 3-7% among those with foot amputation died. Thus, prevention of occurrence of wound is most important.

### **2.7.2 Prevalence**

The prevalence of leg ulceration is approximately 1% to 2%, and is slightly higher in the older adult population. Venous ulcers are the most common form of leg ulcers, accounting for almost 80% of all lower extremity ulcerations. Peak prevalence is between 60 and 80 years. Approximately one third of patients with chronic venous insufficiency will develop venous ulceration before the age of 40 years. In addition, venous ulcers may have a prolonged duration and are associated with a high rate of recurrence, which contributes to their prevalence. Ulcerations associated with diabetes are the most common.

Ulcerations associated with diabetes are the most common cause of foot ulcers. Most of these ulcers are a direct result of loss of sensation secondary to peripheral neuropathy.

Approximately 15% of persons with diabetes will develop foot ulceration during their lifetime. Lower extremity amputations in the United States are preceded by a foot ulcer.

Approximately 15% of persons with diabetes will develop foot ulceration during their lifetime. Most lower extremity amputations in the United States are preceded by a foot ulcer.

Arterial ulcers account for 10% to 20% of lower extremity ulcerations. Other causes of lower extremity ulceration are uncommon. Many ulcers may be of mixed cause, with two or more contributing factors leading to ulceration present in the same patient. We focus on the most common causes of ulceration.

Foot ulcers are a significant complication of diabetes mellitus and often precede lower-extremity amputation. The most frequent underlying etiologies are neuropathy, trauma, deformity, high plantar pressures, and peripheral arterial disease. Thorough and systematic evaluation and categorization of foot ulcers help guide appropriate treatment. The Wagner and University of Texas systems are the ones most frequently used for classification of foot ulcers, and the stage is indicative of prognosis. Pressure relief using total contact casts, removable cast walkers, or “half shoes” is the mainstay of initial treatment. Sharp debridement and management of underlying infection and ischemia are also critical in the care of foot ulcers. Prompt and aggressive treatment of diabetic foot ulcers can often prevent exacerbation of the problem and eliminate the potential for amputation. The aim of therapy should be early intervention to allow

Healing of the lesion and prevent recurrence once it is healed. Multidisciplinary management programs that focus on prevention, education, regular foot examinations, aggressive intervention, and optimal use of therapeutic footwear have demonstrated significant reductions in the incidence of lower-extremity amputations.

Foot disorders such as ulceration, infection, and gangrene are the leading causes of hospitalization in patients with diabetes mellitus. Approximately 15 to 20 percent of the estimated 16 million persons in the United States with diabetes mellitus will be hospitalized with a foot complication at some time during the course of their disease. Unfortunately, many of these patients will require amputation within the foot or above the ankle as a consequence of severe infection or peripheral ischemia. Neuropathy is often a predisposing factor to ulceration and amputation.

The diabetic foot and its sequelae account for billions of dollars in direct medical expenditures, as well as lengthy hospital stays and periods of disability. The most characteristic lesion of the diabetic foot is a mal perforans ulceration, which consequently is one of the major risk factors for amputation. Approximately 85 percent of all diabetes-related lower-extremity amputations are preceded by foot ulcers.

### 2.7.3 Risk factors

Patients who have had a previous foot ulcer are more likely to have future foot complications. Nerve damage, poor circulation, and chronically high blood sugar levels also increase the likelihood of foot complications.

It is important to wear shoes that fit well. Shoes that are too tight can cause pressure ulcers. Going barefoot, even in the home, should be avoided as this increases the risk of injury to the foot.

### 2.7.4 Possible foot problems

**Poor circulation** — Some simple clues can point to circulatory problems. Poor pulses, cold feet, thin or blue skin, and lack of hair signal that the feet are not getting enough blood.

Peripheral arterial occlusive disease is four times more prevalent in diabetics than in nondiabetics (Kannel&McGee,1979).The arterial occlusion typically involves the tibial and peroneal arteries but spares the dorsal is pedis artery (LoGerfo &Coffman,1984).Smoking hypertension and hyperlipidemia commonly contribute to the increased prevalence of peripheral arterial occlusive disease in diabetics(Kannel& McGee,1985;Lee et al.,1993).

The presence of lower extremity ischemia is suggested by a combination of clinical signs and symptoms plus abnormal result on noninvasive vascular tests. Signs and symptoms may include claudication,pain occurring in the arch or forefoot at rest or during the night, absent posterior or posterior tibial pulses, thinned or shiny skin, absence of hair on the lower leg and foot, thickened nail, redness of the affected area when the legs are dependent, or “daggled” and pallor when the foot is elevated(Armstrong& Lavery,1998).

Noninvasive vascular tests include transcutaneous oxygen measurement (Apelqvist et al.,1989;Orchard &Strandness,1993).The ankle-brachial index (ABI) is a noninvasive test that can be performed easily in the office using a handheld Doppler device. A blood pressure cuff is placed on the upper arm and inflated until no brachial pulse is detected by the Doppler device. The cuff is then slowly deflated until a Doppler - detected pulse returns(the systolic pressure).This maneuver is repeated on the leg, with the cuff wrapped around the distal calf and the Doppler device placed over the dorsal is pedis or posterior tibial artery. The ankle systolic pressure divided by the brachial systolic pressure give the ABI (Apelqvist et al.,1989;Bacharach et al.,1992;Orchard et al.,1993).

The sensitivity and specificity of noninvasive vascular test are a matter of some controversy. The noninvasive test have been faulted for underestimating the severity of arterial insufficiency. If lower extremity ischemia is strongly suspected arteriography or some other imaging study should be performed to confirm or rule out ischemia(Caputo et al.,1994).

Optimal ulcer healing requires adequate tissue perfusion.Thus,arterial insufficiency should be suspected if an ulcer fail to heal. Vascular surgery consultation and possible revascularization should be considered when clinical signs of ischemia are present in the lower extremity of a diabetic patient and the results of noninvasive vascular test or imaging studies suggest that the patient has peripheral arterial occlusive disease(Armstrong& Lavery,1998).

Proper control of concomitant hypertension or hyperlipidemia ca help to reduce the risk of peripheral arterial occlusive disease .Smoking cessation is essential for prevention the progression of occlusive disease. The nylon monofilament test is a simply performed office test for diagnosis patients at risk for ulcers due to peripheral sensory neuropathy(Armstrong& Lavery,1998).

**Nerve damage** — Nerve damage may lead to unusual sensations in the feet and legs, including pain, burning, numbness, tingling, and fatigue. Patients should describe these symptoms if they occur, including the timing, if the feet, ankles, or calves are affected, and what measures relieve the symptoms.

Nerve damage may cause no symptoms as the foot and leg slowly lose sensation and become numb. This can be very dangerous because the person may be unaware

that they have improperly fit shoes, a rock or other irritant in a shoe, or other problems that could cause damage.

**Neuropathic ulcer**-The pathophysiology of diabetic foot ulceration is multifactorial, but peripheral is neuropathy through to be responsible for most cases. Diabetic neuropathy means damage of nerve fibers in people with diabetes. How the nerve are injured no flow it entirely clear but research suggests that high blood glucose changes the metabolisms of nerve cells and causes reduce blood flow to the nerve. There are different type of nerves in the body. These can be grouped as.

- Sensory(detect sensation such as heat, cold, pain)
- Motor(contract muscles to control movement)
- Autonomic(regulate functions one cannot control directly, such as heart rate and digestion)

Distal symmetric polyneuropathy is perhaps the most common complication affecting the lower extremities of patients with diabetes mellitus. This complication occurs in up to 58% of patients with longstanding disease(Harati,1994).Neuropathy,a major etiologic component of most diabetic ulcerations, is present in more than 82% and diabetic patients with foot wounds (Pecararo et al.,1990).The lack of protective sensation, combined with unaccommodated foot deformities, exposes patients to undue sudden or repetitive stress that leads to eventual ulcer formation with a risk of infection and possible amputation(Brower &Allman,1981;Edmonds et al.,1985;Armstrong et al.,1997)

In diabetic feet, autonomic neuropathy has several common manifestations. First, denervation of dermal structure leads to decreased sweating. This causes dry skin and fissure formation, which predispose the skin to infection. In competent patients, this "autosympathectomy" may lead to increased blood flow, which has been implicated as one of primary etiologic factors in the development of Charcot's joint and severe foot deformity (Brower &Allman,1981;Edmonds et al.,1985;Armstrong et al.,1997).

Motor neuropathy leading to small muscle wasting lead to an imbalance between flexors and extensors of lower limb, causing clawing of toes and prominence of the metatarsal heads, thus providing appropriate conditions for ulceration (American diabetes Association,1999;Boulton,1996).



These changes along with those previously mentioned lead to a cascade of event resulting in changes to the foot itself. According to Boulton et al.(2004), the” triad of neuropathy, deformity and trauma is present in almost two third of patients with foot ulcers”

### **Structural Deformity and Limited Joint Mobility**

Foot deformity, which are common in diabetic patients, lead to focal areas of high pressure. When an abnormal focus of pressure is coupled with lack of sensation, a foot ulcer can develop. Most diabetic foot ulcers form over areas of bony prominence, especially when bunions, calluses or hammer-toe formations lead to abnormally prominent bony point. Foot deformities are believed to be more common in diabetic patients due to atrophy of the intrinsic musculature responsible for stabilizing the toe (Brand,1991)

Rigid deformities or limited rang of motion at the subtalar or metatarsophalangeal joints have also been associated with development of diabetic foot ulcers. Other mechanisms of skin breakdown in the insensate diabetic foot include puncture wounds and thermal injuries from, for example, hot water soaks (Rosenbloom et al., 1981; Fernando et al., 1991)

### **2.7.5 Ulcer Evaluation**

Despite the best intentions and careful attention to foot care, many diabetic patients eventually develop foot ulcers. These wounds are the principle portal of entry for infection in patients with diabetes. Frequently, the ulcers are covered by callus or fibrotic tissue. This makes the trimming of hyperkeratosis tissue important for comprehensive wound evaluation (Amstorn& Lavery,1998).

