

CHAPTER II

ESSAY

EDUCATION BASED ON HOME HEALTH CARE : AN INTERVENTION TO IMPROVE SELF CARE ABILITY (Knowledge, Attitude towards decision-making, Practice) IN POORLY CONTROLLED BLOOD GLUCOSE LEVEL OF NON-INSULIN-DEPENDENT DIABETES MELLITUS

2.1 INTRODUCTION

The most prominent metabolic abnormality present after the onset of non-Insulin-dependent diabetes mellitus (NIDDM), is hyperglycemia. Poor metabolic control is correlated with a high prevalence of longterm complications represented by ; cardiovascular diseases, cerebrovascular accidents, renal disease, retinopathy and neuropathies. They are already major causes of morbidity, disability and sudden death (Ballard, 1988). The two major factors causing these disorders, are genetic susceptibility environmental factors including physical inactivity, obesity and fat distribution and certain nutritional trends (WHO,1993). The initial management of NIDDM should include patient education, dietary control and individualized physical activity. Drug therapy is given when the first three steps fail to control metabolic status (Lefebvre PJ, 1992). The goal is to control metabolic abnormalities that predispose to long-term degenerative complications which are the causes of death (Pirart J, 1987). Optimal control results in the restoration of nearly normal blood glucose levels and the accompanying proper physiological utilization of carbohydrate, fat and protein. The

ease with which control can be achieved is dependent upon the basic nature of the disease, the knowledge and cooperation of the patient, the skill and concern of health care delivery system, existing technology, and the nature of the evaluation (WHO, 1993).

Many studies focus on the method of health education in NIDDM patients at hospital based care around the country. The study of self care education programs for diabetes may be conducted with individual or in groups. Some models use the leaflets and newsletters for educating patients. The results of these models are not effective in promoting self care, continuity of care and diet control. Some patients do not accept the modern medical treatment. In Thailand there are few qualified diabetes nurse educators who can teach Thai diabetes patients. The development of proper video tapes to aid diabetic education is still needed to cope with the lack of adequate educators. According to Archananuparp and colleague 's report of self care education program for diabetes, the project was implemented at NKL hospital in 1995. The program was divided into three phases ; (1) determining the diabetic patients' perceptions, belief and self care behavior, (2) developing educational media, and (3) implementing a self care education program through individual counseling and group discussion in the intervention group and (4) a control group which received simple treatment but no self care education program. It was found that there was a statistically significant change of body mass index but HbA_{1c} and fasting plasma glucose levels did not change (Suthijumroon,1996). The study recommended that group discussion was useful in raising knowledge of self care ability and psychological support to

patients, and encouraging their families to understand and support them. However, there were some weaknesses in the program, mainly related to the nurses who were facilitators in group discussion. The majority of nurses were not skillful in identifying patients' problems, and the patients lack sufficient skill or understanding to carry out provider recommendation in self care behavior. Training nurses to apply nursing process for education based on home health care is the basis of this study. The result of this study should be documented for use in subsequent program planning and modification.

2.2 THE PROBLEM SITUATION

2.2.1 Definition of the problem

Diabetes mellitus (DM), Dictionary Definition: Thomas Willis, 1683 a 17th-century English physician, noted that an illness characterized by raging thirst and excessive urination was described in an Egyptian papyrus as early as 1,500 BC. Arataeus, a Greek physician, first used the word 'diabetes' (meaning "a siphon") nearly 200 years later to describe the same disease. "A melting down of the flesh and limbs into water" describes it accurately; fat and muscle are broken down to glucose which spills from the blood into the urine and "sucks" water out of the body. The urine was sweet to the taste and added the word "mellitus" = 'honeyed' (Daly, 1983).

" A complex disorder of carbohydrate, fat and protein metabolism that is primarily a result of a relative defects of the insulin receptors." (Mosby's Medical, Nursing, and Allied Health Dictionary, 1994)

American Diabetes Association, 1985 " Diabetes mellitus can be defined as a chronic disease associated with abnormal high level of glucose in the blood. A rise in glucose occurs when food is consumed. Glucose in blood is an energy source for cells and tissues throughout the body. However, utilization of glucose requires a hormone, insulin, that allows the glucose to be used. Diabetes occurs when the body does not make enough insulin or when cell can not make use of the available insulin. The two most common forms of diabetes mellitus are as follows:

1. Type I or insulin-dependent diabetes mellitus (IDDM) : Juvenile onset, usually less than 30 years old, usually normal or underweight.
2. Type II or non-insulin-dependent diabetes mellitus (NIDDM) : Maturity onset, usually over than 40 years old, usually overweight.

Non-insulin-dependent diabetes mellitus (NIDDM or Type II diabetes)

DeFronzo, 1983 " A heterogeneous disease characterized by hyperglycemia resulting from pancreatic beta-cell dysfunction, excessive hepatic glucose production, and insulin resistance. Phyllis ,1997 documented that NIDDM is a disorder that occurs when the body does not make enough insulin or when cells cannot make use of the available insulin. Insulin is a hormone produced by the pancreas. (The pancreas is the large gland that lies behind the stomach.) When food is digested the body breaks down the food into sugar (glucose) and carries the sugar to the cells of body for energy. Insulin helps the sugar enter the cells and controls the level of sugar in blood. When

the body does not have enough insulin, the cells do not absorb enough sugar from blood, as the result the blood has high levels of sugar.