Because these ulcers almost always form in patents with neuropathy, they are typically painless. Even in the presence of severe infection, many patients have few subjective complaints and often more concerned with soiled footwear and stroking than with the penetrating wound (Lavery et al.,1996).

A thorough evaluation of any ulcer is critical and should direct management (Frykberg et al.,2000). An adequate description of ulcer characteristics, such as size, depth, appearance, and location, also provides for the mapping of progress during

treatment (ADA,1999). The evaluation should determine the etiology of the ulcer and ascertain whether the lesion is neuropathic, ischemic, or neuro- ischemic. Location is important in evaluating the cause of a neuropathic foot ulcer. Usually, planter ulcers are the result of moderate repetitive trauma underneath a metatarsal head Medial, Lateral, and digital ulcers are often the result of pressure from shoes overlying such osseous abnormalities as bunioshammertoe (ADA, 1999;Muha,1999;Albrant,2000)

In patients with ulcers on sole of the foot, the sole should be examined for signs of ascending infection, including proximal tenderness and appearance of pus on proximal compression of the sole. Surrounding calluses are typical of neuropathic ulcerations, and sinus track formation should be explored by probing the wounds (ADA,1999).

Determining the point at which loss protective sensation develops, and thus the risk of injury increases, is important. The loss of protective sensation is defined as the inability to perceive testing with a 5.07 Semmes-Weinstein monofilament (SWM) Standardized to deliver a 10-g force. The SWM s pressed against the skin to the point of buckling. Measurements are usually taken at each of 10 sites on the foot annually (Armstrong et al., 1998).

Inability to perceive 4 or more sites is associated with a higher risk of loss of sensation and concomitant risk of ulceration (Armstrong et al., 1998). Wunderlich et al.,1998). A simplified monofilament examination using only 4 sites per foot(total 8 sites ) (Smieja et al., 1999).

Other common modalities that can detect insensitivity are a standard tuning fork (128 cycles per second) and a neurologic reflex hammer (Frykberg et al.,2002).

After describing the dimensions and appearance of the ulcer the physician should examine the ulcer with a blunt sterile probe. Gentle probing can detect sinus tract formation, undermining of ulcer margins, and dissection of ulcer into tendon sheaths, bone or joints. A positive probe-to-bone finding has a high predictive value for osteomyelitis (Grayson et al., 1995). Failure to diagnose underlying osteomyelitis often results in failure of wound healing. The existence of odor and exudates, and the presence and extent of cellulites must be noted(Fryberg,1991;Saar et al.,2005; Evans&Pinzur,2005).

Because all ulcers are contaminated, culture of noninfected wounds is generally not recommended (Lipsky et al., 1990; ADA, 2006). Polymicrobial infections predominate

In severe diabetic foot infections and include a variety of aerobic gram-positive cocci, gram negative rod, and anaerobes (Lipsky et al., 1990; Caballero & Fryberg, 1998).

Radiographs should be obtained in most patients with deep or longstanding ulcers to rule out osteomyelitis; however, radiographs are not a very sensitive indicator of acute bone infection (Lipsky et al., 1997; ADA, 1999; 2006). When clinical suspicion indicates osteomyelitis but radiographs are negative, additional bone or leukocyte scanning is helpful in ascertaining bone involvement. However, in the neuropathic patient, bone scans are often falsely positive because of hyperemia or Charcot's arthropathy. Leukocyte scanning or magnetic resonance imaging offers better specificity in this situation (Lipsky, 1997). Ultimately, bone biopsy is necessary to firmly establish the diagnosis of osteomyelitis (Fryberg, 2002)

for healing without vascular intervention. The simple palpation of both pedal pulses and posterior pulses is the most reliable indication of arterial perfusion to the foot. The absence of pedal pulses in the presence of a palpable posterior pulse is a classic finding in diabetic arterial disease because of the selective envelopment of the tibial arteries below the knee (Caputo et al., 1994; ADA, 1999). Noninvasive Doppler studies should be used to augment the clinical examination as needed, although even with these tests, the severity of arterial insufficiency can be underestimated (Caputo et al., 1994). Vascular surgical consultation is warranted when there is significant suspicion of ischemia.

### **2.7.6 Treatment**

The primary goal in the treatment of diabetic foot ulcer is to obtain wound closure. Management of the foot ulcer is largely determined by its severity and vascularity, and the presence of infection (Frykberg, 1999; Frykberg et al, 2000; Tai et al). A systemic approach to treatment should be taken for all diabetic foot lesions. A multidisciplinary approach should be employed because of the multifaceted nature of foot ulcer and the numerous co-morbidities that can occur in these patients (ADA, 1999, Frykberg et al, 2001) This approach has demonstrated

significant improvement in outcomes, including reduction incidence of major amputation(Holstein&Sorensen,1999;Dargis et al.,1999)

Rest, evaluation of affected foot, and relief of pressure are essential components of treatment and should be initiated at first presentation, Ill-fitting footwear should be replaced with a postoperative shoe or another type of pressure-relieving footwear (Frykberg et al.,2000).Crutches or wheelchair might also be recommended to totally off-load pressure from the foot. Although contact casting (TCC) is considered the optimal method of management for neuropathic ulcer, it must be reapplied weekly and requires considerable experience to avoid iatrogenic lesion (Cavanagh et al., 2000). Acceptable alternative to TCC are removable walking and the “half-shoe” (Frykberg et al.,2000; Harstsell et al., 2001;Amstrong et al.,2001). A mainstay of ulcer therapy is debridement of all necrotic, calluses, andfibroustissue (Amstro&Lavery, 1998; ADA, 1999) Unhealthy tissue must be sharply derided black to bleeding tissue to allow full visualization of the extent of the ulcer and detect underlying abscesses or sinuses. Topical enzymes have not been proved effective for this purpose and should only be considered as adjuncts to sharp debridement. Soaking ulcers is controversial and should be avoided because the neuropathic patient can easily be scalded by hot water (ADA, 1999)

Although numerous topical medications and gels are promoted for ulcer care, relatively few have proved to be more efficacious than saline we-to-dry dressings (Frykberg et al., 2000; ADA, 1999;Hogge et al.,2000) Topical antiseptics, such as povidone-iodine, are usually considered to be toxic to healing would (ADA,1999; Frykberg,1991).Generally warm, moist environment that is protected from external contamination is most conducive to would healing. This can be provided by an umber of commercially available special dressing, including semiperme flim, foam, hydrocoll and calcium alginate swabs (Hogge et al., 2000).

The genetically engineered platelet-derived growth factor becaplermin (Regranex gel) is improved for use on neuropathic diabetic foot ulcer and can expedite healing. Growth factors stimulate chemo taxis and mutagenesis of neutrophils, fibroblast, and monotypes, as well as other components that from the cellular would healing (Wieman et al.,1998).

Bioengineered skin (Apligraf) and human dermis (Dermograft) are new types of biologically active implants for ulcer that are derived from fibroblasts of neonatal foreskins (Hogge et al., 2000; Venes et al., 2001). These bioengineered products enhance healing by acting as delivery system for growth factors extracellular matrix components through the activity of live human fibroblast contained in their dermal elements (Frykberg, 2002).

Treatment of the underlying ischemia is critical in achieving a successful outcome, regardless of topical therapies. Vascular surgical consultation should be obtained when a patient presents with an ischemic wound and when ulcers show no sign of progress despite appropriate management. A major component of the limb salvage strategy in these patients is extreme distal arterial reconstruction to restore pulsation flow to the foot (Caputo et al., 1994). Hyperbaric oxygen therapy has been used as adjunctive treatment of foot ulcers, however, support for its use is limited by the small number of carefully controlled clinical trial (Wunderlich et al., 2000).

When infection is present aerobic and anaerobic cultures should be obtained, followed by initiation of appropriate broad-spectrum antibiotic therapy (Caputo et al., 1994; Lipsky et al., 1990; ADA, 1999). Antibiotic coverage should subsequently be tailored according to the clinical response of the patient, culture results, and sensitivity testing. Surgical drainage, deep debridement, or local partial foot amputations are necessary adjuncts to antibiotic therapy of infections that are deep or limb-threatening (Eneroth et al., 1997; Frykberg et al., 2000).

Underlying osteomyelitis is frequently present in patients with moderate to severe infections and requires aggressive bony resection of infected bone and joints followed by four to six weeks of culture-directed antibiotic therapy (Caputo et al., 1994; Lipsky, 1997; Lipsky et al., 1990; Caballero & Frykberg, 1998). The presence of deep infection with abscess, cellulitis, gangrene, or osteomyelitis is an indication for hospitalization and prompt surgical drainage. Even in the absence of bone infection, foot-sparing reconstruction procedures might be necessary to achieve final healing of the foot ulcer, especially in areas subject to exceedingly high plantar or shoe pressures (Caputo et al., 1994; Frykberg, 1998; Frykberg et al., 2000)

### 2.7.7 Prevention

Prevention of an initial or subsequent foot lesion is crucial to avoiding amputation. The best approach is to make use of a team of multidisciplinary professionals who are committed to limb salvage. Centers that have instituted teams specifically for this purpose have subsequently reported dramatic reductions in lower-extremity amputation and improved rates of primary-ulcer healing. Patient education has a central role in treatment and should include instruction on foot hygiene, daily inspection, proper footwear, and the necessity of prompt treatment of new lesions.

**Regular foot-care examinations**, including debridement of calluses and ingrown toe-nails, provide an opportunity to reinforce appropriate self-care behaviors and allow for early detection of new or impending foot problems. Therapeutic shoes with pressure-relieving insoles are an essential element of ulcer prevention and have been associated with significant reductions in their development.

**Elective surgery** to correct structural deformities that cannot be accommodated by therapeutic footwear can be performed as needed in certain patients (Caputo et al., 1994; Catanzariti et al., 1995).

Common procedures include hammertoe repair, metatarsal osteotomies, plantar exostectomies, and Achilles tendon lengthening (Catanzariti et al., 1995; Frykberg et al., 2000). In patients with neuropathy, these procedures can be easily performed under local anesthesia.

Working in unison with a vascular surgeon, these foot-sparing reconstructive procedures can even be performed after revascularization in an ischemic patient who might otherwise have needed amputation (Caputo et al., 1994).

Daily foot inspection by the patient (or a caretaker if the patient lacks sufficient visual acuity or mobility to perform the examination) is the cornerstone of proper foot care. Gentle cleansing with soap and water, followed by the application of topical moisturizers, helps to maintain healthy skin that can better resist breakdown and injury (Armstrong&Lavery, 1998).

While many patients do well with commercially available athletic shoes and thick, absorbent socks, patients with foot deformities or special support need may benefit from custom shoes. Patients should be reminded to avoid hot soak, heating pads and harsh topical agents such as hydrogen peroxide, iodine (e.g., Beta dine) and

astringents (e.g., witch hazel). Gentle cleansing of minor wound and the application of topical antibiotic to maintain a moist wound environment can help to prevent ulcer formation. In addition, the physician should inspect any minor wound that does not heal rapidly (Armstrong & Lavery, 1998).

Diabetic foot ulcers can be managed without amputation by following the principles discussed above and having a thorough understanding of the pathogenesis of these ulcers.

**Poor circulation** — longstanding high blood sugar can damage blood vessels, decreasing blood flow to the foot. This poor circulation can weaken the skin, contribute to the formation of ulcers, and impair wound healing. Some bacteria and fungi thrive on high levels of sugar in the bloodstream, and bacterial and fungal infections can break down the skin and complicate ulcers.

More serious complications include deep skin and bone infections. Gangrene (death and decay of tissue) is a very serious complication that may include infection; widespread gangrene may require foot amputation. Approximately 5 percent of men and women with diabetes eventually require amputation of a toe or foot. This tragic consequence can be prevented in most patients by managing blood sugar levels and daily foot care.

**Nerve damage (neuropathy)** — Elevated blood glucose levels over time can damage the nerves of the foot, decreasing a person's ability to notice pain and pressure. Without these sensations, it is easy to develop callused pressure spots and accidentally injure the skin, soft tissue, bones and joints. Over time, bone and joint damage can dramatically alter the shape of the foot. Nerve damage, also called neuropathy, can also weaken certain foot muscles, further contributing to foot deformities. (See "[Patient information: Diabetic neuropathy](#)") and having a thorough understanding of the pathogenesis of these ulcers.

## **CHAPTER III**

### **Research Methodology**

#### **3.1 Research Design**

This is a survey research that the researcher studied and utilized several concepts, theories and related researchers to develop a guideline for the research. The research is conducted to Assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province Thailand. The data collected from the research was statistically analyzed. Process of the research can be explained following:

1. Research population and sample
2. Research tools
3. Quality test of research tool
4. Data collection
5. Data analysis

#### **3.2. Research Period**

September to December 2009

**3.3 Research area :** Muang District ,Roi- Et Province.

**3.4. Research Population** – 300 cases

The sample population for this study was eight hundred persons both male and female who registered at DM Clinic Foot, Roi-Et Hospital (October 2007-December 2009)

#### **3.5. Sampling Technique**

3.5.1 Develop a registration of diabetic type two patients who are registered as diabetic patients at diabetic foot clinic, Roi Et hospital by sorting out registered ID number of diabetes mellitus.

Conduct systematical random sampling and random interval is  $800/267 = 3$ , until required numbers of samples are reached.



Sample size is determined by using formula developed by Taro Yamane at 95 percent level of significance.(Yamane,1973 refer to Boonthum Kitpreedaborisut, 2003: 164).

$$n = \frac{N}{1 + Ne^2}$$

When n means Sample size

N means Numbers of research populations (800 people)

e means Error allowance (0.05)

Sample size calculated by using the formula is 267 cases (Round up = 300 cases)

Criteria for recruitment of research sample

Diabetic Type Two patients who have lived in Muang District, Rot Et over 6 months and been registered as diabetic patients. They also must be entitled to gold card with Baht30 per visit. Their blood glucose level is more or equal as 180 mg and able to come according to the set appointments during the two months.

3.5.3The selected subjects were interviewed accordingly. For those who had speaking, listening and memory would be replaced by care keeper.

### **Inclusion criteria**

- 1) Register with DM Type II in DM clinic Roi-Et Hospital who had any complications. Since October 2007-October 2009, both male and female.
- 2) Head been living for at least 6 months within the community.
- 3) Had no speaking, listening and memory problem.
- 4) Understand Thai and be able to answer the questions.
- 5) Willing to participate in this study.

Exclusion criteria:

- 1) Living for less than 6 months within the community
- 2) Cannot understand Thai language
- 3) Hearing, speaking or memory defect
- 4) Do not have consent to participate for the study.

**Table2.** The population of DM Type II 40-60 year.

No	Sub-district	Number ID(DM)	Population sampling
1	Neamuang	202	73
2	Nongweaw	36	13
3	Nontan	25	9
4	Kanyai	26	9
5	Khonkhan	51	18
6	Sikaew	74	26
7	Napho	21	7
8	Donglan	22	7
9	Poparn	34	12
10	Robmeang	69	25
11	Nongkeaw	36	13
12	Muaengthong	44	15
13	Nonsang	32	11
14	Saardsomboon	65	23
15	Nimuaeng	91	32
	TOTAL	800	267

Source:Hxp PCU, Roi-Et Hospital 2551-2552

Put the number in formula:

$$n = \frac{800}{1+800(0.0025)}$$

$$n \sim 267$$

### 3.6 Research Tool – questionnaire

This study used interview guideline which was modified to be more appropriate for the area (Tarathon Duangkaew,Hiranya Deudom,2007).

The steps of tool development are explained below:

3.1 The researcher studied theories from documents, books and researches relating to the title and utilized such information as appropriate for the research.

3.2 The researcher studied about criteria and methods used to develop a questionnaire from documents and related researches.

3.3 Through studying about previously developed questionnaire, the researcher revised and developed a questionnaire comprising of 28 questions on knowledge part, 11 questions on attitude part and 12 questions on preventive self-care part.

3.4 The questionnaire was submitted to the thesis committee to seek for suggestion and later submitted to three experts who are Dr. Ramiro Suriyawanakul, Manager of Roi-Et Hospital, an expert in DM, Dr. Wanchai Attakorn, Subdirector of Academic

Department, Roi-Et Hospital and Dr. Watchara Iamratsameekul, Head of Research Office, Roi-Et Public Health Office.

3.5 After modification of questionnaire according to the suggestion of a committee and experts, the questionnaire was in a try-out process with 30 diabetic patients who were not samples of the research. The data found from the 'try-out' was analyzed to find out quality of research tool. The total reliability value was 0.758.

### 3.7. Research Variables

**Independent variables** are demographic data such as gender, age, marital status, education level, occupation, numbers of family members, monthly household income, monthly household expense, family history of diabetes mellitus (DM); knowledge of preventive self-care on diabetic foot ulcer; attitude of DM on preventive self-care on diabetic foot ulcer.

**Dependent Variables** -Practice of preventive self-care on diabetic foot ulcer.

### 3.8. Data Analysis

SPSS Version 17 were used to find out

: Descriptive statistic by distributing frequency and percentage.

: The relationship between independent variables which are social-demographic characteristics, knowledge and attitude toward preventive self-care on diabetic foot ulcer. Dependent variable is practice of preventive self-care on diabetic foot ulcer.

#### 3.8.1 Development of Research Tools as follows:

Step on data collection tool development

1. The researcher studied theories from documents, books and researches relating to factors indicating a relationship with preventive self-care on diabetic foot ulcer of type 2 diabetic patients.

2. The researcher studied about criteria and methods used to develop a questionnaire from documents and related researches.

3. Apply the comment to correct and improve the questionnaire so as to cover all related topic. Submit the corrected and approve questionnaire for approval.

4. Try out with 30 diabetes patient in Sealapoom District, Roi-Et Province.

5. Test for reliability with Cronbrach's Alpha Coefficient.

6. Use the questionnaire version of the questionnaire to interview diabetes patient who were living in Amphur Mueang Roi-Et. Before the interview session, the researcher would train and explain the interview on how to do the interview ranging from sampling methods, inclusion and exclusion criteria, the need to obtain their consent by signature or fingerprint as well as going through questionnaire in each session on ensure that the DM patient understand the content of the questionnaires.

The researcher developed a questionnaire which is divided into 4 parts as follows:

**Part 1- Personal data** of DM type II patients including gender, age, marital status , education level, occupation, numbers of family members, monthly household income, monthly household expense, family history of diabetes mellitus (DM).

**Part 2 - Knowledge** of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et, Roi-Et Province, This part consists of 28 questions which include causes of diabetes mellitus, DB symptoms, food, exercise, disease control, foot care management. Scores are divided into three levels.

‘Correct’ refers to ‘you think that sentence is correct’=3 points

‘Incorrect’ refers to ‘you think that sentence is not correct’=2 points

‘Do not know’ refers to ‘you do not know whether it is correct or incorrect about that sentence’ =1 point

After calculation of scores and distribution data by analysis, the total score will be used to compare with the following criteria (Bloom, 1968:60).

Score 0-16 (less than 60%) indicates low level of knowledge.

17-22 (60-80%) indicates moderate level of knowledge.