WHO,1993 noted that NIDDM is often asymptomatic and consequently many cases remain undiagnosed, individuals may have the disease for years before it is clinically diagnosed. Epidemiological studies of the prevalence of NIDDM have been carried out in many parts of the world , the most frequent forms of NIDDM result from an interaction between genetic susceptibility and environmental risk factors.

There are probably multiple etiologies for NIDDM, for examples; (1) the common outcome being derangement of carbohydrate metabolism, (2) genetic factors, (3)environmental factors and (4) obesity. Most signs and symptoms are the same as IDDM and associated with hyperglycemia. These include polydipsia, polyuria, nocturia, visual disturbances, fatigue and weight loss. In most cases the disease starts after age 40 (Heather,1983) . NIDDM can present classic diabetic symptoms and signs such as thirst, polyuria, polyphagia, pruritus, and weight loss, but these often occur only after a long asymptomatic period. Other complications such as retinopathy, nephropathy, atherosclerotic heart disease or neuropathy may be the first clinical indications of the disease. An abnormal urine or blood glucose test, performed as part of health screening or routine medical care in an otherwise asymptomatic individual, may be the first indication that the subject may have NIDDM (C. Ronald, 1994). The cause of NIDDM is even less well understood than IDDM but the B-cells seem to lose their ability to recognize a rise in blood glucose and respond to it by secreting insulin

(a faulty thermostat). Strangely, they may be able to secrete insulin quite normally when stimulated in other ways. The primary difference from IDDM is that the pancreas still continues to produce some insulin, enough to prevent ketosis but not enough to prevent hyperglycaemia.

Hyperglycemia, the diagnostic feature of NIDDM, results from a combination of insulin resistance and inadequate insulin secretion and is caused most commonly by obesity, increasing age, physical inactivity and genetic factors. The treatment focuses on decreasing insulin resistance and increasing insulin availability (McFarland, Kay F, 1997). Middle aged and older diabetic adults are at high risk of microvascular complications such as retinopathy, nephropathy (Ballard, 1985) and macrovascular complications, including the risk of recurrent myocardial infarction in established atherosclerosis and neuropathy, or amputation (Rytter L, Ulvenstam G, 1985). The morbidity and mortality associated with macrovascular disease largely determine the prognosis of NIDDM . The mortality risks are linked with increasing glucose levels. Decreasing glucose levels and reducing retinopathy, nephropathy and neuropathy are intensive management techniques (Onkubo Y, 1995).

Foster, 1991; Melkus, 1993; Wilson & Foster, 1985 " It is well known to all that NIDDM is a life-long disease. It requires a series of long-term self-care activities to maintain metabolic control. The clients with NIDDM must attempt to balance their diet, exercise / activity, and medications to keep their blood glucose levels within an acceptable range and thereby reduce the probability of developing complications or

minimize the progress of macrovascular and microvascular complications " . Some research studies reported that about 90 percent of people with diabetes are in the NIDDM category . In addition, it was estimated that approximately 74.4 % clients with NIDDM remain undiagnosed . NIDDM is characterized by fasting hyperglycemia, atherosclerosis, microangiopathic vascular disease, and neuropathy. (Huang Jin, 1996).

The diagnosis was made in middle age and with asymptomatic condition when the disease was detected. Sometimes the disease is present with either acute or chronic complications which in turn leads to detection. In addition to the characteristics of hyperglycemia and hyperinsulinemia, hyperlipidemia is also present in NIDDM. Low-density lipoprotein (LDL) is elevated, and high-density lipoprotein (HDL) is low. These metabolic abnormalities contribute to the extent of macrovascular complications that are typically seen in NIDDM (Melkus,1993).

Most often the clinician encounters patients who present either suggestive symptomatology, i.e., a possible complication of diabetes, or an abnormal blood or urine glucose test. Diagnosis depends primarily on when hyperglycemia can be confirmed. The most useful initial test is the measurement of fasting blood or plasma glucose level. If it can be shown and/or confirmed that the fasting glucose concentration is elevated to a level diagnostic of diabetes (Table 2.1) and that ketosis is absent, the diagnosis of NIDDM is established, if it is nondiagnostic an oral glucose tolerance test is needed to exclude or confirm the diagnosis or to determine whether impaired glucose tolerance is present (C.Ronald, 1994).

Table 2.1: Diagnosis Values for the Oral Glucose Tolerance Test

Diagnosis, Test	Glucose Concentration, mmol/L (mg/dL)			
	Whole Blood		Plasma	
	Venous	Capillary	Venous	Capillary
DIABETES MELLITUS				
Fasting value	≥6.7 (≤120)	≥6.7 (≤120)	≥7.8 (≤140)	≥7.8 (≤140)
or				
2 hr after glucose load	≥10.0 (≤180)	≥11.1 (≤200)	≥11.1 (≤200)	≥12.2 (≤220)
IMPAIRGLUCOSE TOLERANCE				
Fasting value	≥6.7 (≤120)	≥6.7 (≤120)	≥6.7 (≤120)	≥6.7 (≤120)
and				
2 hr after glucose load	≥10.0 (≤180)	≥10.0 (≤180)	≥10.0 (≤180)	≥10.0 (≤180)

Source : Diabetes mellitus. Report of WHO study group, 1985.