23-28 (more than 80%) indicates high level of knowledge.

**Part 3 –Attitude on preventive self-care** on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et, Roi-Et Province. This part consists of 11 questions and requires samples to give answers in three different answers which are

‘agree’ refers to ‘you agree with that sentence’ =3 points

‘disagree’ refers to ‘you do not agree with that sentence’ =2 points

‘unsure’ refers to ‘you are not sure about that sentence’=1 point

After calculation of scores, an average will be used to compare with the following criteria:

Average	1.00-1.66	indicates	low level of attitude
Average	1.67- 2.33	indicates	medium level of attitude
Average	2.34-3.00	indicates	high level of attitude

**Part 4- Practice of preventive self-care** on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et, Roi-Et Province. This part comprises 12 questions and scores are divided into three levels which are:

‘always/often’ refers to ‘you perform that behavior mentioned in the question for 5-7 days a week’ =3 points

‘occasionally’ refers to ‘you perform that behavior mentioned in the question for 3-4 days a week’=2 points

‘rarely/never’ refers to ‘you perform that behavior mentioned in the question for 1-2 days a week’ =1 point

This study set criteria for analysis the overage preventive self care of wound acores according to Kulaya2001.as follow.

Interval = Maximal score-Minimal score

$$\frac{\text{Maximal score} - \text{Minimal score}}{\text{Number of level}} = \frac{3-1}{3} = 0.66$$

After calculation of scores, an average will be used to compare with the following criteria:

Average	1.00-1.66	indicates	low level of preventive self-care
Average	1.67-2.33	indicates	moderate level of preventive self-care behavior
Average	2.34-3.00	indicates	high level of preventive self-care

### 3.9 Quality test of research tool

1. Validity – a modified questionnaire was submitted to the three experts in order to test its validity on content and appropriateness of language by each question. Each question is consistent with unique behavioral group, the score used is as follow: (Puangrat Thaweerat, 1997)

After that index of consistency of questions was calculated, questions with IOC are equal or higher than 0.5 were selected as such questions were validated in aspect of content and appropriate to further use. Through this process, IOC of all questions are from 0.61 – 0.89.

2. Power of discrimination and difficulty of each question =30 diabetic patients whose characteristics are similar to the research sample participated in this step. The results from the test were analyzed to find out power of discrimination and difficulty between 25% of high group and low group by calculating 't' for each question according to t-test. Questions with 't' value is higher than 1.734 are selected as they are considered as having significant level of 0.05. Formula used to find out 't' is as follow (Puangrat Thaweerat, 1987).

3. Difficulty and power of discrimination of the questionnaire (Somnuek Patthiyathanee, 1998)

3.3)The validated questionnaire on DM knowledge was used among 30 diabetic patients whose characteristics are similar to the samples of the research. The questionnaire was checked and given a score. The correct answer will get one point and incorrect answer will get no point. Total of score of each questionnaire was calculated.

3.2) All questionnaires were arranged from highest to lowest scores. The highest score was placed on the top (questionnaires with same scores can be placed anyhow together).

3.3)Then start counting marking numbers of questionnaire from the top to down (27%), the first set consisting of 11 questionnaires is called 'high group' with abbreviation of 'H'. After that counting numbers of questionnaire from the down to top (27%), the second set consisting of 11 questionnaires is called 'low group' with abbreviation of 'L'.

3.4)To find out frequency of numbers of diabetic patients who provided correct answers among high and low groups, a tally method was used.

3.5) Use total of 'H' and total of 'L' of each question for difficulty calculation. It is found that difficulty of each question is between 0.35-0.80 and power of discrimination of each question is between 0.20-0.63.

**3.10 Data Collection** – the researcher initiated coordination with officials in the Roi Et Hospital to explain research objectives and to discuss about preparation of research assistant, provision of equipments used for interview, further coordination with others, data collection and clarification of each question in the questionnaire to create a same understanding when conducting of analysis.

### **3.11 Ethic Consideration**

3.10.1 DM patients are the pillar of the society and social force as they are valuable human resources who contribute to their family, community and society, there before; they should be honored and admired.

3.10.2 DM patients have the right to or not join the research

3.10.3 Their in formation was kept confidential

3.10.4 Ethic review was requested and obtained from Chulalongkorn University.

### **3.12 Limitation**

At the time for collection data is limited, the researcher confined group to only from DM patients, health financial, and overage 40-60 year, who live in Muang District, R0i-et province.

### **3.13 Expected Benefits & Application**

Expected Benefits of the study are:

3.13.1 To learn about the level of preventive of health in DM patients who living Muang District, Roi-Et province.

3.13.2 To makes a plan/ project for public health organizations and other related organizations to promote DM patients for correct and suitable health behavior as well as raising living standard.

3.13.3 To determine study approach about DM patients in various topics.

## CHAPTER IV

### RESULTS

#### 4.1 The research results are presented in the following.

- : Symbol used for results presentation
- : Structure of results presentation
- : Results found through data analysis

#### 4.2 Symbol used for results presentation

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

- $\bar{X}$  Represents Average
- n represents Number of sample
- S.D represents Standard deviation
- t represents Test statistic for t-distribution
- p represents Statistical probability
- \* represents Statistic significance level of 0.05

#### 4.3 Structure of results presentation

- 1) Results found through the data analysis of numbers and percentages, by general data, knowledge, attitude, and practice of the sample group
- 2) Results found through the data analysis on the relationship between independent variables and practice of preventive self-care on diabetic foot ulcer of type II diabetic patients by Chi Square test ( $\chi^2$ ).



## Results through data analysis

### Part I : Socio-demographic data

**Table 3.** Socio-demographic data (n = 300)

<b>Personal data</b>	<b>Number</b>	<b>Percentage</b>
<b>Gender</b>		
Male	98	32.7
Female	202	67.3
<b>Age</b>		
40-44 years	31	10.3
45-49 years	69	23.0
50-54 years	75	25.0
55-60 years	125	41.7
(Median = 53, $\bar{X} = 52.25, SD = 5.36, Min = 40, Max = 60$ )		
<b>Persons in household</b>		
1 – 2 persons	39	13.0
3 – 4 persons	128	42.7
5 person and over	133	44.3
<b>Family household expense</b>		
1,000-9000 baht	155	51.7
9,001-25,000 baht	133	44.3
25,001-80,000 baht	12	4.0
(Median = 8,000, $\bar{X} = 10,702.67, SD = 8,561.17, Min = 1,000, Max = 80,000$ )		
<b>DM history of family members</b>		
Older/younger sister	75	25.0
Father/mother	83	27.7
Grandfather/grandmother	6	2.0
No family members with DM	136	45.

**Table 3.** (Continued):

<b>Personal data</b>	<b>Number</b>	<b>Percentage</b>
<b>Numbers of occurrence of foot wound</b>		
<b>without being awareness</b>	35	11.7
One time	17	5.7
More than one time	7	2.3
One time with losing finger	241	80.3
Never/cannot remember		

**From Table.3:**, Indicates that most of diabetic type two patients are women The research results are found that most of diabetic type two patients Muang District, Roi Et Province, are Female with an mean age of 52 years and from 45-49 (69.0%)Years-old.( Median = 53 years,  $\bar{X}$  = 52.25 years, SD.= 5.36, Min = 40.0 years, Max = 60.0 years) Most of them are married =228 (76.0%). The highest education level of majority of the group is primary school=177(59.0%). Principal occupation is agriculture=90 (30.0%). 4 members are mean numbers of family members. (Median = 4 persons,  $\bar{X}$  = 4.3 persons, SD = 1.56 ,Min = 1.0 persons, ax=16 persons). Monthly Mean income 9,001-25,000 Baht (Median = 10,000 baht,  $\bar{X}$  = 15,682.67 baht, SD = 15,637.03 baht,Min = 1,000 baht Max = 200,000 baht). While monthly Mean expense is 1,000-9,000 Baht (Median = 8,000 baht,  $\bar{X}$  = 10,702.67 baht, SD = 8,561.17 baht, Min = 1,000 baht Max = 80,000baht) Most of the samples live with their father/mother = 223 (74.3%), and there is no history of DM and occurrence of foot wound without being awareness = 214 (80.3%).

## Part 2. Knowledge part

Table 4. Knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province

Questions	Correct	Not correct or do not know
1. One of diabetes mellitus's causes is hereditary.		
2. Diabetes mellitus is a condition of an excessive blood glucose amount in human body.	283 (94.3)	17 (5.7)
3. Reduction of body's insulin is a major cause of diabetes mellitus	289 (96.3)	11 (3.7)
4. Diabetic patients can easily get foot syndrome, if they do not control their blood glucose level to its normal level.	247 (82.3)	53 (17.7)
5. Diabetic patients who can maintain blood glucose level to its normal level can decide to stop taking medicine themselves.	274 (91.3)	26 (8.7)
6. Diabetic patients who do not receive a continuous treatment, they may experience complications that will cause a wound and ulcer.	145 (48.3)	155 (51.7)
7. A patient who has been suffering from DM for a long time and cannot control blood glucose level will experience numbness of hand and feet.	283 (94.3)	17 (5.7)
8. Hypoglycemia condition includes such as sweating, heart shake and freezing cold body.	231 (77.0)	69 (23.0)
9. Taking Phyllanthus urinaria, commonly known as Chanca piedra can cure diabetes mellitus completely	258 (86.0)	42 (14.0)
10. A regular exercise (at least 3 times a week) can help controlling a blood glucose level.	153 (51.0)	147 (49.0)
11. Diabetic wound is difficult to cure and may later cause a toe and leg amputation.	216 (72.00)	84 (28.0)
	286 (95.30)	14 (4.7)