Primary treatment goals of NIDDM includes avoiding symptoms of hyperglycemia, minimizing risk therapy, and reducing long-term diabetic complications (McFarland, Kay F, 1997). The normal and near normal metabolic control are the goals of treatment, the current recommended treatment modalities are dietary control, increasing physical activity, and pharmacologic therapy (Melkus, 1993). Table2.2 presents targets that may be considered.

Table 2.2 : Therapy targets

Value	Unit	Good	Fair	Poor
Fasting Plasma glucose level	mg/dl	80-120	121-140	>140
HbA1c	%	< 6.5	6.5-7.5	> 7.5
Cholesterol level	mg/dl	< 200	200-250	> 250
Triglyceride level	mg/dl	< 150	150-200	≥ 200
Body mass index - male	Kg/m ²	< 20-25	25.1-27	> 27
- female		< 19-24	24.1-26	> 26
Blood pressure	Mm Hg	< 140/80	140/80 - 160/95	>160/95

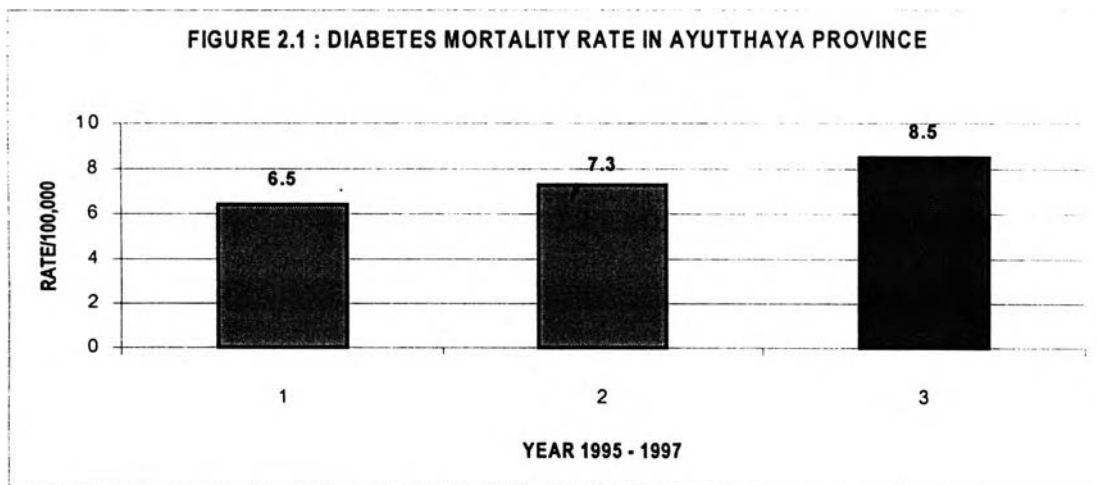
Source : Suriyawongpaisarn, P. Standard method of diabetic care, 1996.

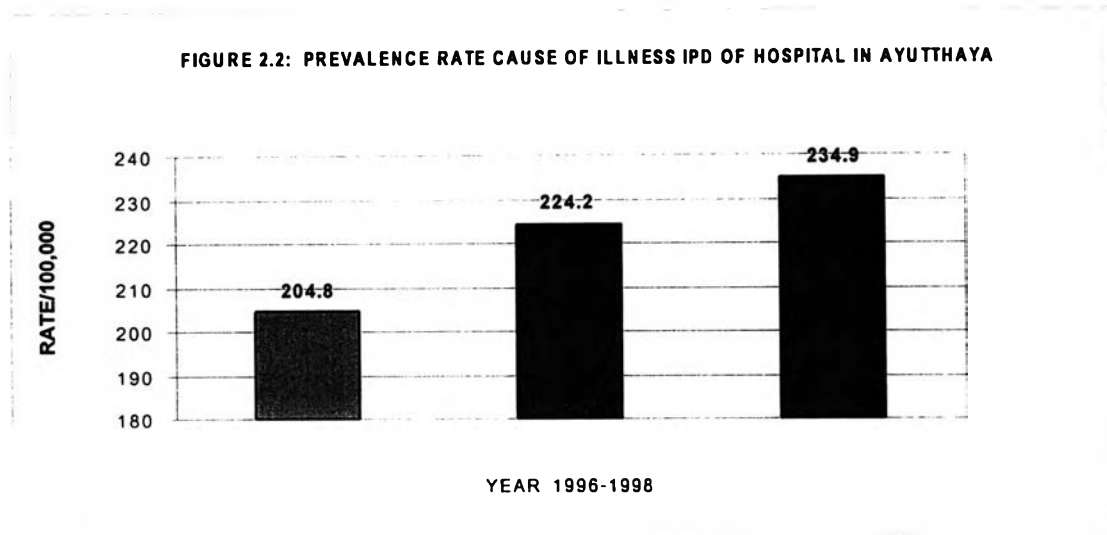
2.2.2 Reasons, assumptions and evidence

Studies of the prevalence of NIDDM have been carried out in many parts of the world, NIDDM is higher in certain ethnic groups than in others, even when they live under similar conditions. It is often higher in people of the same ethnic group living in an urban or industrialized environment than in a more traditional rural environment, particularly in developing countries (WHO, 1993).

According to public health statistics of Thailand, Office of Health Policy and Health Planning, Ministry of Public Health Thailand (1994), there are 79.10 cases per 100,000 inpatients with DM throughout Thailand, with most of the cases 53.60 / 100,000, in the central region. Ayutthaya is one of the cities in the Central region of

Thailand and according to the annual report of Ayutthaya Health Office has reported that accident, heart, hypertension and cerebrovascular diseases, diabetes are the five major caused of deaths from 1996-1998. In 1998 it is indicated that diabetes mellitus (DM) is one of ten leading causes of death (5.7 /100,000 of all deaths with specific diagnosis). The mortality rate also increases steadily from 6.5/100,000 in 1995 to 8.5/100,000 in 1997 (Figure2.1). The cause of illness in hospitalization load for DM from 1996 - 1998 was 204.8, 224.2 and 234.9 / 100,000 of all inpatients in Ayutthaya hospitals respectively (Figure 2.2).





Source: The Annual Report of Ayutthaya Health Office

In 1997 to 1998 diabetes patients increased from 12.72% to 13.74% of all service in Ayutthaya hospitals and 66 percent of these were sought for registration at 14 community hospitals, particularly in Nakornluang (Ayutthaya Annual report, 1998). Nakornluang (NKL), one of sixteen districts, is located in the northeast of Ayutthaya province, has a population about 30,000, divided among 12 subdistricts with a health center in every sub-districts.

NIDDM patients increase year by year from 7.3% in 1995 to 8.6% of total patients in 1997 at NKL out-patient department. NKL hospital located in Borpong subdistrict of NKL district, serves a population of 5,698. The hospital provides comprehensive health services including curative, preventive, promotive and rehabilitative. More emphasis is placed on curative care, and in secondary level of health care. The annual report of NKL hospital in 1998 showed that the diabetes

patients who registered in the diabetic clinic totaled about 491 cases, these patients accounted for 3,000 visits / year. The trend in admission rates increased from 1.5 in 1993 to 5.6 in 1998. More than 50 % of DM patients were over 60 years old. Even through the DM clinic was developed to provide a more effective follow up system , a high percentage of patients are still lost . In 1997, NKL hospital participated in Ayutthaya Health Care System Research Project (AHSRP). The objective of the research was (1) to develop an integrated health care system in which the health center and the district hospital fulfill their respective functions and (2) to strengthen primary health care. The study in the Ayutthaya research project found that the causes of low follow up and irregular visits were (1) economic, (2) lack of persons who provide patient care and (3) insufficient of knowledge and low understanding of the nature of DM between patients and health providers. Another study by a medical student from the Faculty of Medicine, Ramathibodi Hospital, showed that among most NIDDM patients, blood sugar is poorly controlled (fasting blood glucose are over 140 mg%). This caused a wide range of problems for patients and their family members. These problems included hospitalization, changes in lifestyle and vocation, physical disabilities, and threatened survival.