**Table 4.** (Continued):

Questions	Correct	Not correct or do not know
12. An accurate glucose test is to measure glucose in a urine sample.	143 (47.7)	157 (52.3)
13. One good methodology for reducing blood glucose level is not to have dinner.	121 (40.3)	179 (59.7)
14. Difficult-to-heal wound is one of symptoms of diabetic mellitus.	233 (77.7)	67 (22.3)
15. If a diabetic patient with DM does not receive a good treatment, he/she will easily get a diabetic wound.	232 (77.3)	68 (22.7)
16. An appropriate foot care can prevent a diabetic wound at foot.	266 (88.7)	34 (11.3)
17. If a diabetic patient wants to take care of their feet themselves, monitoring on feet is a must.	253 (84.3)	47 (15.7)
18. Diabetic patients must be able to report/identify an occurrence of inflammation that may cause a diabetic wound.	253 (84.3)	47 (15.7)
19. Diabetic patients should use hot water to clean their feet.	249 (83.0)	51 (17.0)
20. Diabetic patients should dry their feet, especially between foot fingers after taking a shower.	231 (77.0)	69 (23.0)
21. Diabetic patients should put sesame oil, olive oil and lotion on their feet and between foot fingers.	214 (71.3)	86 (28.7)
22. Diabetic patients should scrape corns or harden-thin skin on feet themselves.	136 (45.3)	164 (54.7)
23. Toenail care is not important for diabetic patient.	180 (60.0)	120 (40.0)

**Table 4.** (Continued):

Questions	Correct	Not correct or not know
24. Diabetic patients should not walk with bare feet.	251 (83.7)	49 (16.3)
25. It is not necessary for diabetic patients to change shoes during a day.	165 (55.0)	135 (45.0)
26. Diabetic patients should wear a high-heel shoe .and a topless-flip-flop a slipper.	85 (28.3)	215 (71.7)
27. Diabetic patients should avoid wearing too-tight socks or too-tight clothes for groin and foot areas.	200 (66.7)	100 (33.3)
28. If a diabetic patient experiences a problem of foot	236 (78.7)	64 (21.3)
<b>Assessment of knowledge part</b>		
Low (0-16 score)	43	14.3
Moderate (17-22 score)	198	66.0
High (23-28 score)	59	19.7
— $\bar{X} = 19.75$ score $SD = 3.11$ score		
Min = 10 score    Max = 27 score		

**From table 4;** Indicates that in overall = 198 (66.0%) of the diabetic type two patients, Muang District, Roi Et Province, had a moderate level of DM knowledge. Considering at each question, more than 80% of the samples provided correct answer to 11 questions, while less than 80% of the samples did not provide correct answer to the questions # 5, 7, 9, 10, 12, 13, 14, 15, 20, 21, 22, 23,25, 26, 27 and 28. Shown of knowledge score that Low (0-16 score) = 43 (14.3%), Moderate (17-22 score) = 198 (66.0%) and High (23-28 score) = 59 (19.70%),  $\bar{X} = 19.75$  scores,  $SD = 3.11$  score, Min = 10 score and Max = 27 score.

**Part 3.** Attitude part**Table 5.** Attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province.Thailand.(n = 300)

Questions	agree	unsure	disagree
1. It is difficult not to eat sweet food and high-fat meat.	238(79.3)	41(13.7)	21(7.0)
2. An exercise is considered a matter for young people.	151(50.3)	82(27.3)	67(22.3)
3. Diabetic patients can take care of their feet themselves.	245(81.7)	51(17.0)	4(1.3)
4. A strictly dietary is a must for diabetic patients.	240(80.0)	57(19.0)	3(1.0)
5. Having a lifestyle with concept of ‘You DeeMeHang’ can prevent a foot wound for diabetic patients.	181(60.3)	91(30.3)	28(9.3)
6. It is worthwhile to strictly perform behaviors according to foot-wound care related suggestion given by a doctor.	208(69.3)	83(27.7)	9(3.0)
7. Everyday-foot monitoring does not waste your time as it helps preventing an occurrence of a foot wound.	195(65.0)	74(24.7)	31(10.3)
8. Preventing an occurrence of a foot wound is another step for diabetic patients to increase their self-value.	237(79.0)	48(16.0)	15(5.0)
9. Warm water should be used to clean feet.	163(54.3)	113(37.7)	24(8.0)
10. As foot is regarded as lowly structure, therefore; to request helps regarding foot from others is considered an inappropriate matter.	127 (42.3)	131 (43.7)	42 (14.0)
11. An effective foot care is viewed as responsibility of a doctor only.	136 (45.3)	64 (21.3)	100 (33.3)

**Assessment:**

Low (Average 1.00 – 1.66)	
Moderate (Average 1.67 – 2.33)	3 (1.0)
High (Average 2.34 – 3.00)	71 (23.7)
—	226 (75.3)
$\bar{X} = 2.54$ $SD = 0.29$	
Min = 1.64 Max = 3.00	

**From table 5:** indicates that in overall = 226 (75.3%) of type II patients, Muang District, Roi-Et Province, had a high level of DM attitude. Considering at each question, it is found that two questions were agreed by over 80% of the samples (the questions # 3, 4), while another 9 questions were agreed by less than 80% of the samples. Shown score of attitude that Low (Average 1.00 – 1.66) = 3 (1.0%), Moderate (Average 1.67 – 2.33) = 71 (23.7%) and High (Average 2.34 – 3.00) = 226 (75.3%) ( $\bar{X} = 2.54$   $SD = 0.29$ , Min = 1.64 Max = 3.00). Therefore relevant agencies should develop a solution for this matter.

**Part 4. Practice part**

**Table 6:** Practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.(n = 300)

Questions	regularly	occasional ly	rarely
1. You check your blood glucose level according to suggestion given by a doctor.	230(76.7)	49(16.3)	21(7.0)
2. You check your sight according to suggestion given by a doctor.	217(72.3)	78(26.0)	5(1.7)
3. You abstain from drink and food to control blood glucose level before the day of your blood test	242(80.7)	51(17.0)	7(2.3)
4. You check your feet every time when you recognize numbness at your foot.	168(56.0)	108(36.0)	24(8.0)

**Table 6.** (Continued):

<b>Questions</b>	<b>regularly</b>	<b>occasionally</b>	<b>rarely</b>
6. You use warm water to clean your feet.	202(67.3)	68(22.7)	30(10.0)
7. After cleaning feet, you will completely dry your feet and between foot fingers.	141(47.0)	97(32.3)	62(20.7)
8. You put olive oil or lotion on your feet, except between foot fingers.	192(64.0)	91(30.3)	17(5.7)
9. You use 'foot stick' to scrub your feet and/or foot heel while taking a shower.	139(46.3)	111(37.0)	50(16.7)
10. When having ingrown toenail, you trim your nail short to its edge of nail and also trim side-nail.	134(44.7)	80(26.7)	86 (28.7)
11. When wearing a shoe, you do use put shoe-pad.	139(46.3)	84(28.0)	77(25.7)
12. When you stay at home, you walk by barefoot	70(23.3)	155(51.7)	75(25.0)
<b>Total</b>	<b>158(52.7)</b>	<b>73(24.3)</b>	<b>69(23.0)</b>



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<b>Assessment:</b>	
Low (Average 1.00 – 1.66)	1 (0.3)
Moderate (Average 1.67 – 2.33)	147(49.0)
High (Average 2.34 – 3.00)	152(50.7)
—	
$\bar{X} = 2.42$ $SD = 0.33$	
Min = 1.58 Max = 3.00	

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**From table 6;** Indicates that in overall = 152 (50.7%) of practice of preventive self-care in type II patients, Muang District, Roi-Et Province had a high level of practice. Considering at each question, only one practice was performed regularly by over 80% of the samples (the questions # 3), while the other practice stated in 11 questions by less than 80% of the samples. Shown score of attitude that low (Average 1.00 – 1.66) = 1 (0.3%), moderate (Average 1.67 – 2.33) = 147 (49.0%) and high (Average 2.34 – 3.00) = 152(50.7%) ( $\bar{X} = 2.42$ ,  $SD = 0.33$ , Min = 1.58 Max = 3.00). Therefore relevant agencies should develop a solution for this matter.

### Part 5 – Analysis of relationship

**Table 7.** Association between gender and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province

Gender	Knowledge			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Male	79(80.6)	19(19.4)	98(100)	.007	.933
Female	162(80.2)	40(19.8)	202(100)		
Total	241(80.3)	59(19.7)	300(100)		

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**As presented in table 7.** Shown that there was no statistically significant association between gender and knowledge ( $p$ -value 0.933).

**Table 8** Association between gender and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Gender	Attitude			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Male	22(22.4)	76(77.6)	98(100)	.385	0.535
Female	52(25.7)	150(74.3)	202(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As presented in table 8.** Shown that there was no statistically significant association between gender and attitude ( $p$  – value 0.535).

**Table 9.** Association between gender and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Rios-Et District, Roi-Et Province, Thailand.

Gender	Practice			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Male	39(39.8)	59(60.2)	98(100)	5.297	0.021*
Female	109(54.0)	93(46.0)	202(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in table 9.** Shown that there was statistically significant association between gender and practice ( $p$ -value 0.021). In the female subjects low and moderate level of practice was 109 (54.0%), and high level of practice was 93(46.0%), while in male subjects low and moderate level of practice was 39(39.8%), and high level of practice was 59 (60.2%).

**Table 10.** Association between age and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Age (years)	Knowledge			Chi Square	p value
	Low	High	Total		
	n(%)	n(%)	n(%)		
40-44	23(74.2)	8(25.8)	31(100)	2.957	0.398
45-49	60(87.0)	9(13.0)	69 (100)		
50-54	60(80.0)	15(20.0)	75(100)		
55-60	98(78.4)	27(21.6)	125(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As presented in table 10** Shown that there was no statistically significant association between age and knowledge ( $p$  –value 0.398).

**Table 11.** Association between age and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Riot-Et District, Roi-Et Province, Thailand.