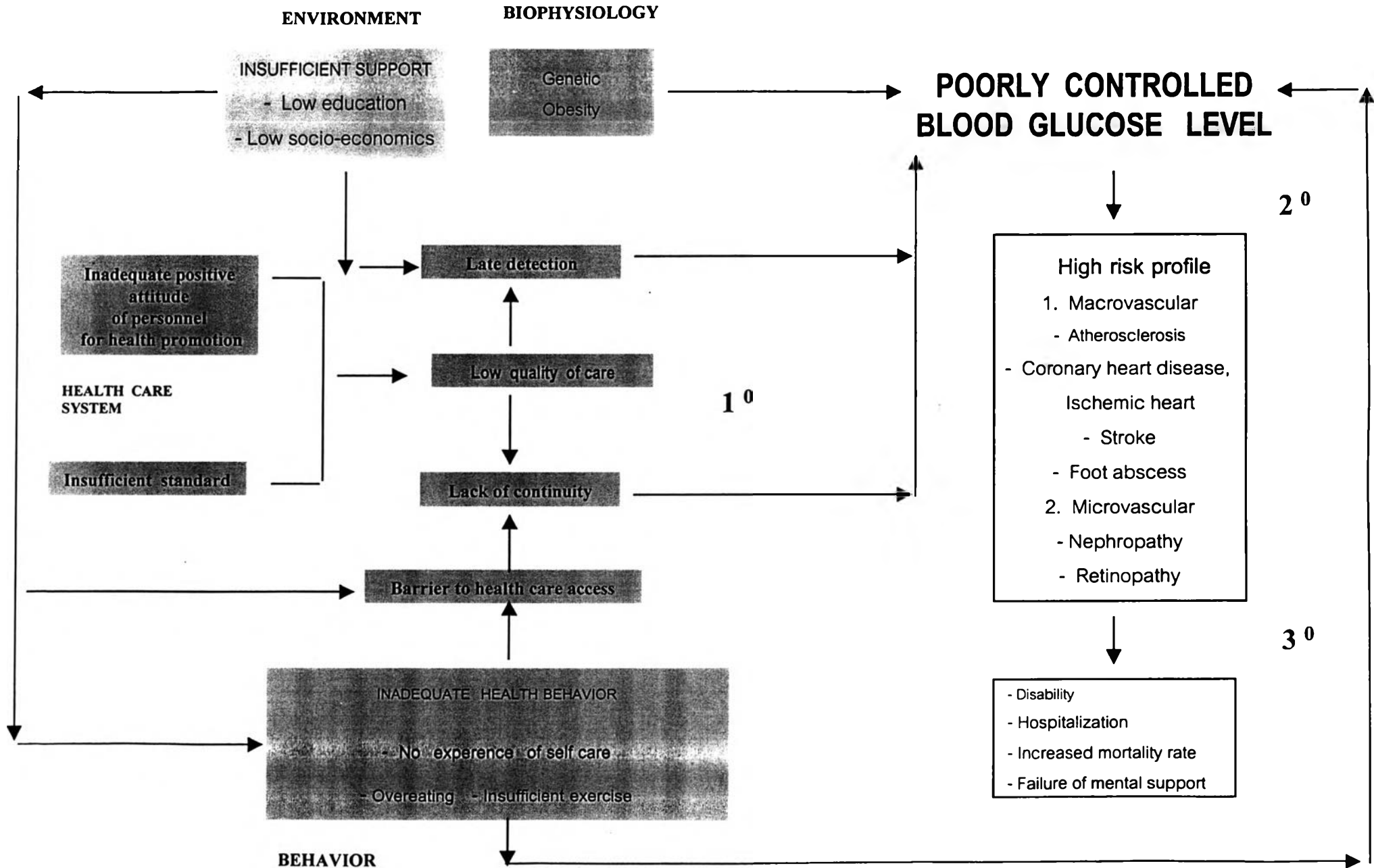
2.2.3 The causal web of the problem

The situation is complex and many factors collectively contribute to it. The causes and consequences of the problem situation are described as a causal web. This framework shows that any effort directed toward health promotion and disease

prevention must be based on clear understanding of the natural history of the processes responsible for the etiology of the disease. The etiology of NIDDM involves a web of factors, each of which has a modest impact on the risk of complication. According to H.L.Blum , in 1976 the classifications of impacts on health status are as follows: (1) Bio-physiological, (2) health service system, (3) behavioral, (4) environment or socioeconomic.

The model that served as the framework for this study was developed to analyze the methods currently available to prevent the occurrence of complications from disease and to identify gaps to be substantiated for this study. Therefore, prevention efforts should focus on risk factors that are associated with an increase in risk of complication , and have the potential to respond positively to changes in environment and life-style. It is described in the causal web in Figure 2.3

FIGURE 2.3: The causal web of the problem situation
THE POORLY CONTROLLED BLOOD SUGAR LEVEL NON - INSULIN - DEPENDENT DIABETES MELLITUS



2.3 THE MECHANISM OF THE PROBLEM SITUATION

2.3.1 Causes of the problem situation

Prolonged hyperglycemia, the effect of poorly controlled blood glucose level NIDDM, is a toxic condition which can produce both microvascular and macrovascular damages over time. Patient adherence to the complex regimen for control of blood glucose is one of the more problematic aspects of diabetes care. Both provider and patient must have the knowledge and skills to control blood glucose. Complications will occur if blood sugar levels are poorly controlled.

According to H.L.Blum's concepts, there are many causal factors that influence the quality of care for NIDDM patients. Figure 2.3 shows factors leading to poorly controlled fasting blood glucose levels and increased complications, they are listed and analyzed below.

Biophysiological

The two major bio-physiological determinants, interacting with each other in causing NIDDM are genetic susceptibility and environmental factors particularly obesity(WHO, 1993).

A genetic defect in the insulin secretory response to nutrients may be brought out for the first time when insulin resistance increases. NIDDM has a genetic basis that is commonly expressed by a more frequent familial pattern of occurrence than is seen

in IDDM (Daniel,1997). Familial aggregation, the empirical risks of having NIDDM are increased two to six fold . Positive family history in a parent is a practical way of estimating if an individual is likely to have inherited susceptibility genes for NIDDM. Among identical twins there is strong evidence that genetic factors are important in determining susceptibility, a high degree of concordance for NIDDM (John K, 1991).

One environmental factor as described by WHO (1993) is obesity. The majority of patients with NIDDM are obese (John K, 1991). Patients with NIDDM may have a body weight that ranges from normal to excessive; indeed, NIDDM has been sub-classified according to associating with obesity . Obesity and pathologic insulin resistance are by no means essential in the evolution of NIDDM. Fasting hyperglycemia (poorly controlled blood glucose level) is usually improved or corrected by weight loss (Daniel,1997).

Obesity causes diabetes by increasing the demand for insulin beyond the capacity of the pancreas to supply it, which is directly associated with body mass index (BMI). BMI is a simple index of weight- for-height commonly used to classify overweight and obesity in adults. BMI is calculated by the weight in kilograms divided by the square of the height in meters (kg/m^2). For example, an adult who is 70 kgs. in weight and 1.75 m. in height will have a BMI of $70 / 1.75^2 = 22.9$. A BMI of 30 or more is now widely accepted as a classification of obesity (WHO, 1997).