Age (years)	Attitude			Chi Square	p value
	Low& Moderate	High	Total		
	n(%)	n(%)	n(%)		
40-44	10(32.3)	21(67.7)	31(100)	2.721	.437
45-49	19(27.5)	50(72.5)	69(100)		
50-54	14(18.7)	61(81.3)	75(100)		
55-60	31(24.8)	94(75.2)	125(100)		
Total	74(24.3)	226(75.7)	300(100)		

**As presented in table 11** Shown that there was no statistically significant association between age and attitude ( $p$  – value 0.437).

**Table 12.** Association between age and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Age (years)	Practice			Chi Square	p value
	Low /Moderate	High	Total		
	n(%)	n(%)	n(%)		
40-44	16(51.6)	15(48.4)	31(100)	2.951	0.399
45-49	38(55.1)	31(44.9)	69(100)		
50-54	31(41.3)	44(58.7)	75(100)		
55-60	63(50.4)	62(49.6)	125(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in Table 12.** Shown that there was no statistically significant association between age and practice ( $p$  – value 0.399).

**Table 13.** Association between marital status and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Marital Status	Knowledge			Chi Square	p value
	Moderate	High	Total		
	n(%)	n(%)	n(%)		
Single	33(86.8)	5(13.2)	38(100)	6.499	0.039*
Married	186(81.6)	42(18.4)	228(100)		
Widowed/Divorce	22(64.7)	12(35.3)	34(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As presented in table 13.** Shown that there was statistically significant association between marital status and knowledge ( $p$  - value 0.039). In the married subjects moderate level of knowledge was 148 (64.9%), the moderate level of knowledge in married status was 186 (81.6%), and high level of knowledge in married status was 42

(18.4%), while in single group, the moderate level of knowledge was 33 (86.8%), the moderate level of knowledge in widowed/divorce was 22 (64.7%), and high level of knowledge in widowed/divorce was 12 (35.3%).

**Table 14.** Association between marital status and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Marital Status	Attitude			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Single	11(28.9)	27(71.1)	38(100)	.680	0.712
Married	56(24.6)	172(75.4)	228(100)		
Widowed/Divorce	7(20.6)	27(79.4)	34(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As presented in table 14.** Shown that there was no statistically significant association between marital status and attitude ( $p$ -value 0.712).

**Table 15.** Association between marital status and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Marital Status	Practice			Chi Square	p value
	Low /Moderate	High	Total		
	n(%)	n(%)	n(%)		
Single	18(47.4)	20(52.6)	38(100)	2.093	0.351
Married	117(51.3)	111(48.7)	228(100)		
Widowed/Divorce	13(38.2)	21(61.8)	34(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in table 15.** Shown that there was no statistically significant association between marital status and practice ( $p$ - value 0.351).

**Table 16.** Association between education and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Rios-Et District, Roi-Et Province, Thailand.

Education	Knowledge			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Non-ed& Primary	152(79.6)	39(20.4)	191(100)	.188	0.664
Secondary& Bachelor	89(81.7)	20(18.3)	109(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As presented in Table 16.** Shown that there was no statistically significant association between education and knowledge ( $p$ - value 0.664).

**Table 17.** Association between education and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Education level	Attitude			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Non-ed & Primary	53(27.7)	138(72.3)	191(100)	2.687	0.101
Secondary & Bachelor	21(19.3)	88(80.7)	109(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As presented in Table 17.** Shown that there was no statistically significant association between education and attitude ( $p < 0.101$ ).

**Table 18.** Association between education and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Education level	Practice			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
Non-ed & Primary	92(48.2)	99(51.8)	191(100)	.286	0.593
Secondary & Bachelor	56(51.4)	53(48.6)	109 (100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in Table 18.** Shown that there was no statistically significant association between education and practice ( $p$  –value 0.593).

**Table 19.** Association between occupation and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Riot-Et District, Roi-Et Province, Thailand.

Occupation	Knowledge			Chi Square	p value
	Low	High	Total		
	n(%)	n(%)	n(%)		
House worker	41(91.1)	4(8.9)	45(100)	5.121	0.163
Labor	59(77.6)	17(22.4)	76(100)		
Agriculturist	68(75.6)	22(24.4)	90(100)		
Trade	73(82.0)	16(18.0)	89(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As presented in Table 19.** Shown that there was no statistically significant association between occupation and knowledge ( $p$ -value 0.163).

**Table 20.** Association between occupation and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Occupation	Attitude			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
House worker	20(44.4)	25(55.6)	45(100)	11.241	0.010*
Labor	16(21.1)	60(78.9)	76(100)		
Agriculturist	20(22.2)	70(77.8)	90(100)		
Trade	18(20.2)	71(79.8)	89(100)		
Total	74(24.7)	226(75.3)	300(100)		



**As presented in table 20.** Shown that there was statistically significant association between occupation and attitude ( $p$ - value 0.010). In the agriculturist subjects the low and moderate level of attitude was 20 (22.2%), and high level of attitude was 70(77.8%),while in trade subjects the low and moderate level of attitude was 18(20.2%),and high level of attitude was 71(79.8%).

**Table 21.** Association between occupation and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province,Thailand.

Occupation	Practice			Chi Square	p value
	Low& Moderate	High	Total		
	n (%)	n(%)	n(%)		
House worker	33(73.3)	12(26.7)	45(100)	12.761	0.005*
Labor	37(48.7)	39(51.3)	76(100)		
Agriculturist	39(43.3)	51(56.7)	90(100)		
Trade	39(43.8)	50(56.2)	89(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in table 21.** Shown that there was statistically significant association between occupation and practice ( $p < 0.005$ ). In the agriculturist subjects, low and moderate level of practice was 39(43.3%), and high level 51 (56.7%). The house worker subjects low and moderate level of practice was 33(73.3%),and high level of practice 51(56.70%),while in trade subjects, low and moderate level of practice was 39(43.8%), and high level of practice was 50(56.2%).

**Table 22.** Association between number of family members and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Group-nf	Knowledge			Chi Square	p value
	Low & Moderate	High	Total		
	n(%)	n(%)	n(%)		
1-2	29(74.4)	10(25.6)	39(100)	1.868	0.393
3-4	101(78.9)	27(21.1)	128(100)		
5/above	111(83.5)	22(16.5)	133(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As presented in table 22.** Shown that there was no statistically significant association number of family members and knowledge ( $p$ -value 0.393).

**Table 23.** Association between number of family members and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Group-nf	Attitude			Chi Square	p value
	Low & Moderate	High	Total		
	N(%)	N(%)	N(%)		
1-2	7(17.9)	32(82.1)	39(100)	1.374	0.503
3-4	31(24.2)	97(75.8)	128(100)		
5/above	36(27.1)	97(72.9)	133(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As present in table 23.** Shown that there was no statistically significant association between number of family members and attitude ( $p$  –value 0.503).

**Table 24.** Association between number of family members and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Group-nf	Practice			Chi Square	p value
	Low& Moderate	High	Total		
	n(%)	n(%)	n(%)		
1-2	18(46.2)	21(53.8)	39(100)	1.046	0.593
3-4	60(46.9)	68(53.1)	128(100)		
5/above	70(52.6)	63(47.4)	133(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As present in table 24.** Shown that there was no a statistically significant association between number of family members and practice ( $p$ - value 0.593).

**Table 25.** Association between monthly-household income and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly Income (bath)	Knowledge			Chi Square	p value
	Low& Moderate	High	Total		
	n(%)	n(%)	n(%)		
1,000-9000	82(82.0)	18(18.0)	100(100)	0.264	0.608
9,001-200,000	159(79.5)	41(20.5)	200(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As present in table 25.** Shown that there was no statistically significant association between monthly-household income and knowledge ( $p$  – value 0.608).

**Table 26.** Association between monthly-household income and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly Income (bath)	Attitude			Chi Square	p value
	Low/Moderate	High	Total		
	n(%)	n(%)	n(%)		
1,000-9000	26(26.0)	74(74.0)	100(100)	0.144	0.705
9,001-200,000	48(24.0)	152(76.0)	200(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As present in table 26.** Shown that there was no statistically significant association between monthly-household income and attitude ( $p$  – value 0.705).

**Table 27.** Association between monthly-household income and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly Income (bath)	Practice			Chi Square	p value
	Low/ Moderate	High	Total		
	n(%)	n(%)	n(%)		
1,000-9000	53(53.0)	47(47.0)	100(100)	0.807	0.369
9,001-200,000	95(47.5)	105(52.5)	200(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As present in table 27.** Shown that there was no statistically significant association between monthly-household income and practice ( $p$ -value 0.369).

**Table 28.** Association between monthly-household expense and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly -household expense (bath)	Knowledge			Chi Square	p value
	Low /Moderate	High	Total		
	n(%)	n(%)	n(%)		
1,000-9,000	128(82.6)	27(17.4)	155(100)	1.025	0.311
9,001-80,000	113(77.9)	32(22.1)	145(100)		
Total	241(80.3)	59(19.7)	300(100)		

**As present in table 28.** Shown that there was no statistically significant association between monthly-household expense and knowledge ( $p$  – value 0.311).

**Table 29.** Association between monthly-household expense and attitude of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly -household expense (bath)	Attitude			Chi Square	p value
	Low/ Moderate	High	Total		
	n(%)	n(%)	n(%)		
1,000-9000	36(23.2)	119(76.8)	155(100)	0.358	0.549
9,001-80,000	38(26.2)	107(73.8)	145(100)		
Total	74(24.7)	226(75.3)	300(100)		

**As present in table 29** Shown that there was no significant association between monthly-household expense and attitude ( $p$  –value 0.549).

**Table 30.** Association between monthly-household expense and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Monthly -household expense (bath)	Practice			Chi Square	p value
	Low/Moderate	High	Total		
	n (%)	n (%)	n (%)		
1,000-9000	88(56.8)	67(43.2)	155(100)	7.103	0.008*
9,001-80,000	60(41.4)	85(58.6)	145(100)		
Total	148(49.3)	152(50.7)	300(100)		

As present in table 30. shown that there was a statistically significant association between monthly-household expense and practice (p-value 0.008). In monthly-household expense 1,000-9000 baht, subjects with low and moderate level of practice was 88(56.8%), and high level of practice was 67(43.2%), while monthly-household expense 9,001-80,000 baht the subjects with low and moderate level of practice was 60(41.4%), and high level of practice was 85(58.6%)

**Table 31.** Association between knowledge and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Knowledge	Practice			Chi Square	p value
	Low /Moderate	High	Total		
	n (%)	n (%)	n (%)		
Low & Moderate	140(58.1)	101(41.9)	241(100)	37.604	0.000*
High	8(13.6)	51(86.4)	59(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As present in table 31.** Shown that there was a statistically significant association between knowledge and practice ( $p$  -value 0.000). Subjects with low and moderate level of knowledge had low and moderate level of practice was 140(58.1%), and high level of practice was 101(41.9). while high level of knowledge and high level of practice was 51(86.4%).

**Table 32.** Association between attitude and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Attitude	Practice			Chi Square	p value
	Low /Moderate	High	Total		
	n(%)	n(%)	n(%)		
Low /Moderate	51(68.9)	23(31.1)	74(100)	15.075	0.000*
High	97(42.9)	129(57.1)	226(100)		
Total	148(49.3)	152(50.7)	300(100)		

**As presented in the table 32.** Shown that there was a statistically significant association between attitude and practice ( $p$  – value 0.000). In subjects with low /moderate level of attitude and had low and moderate level of practice was 51(68.9%), high level of practices was 23(31.1%). On the other hand, in subjects with high level of attitude and high level of practices were 129(57.1%)

**Table 33.** Association between attitude and knowledge of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

Knowledge	Attitude			Chi Square	p value
	Low /Moderate	High	Total		
	n(%)	n(%)	n(%)		
Low/Moderate	69(28.6)	172(71.4)	241(100)	10.362	0.001*
High	5(8.5)	54(91.5)	59(100)		
Total	74(24.7)	102(34.0)	300(100)		

**As presented in the table 33.** Shown that there was a statistically significant association between knowledge and attitude ( $p$  –value 0.001). In subjects with low and moderate level of knowledge and low and moderate level of attitude was 69(28.6%), and high level of attitude was 172(71.4%). On the other hand, in subjects with high level of knowledge and high level of attitude was 54(91.5%), high level of knowledge had low and moderate level of attitude was 5(8.5%).



## **CHAPTER V**

### **SUMMARY, DISCUSSION AND RECOMMENDATIONS**

#### **5.1 SUMMARY**

Numbers of diabetic patients who have experienced diabetic lower extremity amputation are high. Lower extremity amputation is considered a threat to quality of life of diabetic patients (Carrington et al., 2009). About 50% of diabetic patients with lower extremity amputation die within 5 years after the amputation. In several countries, studies on prevention and treatment of diabetic foot have been focused to reduce occurrence of lower extremity amputations. Foot deformities are more likely to be occurred among diabetic patients rather than others. Apart from dietary management, exercise, medication and foot care are very important for diabetes mellitus treatment. For developing country, expenses for diabetic foot care are as high as 40% of the total health care expense. Preventive self-care information is required to be given for diabetic patients. Based on working experiences as nurse at the surgery patient ward at Roi-Et Hospital, there have been diabetic patients admitted to the hospital due to a lack of knowledge, understanding, and awareness of preventive self-care for diabetic feet. The objective of this study were to (1) assess the demographic data, the level of knowledge, the level of attitudes, and the level of preventive self-care for diabetic foot ulcer of the respondents (2) study the factors associated with the preventive self-care for diabetic foot ulcer of the respondents.

This study is a cross-sectional study with an interview questionnaire as a research tool. Data collection was between September to December 2009 with a total number of 300 respondents by Taro Yamane sample size calculation formula. The sampling technique was quota sampling from the total numbers of 800 out-patient department patients who were registered as diabetic patients at the Diabetic Foot Clinic at Roi-Et Hospital during October 2007-October 2009, and held Thailand's Gold Card. There were 4 sections in the questionnaire. The first part was the socio-demographic of the respondents (gender; age; marital status; educational level; occupation; numbers of family members; monthly household income; monthly household expense; and family history with diabetes mellitus. The second part was knowledge on diabetes mellitus in general and knowledge on preventive self-care of diabetic foot ulcer in particular (28

items). The third part attitude on diabetes mellitus in general and attitude on preventive self-care of diabetic foot ulcer in particular (11 items). The fourth part was on practice of preventive self-care for diabetes mellitus in general and o diabetic foot ulcer in particular (12 items). The reliability with 30 samples for try-out of the questionnaire revealed the value of 0.758. The scoring of knowledge part was in 3 levels: 0-16 (less than 60%) indicated the low knowledge level; 17-22 (60-80%) indicated the moderate knowledge level; 23-28 (more than 80%) indicated the high knowledge level (Bloom, 1968:60). The scoring for attitude and practice part was in 3 same level by the use of range: 1.00-1.66 indicated low level; 1.67-2.33 indicated moderate level; 2.34-3.00 indicated high level. The statistic significant level was less than 0.05. Data analysis for descriptive (frequency, Percentage, mean, standard deviation, minimum and maximum values) and inferential statistics (Chi-square test) were conducted by SPSS version 17 (licensed for Chulalongkorn University).

The study revealed that majority of the respondents were female (67.3%), in the age bracket of 55-60 years old (41.7%) with mean age of 53 years. They were married (76.0%), finished their primary school (59.0%), and were agriculture by occupation (30.0%). The average numbers of their family members were 4 persons. Their household monthly income was 15,682 baht on average with average household monthly expenses of 10,702 baht. The family members had no diabetes mellitus problem (45.3%) and had on foot ulcer unconsciously (80.3%). In terms of their knowledge level, the respondents were on moderate (66.0%), their attitude was on high level (75.3%), and their practice was on high level (50.7%). Regarding factors associated with the practice of preventive self-care of diabetic foot ulcer were gender (0.021); occupation (0.005); household monthly expense (0.008); knowledge (0.000), as well as attitude (0.000).

## **5.2 DISCUSSION**

### **Discussion**

This study was an analytical cross-sectional study concerning assessment of knowledge, attitude and practice of preventive self-care on diabetic foot ulcer in type II diabetes patients, Muang District, Roi-Et Province. According to the questionnaires constructed by author from various book and research papers applicable question

items, after the thesis Committee's approval, on-probability in quota sampling method was applied in subjects with diabetes among 40-60 years old. The data was analyzed by Statistical Package for the Social Science (SPSS Version 17) Program for two steps:

### **Descriptive statistics and inferential statistics.**

Overall, 66.0% on knowledge level had a moderate level of DM knowledge; an agreeable high level of attitude (75.3%), and 50.7% of practice also on high level. Above-mentioned findings are in line with a study conducted by Sathienpong Siwina in 2003 revealing that 70.70% of diabetic type two patients had an overall DM knowledge. Likewise, Pitsamai Utharak who conducted a study in 2009 also found that 75.94% and 63.63% of the diabetic type two patients had an overall DM knowledge and positive attitude towards DM, respectively. For aspect of preventive self-care of foot wound, this research found that 56.44% of the samples performed preventive self-care of foot wound in overall. This finding also is in line with a study by Oranut Srisarakam in 2007 and Chutamas Wilasri in 2008. These two researchers found that diabetic type two patients performed preventive self-care of foot wound in all 6 aspects and in each aspect at fair level. In addition, a study of Sujittra Limaunuaylap, Ampaporn and Walaiporn Nunsupawat in 1993 indicated that half of diabetic type two patients performed a correct nail trimming. In addition, 59.46% cleaned their feet properly, while only 4.05% of them let their feet dirty to a wound. Furthermore, most of them (85.29%) wore flip-flop.

At significance level of less than 0.05, factors associated with practice included gender (0.021); occupation (0.005); household expenses (0.008); knowledge (0.000); and attitude (0.000). Such finding is in line with a research conducted by Sathienpong Siwina in 2003 who revealed that factors influencing preventive self-care of diabetic type two patients are DM knowledge and attitude towards DM. For history of occurrence of foot wound is usually occurred with individual who experienced a chronic ulcer before. This is also confirmed by Siriporn Janchai in 2005 who stated that more than 50% of diabetic patients who had leg amputation will get another leg amputation in next few years. In addition, 2 in 3 will lose their lives in 5 years. Risky factors usually reported were previous diabetic wound or leg amputation, long

suffering with DM, uncontrolled blood glucose level, nerve degeneration and peripheral arterial disease.

The above-mentioned findings may be caused by changes of lifestyles at the current. As the economic situation has balanced roles of different gender, so this change also has an influence on individual's lifestyle and health behavior. Therefore, cognitive domain (knowledge) is considered an important component for an individual to perform a healthy and appropriate behavior. (Sanya Tankrongsin, 2001). For affective domain (attitude), it is a component that is associated with a preventive self-care of an individual. Affective domain is like a mechanism for an individual to be ready in acting to an individual, object or any circumstances (Wanida Wieanpak, 2001). For history of occurrence of foot wound, it is found that 15% of diabetic patients experienced foot wound before and 14-24% of those with previous history of foot wound had leg amputation eventually. Therefore, preventing a foot wound can reduce numbers of leg amputation, increase quality of life, decrease a burden towards family and reduce an expense. Diabetic patients are at risk of getting chronic ulcer at foot, because peripheral nerve flowing to leg and foot is degenerated. As a result, foot and leg will get numb and lose feeling when contacting with sharp objects, pressure and heat which will cause a serious and unaware foot ulcer without receiving a proper treatment. Apart from that, degeneration of peripheral nerve also cause a dried a foot's skin, weak muscle of foot, deformed foot to a serious foot ulcer. In addition, obstruction of peripheral nerve flowing to foot is an important cause that slows a recover of foot wound. Risky factors or signs of easily getting a foot wound that should be aware are aging, long suffering from DM, uncontrolled blood glucose level, overweight causing a pressure towards feet, poor vision caused by long suffering from DM, inability to exam a foot wound at the beginning stage and deformation of foot (Pramuk Throngjakkeaw, 2010).