The positive association between obesity and the risk of developing NIDDM have been identified as characteristic of obese persons. Studies of weight loss in NIDDM patients consistently show that weight reduction of 10% to 20% in obese individuals with NIDDM results in marked improvements in glycaemic control and insulin sensitivity. Of the 75 % of newly diagnosed NIDDM patients who are overweight, a 15% to 20% weight loss in the first year after diagnosis seems to reverse the elevated mortality risk of NIDDM (Lean MEJ et al. 1990). Hyperglycemia frequently decreases as soon as a low energy diet is initiated, suggesting that dietary energy restriction has a beneficial effect independent of weight loss.

Health care system

By using the causal web, one can see that the complex and inter-related nature of health care system, which focuses on prevention in Primary Health Care (PHC) as defined by the 1978 International Conference at Alma Ata is a "key strategy consisting of essential care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and cost that the community and country can afford" (WHO, 1978). PHC includes health promotion, disease prevention, curative care and rehabilitation aiming for a better quality of life. We highlighted the following concepts and obstacles in PHC which affects the controlling blood glucose level NIDDM.

Prevention targets the life styles of individuals within the population or environmental factors directly. Three levels of prevention are recognized: primary, secondary, and tertiary. Primary prevention in this causal web can begin very early in life and continue throughout the life span in order to precede the onset of complication. Every person requiring health service has requirements at the primary level of prevention. The focus of promotion of health and primary prevention is to increase health status and prevent early complications. Secondary and tertiary prevention focus on decreasing the consequence of health problem and preventing long term complications.

Inadequate positive attitude of personnel in health promotion : Attitude or one's position for interpreting events, is consciously or unconsciously chosen by individual, and is highly related to human behavior. Positive attitudes of health care providers and consumers towards self care will increase the efficiency of self care promotion. The effects of health promotion education programs in enhancing the diabetic patient's health status and health behavior is dependent upon patient's willingness to participate in programs. Although the distribution of health personnel and number of hospitals and health centers have increased during this decade, this does not mean the quality of care has been developed as much as it should be. Physical structures, are developed more easily than attitude and systems. Attitude is the most important factor because it determines the motivation of personnel including physicians, nurses and other health workers, to provide knowledge and health promotion; the predisposing factors for behavior modification. The relationship

between providers and patients is affected by the attitude of providers. If the relationship is not well established there will be a barrier to health care access, so that patients do not have continuity of care. Some patients make a decision to select alternative care which is not effective and may reduce control.

There are many ways of health promotion such as group discussion, self-help group and individual counseling. Training of health care providers should include attitudinal training. The attitude of the health care personnel will influence the success of the patient self care and control of blood glucose levels. Some research suggests that provider beliefs and attitudes, not knowledge deficits are the major barriers to preventive screening practices and reduce complications in diabetes.

Insufficient standard guideline; New standard guidelines are needed in all situations by meeting desired analysis of appropriateness and utilization of service . To be adequate, concepts should be broad and flexible . The guidelines should emphasise enabling, enhancing and ultimately empowering people for positive health behavior (WHO,1990). An approach to evaluate guidelines for addressing the relationship between culture and health-related beliefs and behavior are discussed. Personal experience, family attitudes, and group beliefs may affect communication to provide support. Effective communication is maximized when the patient and the health care provider share belief that appropriate use of health service and improve health outcome have a higher likelihood of being realized when health care provider and the patient acknowledge and respect each other's beliefs. Therefore opening the lines of

communication around an understanding that the patient's belief can lead to an alliance between patient and practitioner that may facilitate better adherence to health education, more appropriate utilization of standard guidelines of service and improved patient satisfaction with the health care encounter.

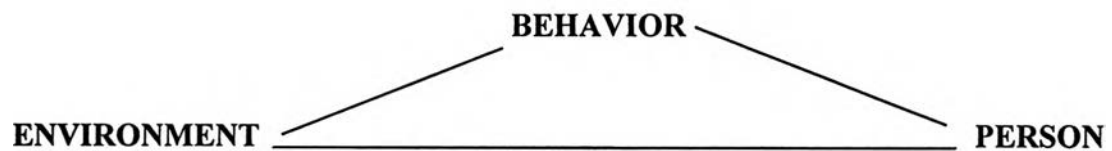
Late detection: A Significant number of NIDDM patients are asymptomatic and many undiagnosed patients are present in the community (Multi-centre study, 1988) . It means that, a large number of people have NIDDM but have not been diagnosed. To identify lost follow up patients, home visits and mailing to give notice to the patients should be included in the follow up system, and it is useful for patient's detection (Adisai, 1989). If the long term complication occurred but the patients could not prevent it because of barring health care access, the consequence of complication is severe.

Low quality of service: The experience and knowledge of a diabetes care team such as : doctors, nurses, pharmacists, and rehabilitative to provide appropriate treatment is not high (Diabetic care, 1989), The standard of treatment should be developed as a guideline for providers especially for the new staff. The providers should have regular training to follow new developments in treatment and technology in diabetic therapy. To improve quality of service the provider should understand the patients' way of life. Record-keeping is important to ensure a good quality of care and is essential for follow-up and monitoring.