### **5.3 Recommendations.**

#### **5.3.1 General recommendations.**

Agencies involved in providing health education activities and events for treatment for diabetes, such as Health hospitals should be organized to suit the condition of each patient, including knowledge of social support. Education. Attitudes

and characteristics of family focused activities that cause the knowledge such as providing health education to small groups for patients' relatives. Because diabetes is a chronic disease It is imperative that patients be treated consistently. So a group of relatives is necessary to intellectual Understanding of self-care practices in the correct way to prevent complications to the patients or with the treatment group relative with a mentor and group relatives, because the sources of social support. This will result in the patient is encouraged and self health care in the right direction and continued.

### 5.3.2 Recommendations for future research

1. Should be to study other factors such as belief in the power of self Social tradition. Housing conditions, health status and stress from a boring unit to maintain the effective self-care behaviors of patients with diabetes or not.

2. Should have the satisfaction of the patient to place public services that affect diabetes patients continuously.

3. Should have the education, motivation or social reinforcement to make diabetes self-care behaviors continued.

4. Data should be collected by General physical examination with to learn self-care behaviors of patients authentic.

5. Should have the dimensions of integrated research and social action (CO-PAR: CO.) To build capacity of communities to promote self-care behavior

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## APPENDIX A

### Questionnaire Research on “Assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand”

#### Part 1 – Personal Data of Samples

1. Age.....years [G1]
2. Sex [G
  - 1. Male  2. Female
- 3.. Marital Status [G3]
  - 1. Single  2. Married
  - 3. Widow/Divorced/Separated  4. Others- please specify.....
4. Religion [G4]
  - 1. Buddhism  2. Islamism
  - 3. Others – please specify.....
5. Education Level [G5]
  - 1. Uneducated  2. Primary level
  - 3. Secondary level  4. Diploma level
  - 5. Bachelor degree or higher  6. Others – please specify.....
- 6.. Occupation [G6]
  - 1. Housework  2. Employee
  - 3. Agriculture  4. Commerce
  - 5. Government service/ State enterprise
  - 6. Others – please specify.....
7. Numbers of household’s members.....people [G7]
8. Monthly household’s income.....Baht [G8]
9. Monthly household’s expense.....Baht [G9]
10. What is your status in your family? [G10]
  - 1. Father/mother  2. Resident  3. Son/daughter/grandchild  4. Other
11. Your family members who have DM history [G11]
  - Older/younger sister  Father/mother
  - Grandfather/grandmother  No family members with DM
12. How many times have you had a foot wound without being awareness? [G12]
  - One time  More than one time
  - One time with losing finger  Never/cannot remember

**Part 2. Knowledge on** Assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand

Please put a (/) in one box where you think your answer is.

‘correct’ refers to you think the sentence is correct.

‘incorrect’ refers to you think the sentence is not correct.

‘not know’ refers to you do not know about the sentence.

Item	Questions	correct (3)	Not correct (2)	Not know (1)	code
1	One of diabetes mellitus’s causes is hereditary.				K1
2	Diabetes mellitus is a condition of an excessive blood glucose amount in human body.				K2
3	Reduction of body’s insulin is a major cause of diabetes mellitus				K3
4	Diabetic patients can easily get foot syndrome, if they do not control their blood glucose level to its normal level.				K4
5	Diabetic patients who can maintain blood glucose level to its normal level can decide to stop taking medicine themselves.				K5
6	Diabetic patients who do not receive a continuous treatment, they may experience complications that will cause a wound and ulcer.				K6
7	A patient who has been suffering from DM for a long time and cannot control blood glucose level will experience numbness of hand and feet.				K7
8	Hypoglycemia condition includes such as sweating, heart shake and freezing cold body.				K8
9	Taking Phyllanthus urinaria, commonly known as Chanca piedra can cure diabetes mellitus completely.				K9
10	A regular exercise (at least 3 times a week) can help controlling a blood glucose level.				K10
11	Diabetic wound is difficult to cure and may later cause a toe and leg amputation.				K11
12	An accurate glucose test is to measure glucose in a urine sample.				K12

<b>Item</b>	<b>Questions</b>	<b>correct (3)</b>	<b>Not correct (2)</b>	<b>Not know (1)</b>	<b>code</b>
13	One good methodology for reducing blood glucose level is not to have dinner.				K13
14	Difficult-to-heal wound is one of symptoms of diabetic mellitus.				K13
15	If a diabetic patient with DM does not receive a good treatment, he/she will easily get a diabetic wound.				K15
16	An appropriate foot care can prevent a diabetic wound at foot.				K16
17	If a diabetic patient wants to take care of their feet themselves, monitoring on feet is a must.				K17
18	Diabetic patients must be able to report/identify an occurrence of inflammation that may cause a diabetic wound.				K18
19	Diabetic patients should use hot water to clean their feet.				K19
20	Diabetic patients should dry their feet, especially between foot fingers after taking a shower.				K20
21	Diabetic patients should put sesame oil, olive oil and lotion on their feet and between foot fingers				K21
22	Diabetic patients should scrape corns or harden-think skin on feet themselves.				K22
23	Toenail care is not important for diabetic patient.				K23
24	Diabetic patients should not walk with bare feet.				K24
25	It is not necessary for diabetic patients to change shoes during a day.				K25
26	Diabetic patients should wear a high-heel shoe and a topless-flip-flop a slipper.				K26
27	Diabetic patients should avoid wearing too-tight socks or too-tight clothes for groin and foot areas.				K27
28	If a diabetic patient experiences a problem of foot, he/she should see a foot clinician at a hospital.				K28



**Part 3 – Attitude** on assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand.

**Explanation** Please put a (/) in a box where you think your answer is.

‘agree’ refers to you agree about the sentence.  
 ‘not sure’ refers to you are not sure about the sentence.  
 ‘disagree’ refers to you disagree about the sentence.

Item	Sentence	Agree (3)	Not sure (2)	Disagree (1)	code
1	It is difficult not to eat sweet food and high-fat meat.				A1
2	An exercise is considered a matter for young people.				A2
3	Diabetic patients can take care of their feet themselves.				A3
4	A strictly dietary is a must for diabetic patients.				A4
5	Having a lifestyle with concept of ‘YouDeeMeHang’ can prevent a foot wound for diabetic patients.				A5
6	It is worthwhile to strictly perform behaviors according to foot-wound care related suggestion given by a doctor.				A6
7	Everyday-foot monitoring does not waste your time as it helps preventing an occurrence of a foot wound.				A7
8	Preventing an occurrence of a foot wound is another step for diabetic patients to increase their self-value.				A8
9	Warm water should be used to clean feet.				A9
10	As foot is regarded as lowly structure, therefore; to request helps regarding foot from others is considered an inappropriate matter.				A10
11	An effective foot care is viewed as responsibility of a doctor only.				A11

**Part 4 – Behavior** on Assessment of knowledge, attitude, and practice of preventive self-care on diabetic foot ulcer in type II diabetic patients, Muang Roi-Et District, Roi-Et Province, Thailand

Please put a (/) in a box where you think your answer is.

‘regularly’ refers to you have performed the behavior for 5-7 times a week.

‘occasionally’ refers to you have performed the behavior for 3-4 times a week.

‘rarely’ refers to you have performed the behavior for 1-2 times a week.

Item	Sentence/behavior	Regularly (3)	Occasionally (2)	Rarely (1)	Code
1	You check your blood glucose level according to suggestion given by a doctor.				B1
2	You check your sight according to suggestion given by a doctor.				B2
3	You abstain from drink and food to control blood glucose level before the day of your blood test.				B3
4	You check your feet every time when you recognize numbness at your foot.				B4
5	You check your feet every time after you received suggestion from a doctor regarding abnormal foot among diabetic patients.				B5
6	You use warm water to clean your feet.				B6
7	After cleaning feet, you will completely dry your feet and between foot fingers.				B7
8	You put olive oil or lotion on your feet, except between foot fingers.				B8
9	You use ‘foot stick’ to scrub your feet and/or foot heel while taking a shower.				B9
10	When having ingrown toenail, you trim your nail short to its edge of nail and also trim side-nail.				B10
11	When wearing a shoe, you do use put shoe-foot pad.				B11
12	You like to walk with bare feet within your in-house area.				B12

**Thank you for your cooperation.**

**APPENDIX B****Budget**

1. Questionnaire development (300 copies)	Baht1,500
2. Typing	Baht600
3. Paper supplies	Baht500
4. Document development	Baht6,000
5. Dissemination and Public Relation	Baht5,000
6. Others	Baht500
<b>Total budget</b>	<b>Baht14,100</b>

## APPENDIX C

### Time Schedule

Project procedure	Time Frame (months)									
	2008-2009					2010-2011			May 2012	
<b>Preparatory phase</b>										
1. Search of information and review of literature	↔									
2. Present a pre-proposal		↔								
3. Develop and inspect of quality of research measurement tools		↔								
4. Ethics review			↔							
<b>Implement collection of data</b>										
5. Data Collection					↔					
6. Analyze and evaluate data							↔			
7. Final exam								↔		
8. Submission of thesis book										↔
9. Publication										↔

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