Behavioral

The principle of reciprocal determinism in social cognitive theory, shown in figure 2.4 postulates that a person's behavior interacts with the characteristics of the person and of the environment. Behavior reflects environmental and personal influences and in turn affect environmental and personal factors . While social cognitive theory has identified many personal influences on behavior such as skills, outcome expectations, self-efficacy, and self-regulation, consideration of environmental factors largely has been limited to social modeling and alternative reinforcers (Marsha, 1997).

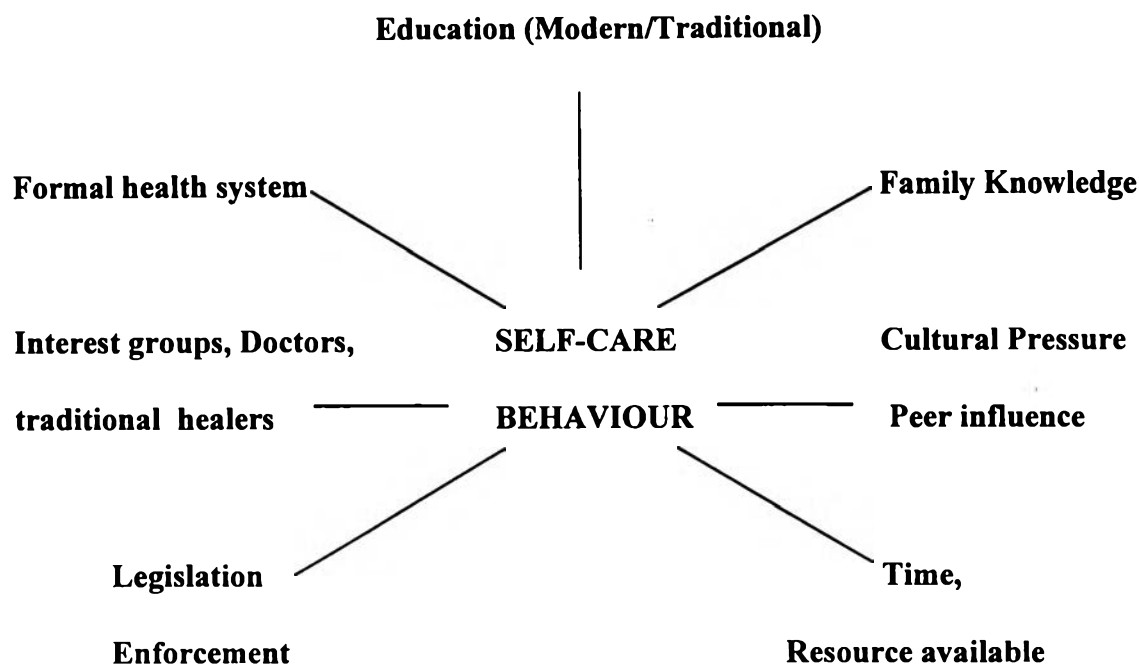
Figure 2.4 : Diagram of social cognitive theory



Source : Albert Bandura (1977)

WHO documented that “ actual self-care is a behavior which is influenced by several factors such as education, modern or traditional, including family knowledge, culturalpressure, the formal health system itself, time and resources available and to a slight degree by legislation and its enforcement “ (Figure 2.5).

Figure 2.5 Influence on Self-Care behavior



Source : Michel Gurney, (WHO/SEARO,1989)

Levin stated that "self-care is a process by which people function on their own behalf in health promotion and prevention and in disease detection and treatment at the level of the primary health resource in the health care system".

" Positive self-care in health is a behavior where individuals, families, neighborhoods and communities undertake promotive, preventive, curative and rehabilitative action to enhance their health. " Self-care in health refers to the activities that individuals, families and communities undertake with the intention of enhancing or bettering health, preventing disease, limiting illness and restoring health. Their activities are derived from knowledge and skills from the pool of both professional and lay experience. These activities are undertaken by lay people on their

own behalf, either separately or in participative collaboration with professionals (WHO, 1983).

Orem (1991) defined self care as the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health and well-being. Self care research in Thailand based on Orem's theory includes exploratory surveys, theory testing studies, nursing intervention studies, and self care outcome studies (Hanuchaunkul, 1993). These studies focus on helping individuals and their families participate in self care. Nurses facilitate individuals' learning and developing skill to care for themselves (Sritanyarat, 1996).

The influence of behavior on health, is very important in successful diabetes control. The behavior of patients has an important role in keeping the blood sugar level within a normal range. In this study, there is a lot of behavior which enhances poorly controlled NIDDM.

Inadequate self care : Self-care activities are important contributors to diabetic care. Some experts and clinicians believe that people with DM who control the disease through a series of self-care activities such as (1) taking recommended medication, (2) self-monitoring glucose levels, (3) participating in an appropriate exercise program, and (4) maintaining a well-balanced diet, will feel much better than those whose disease is not well controlled (Greenfield, Kaplan, Ware, Yane, & Frank, 1988; Zerenz, et al. , 1992). To ensure appropriate management, the basic knowledge

and skills should be acquired by the patient and his family and the health care team should work closely with the patient to achieve and to promote adequate self care. The inter-relationship among inadequate self care and other behavior influences the quality of control, such as; no experience in self care, overeating and insufficient exercise. The following behavioral model relevant to self care education have been considered useful for designing learning experiences and enhancing adherence to diabetes regimens such as self-efficacy, stage of change, patient empowerment and health belief model. Behavioral models have been beneficial in guiding diabetes education for intervention to promote and sustain changes in behavior.

Environmental factors

Socioeconomic: There is no doubt that the socio-economic status/factors of the patient determine the behavior mentioned above. Poor economic status will be a barrier to health care due to treatment cost, as well as an inability to obtain time from the workplace. Economics also be a threat for the wealthy, because they can pay for overeating thus causing poorly controlled NIDDM.

Educational level : This is a predisposing factor in determining the patients' behavior. Highly educated patients can select effective treatment and provide selfcare, but the less well-educated may select ineffective care alternatives which could result in uncontrolled blood sugar levels.

2.3.2 Consequences of problem situation

In non-insulin-dependent diabetes mellitus, the most prominent metabolic abnormality present after the onset of NIDDM is hyperglycemia. Lack of metabolic control is correlated with a high prevalence of microvascular complications e.g., diabetic retinopathy, diabetic nephropathy and macrovascular complications, including the risk of recurrent myocardial infarction in established atherosclerosis and amputation. NIDDM carries a high risk of macrovascular problems of occlusive atherosclerosis affecting the patients' heart, brain and legs; commonly associated hypertension, hyperlipidaemia, may die of macrovascular disease before microvascular disease is advanced. Hyperglycemia or closely associated factors, is of major importance in both the initiation and progression of microvascular disease. In patients with poorly controlled diabetes, even of short duration, blood flow is increased in many tissues including skin, retina and kidney; in the latter, this is reflected by an elevated glomerular filtration rate which predicts eventual renal failure. Neuropathy, is a major cause of diabetic foot syndrome (John Pick-up, 1991).

Finally all these consequences lead to a major negative impact on general health status, mental health and economic development. The complications are a direct consequence of the metabolic abnormalities. There is correlation between the consequent degree of hyperglycemia and the frequency, severity, and rate of progression, leading to early mortality and considerable morbidity. The complications are responsible for the majority of hospitalizations. The economic costs of diabetes, which includes effects on morbidity, employment, productivity, premature mortality

and the use of health service resources, render the disease a major influence on personal, financial, and social life as well as influencing patients and families' mental health.

2.4 AREAS TO BE IMPROVED AND PRIORITY PROBLEMS

In order to select the most promising area for intervention a number of criteria must be examined. Feasibility, practicability, sustainability, political will, cost, vulnerability, magnitude of importance and availability of resources are factors that could be addressed. Self care activities of NIDDM patients are significant factors for controlling the disease, improving the patients self care activities is both feasible and practical.

The problem of diabetic care in NKL hospital are prioritized as follows:

1. There are no effective process for managing the diabetic team.
2. There are many poorly controlled NIDDM patients for managing the diabetic team
3. There is lack of a continuity of care
4. Service providers do not understand the nature of the patient's lifestyle
5. Relationship among team staff, community participation and family is inadequate to promote patients self care.
6. Ayutthaya health care reform project expects that the NKL hospital has the potential to provide equity, quality, efficiency and social accountability,

These measures are the choices for improving quality of diabetic care in the hospital.

Poorly controlled NIDDM patients are our target population. The quality of care for NIDDM is dependent upon behavior modification and self care; for example, diet and body weight control, physical exercise, appropriate drug utilization and foot care. To improve self care ability, the service will concentrate on health education and promoting the necessary self care. Diabetes education is one major aspect that requires strengthening, it is the most important measure in the treatment of NIDDM in improving self care ability (Mazzuca SA, 1986).

This program must be organized according to the culture, situation and life style of the individual patient at home. Self care education is an important contributor to diabetic control such as; taking recommended medications, self-monitoring glucose level, participating in appropriate exercise and keeping within well balanced diet. Those who follow the self care education program will feel much better than those who do not.

2.5 IMPROVING THE PROBLEM SITUATION

The Diabetes Control and Complications Trial (DCCT) confirmed that NIDDM patients who were able to maintain glucose at near normal levels had significantly less diabetic retinopathy, neuropathy, and nephropathy. Normal and near-normal metabolic control of diabetes mellitus are the goals of diabetic treatment, this control can be achieved through standard management including dietary control,

exercise and drug therapy. Self care is a basic strategy for diabetes control (WHO, 1993). It has long been recognized that people with diabetes have to learn to use self care for ongoing disease management (Funnell MM, 1995).

Education allows people with diabetes to take control of their condition, integrating the daily routines of self-monitoring and discipline into their lifestyle rather than permitting this condition to overwhelm them and control their lives (Richard S,1994), it may result in improved self care practices (Mazzuca SA, 1986). Self care practices have been shown to lead to improved metabolic control, sustained over 6 months (Rubin RR, 1989). The authors of the study suggested that emotional well-being itself may contribute to improved self care. Others contend that, for many patients, education about diabetes and self care alone benefits emotional well-being, which further boosts self care ability , therefore there is an association between education, improved self care, and improved emotional outlook, independent of improvements in metabolic control (Richard S,1994). A diabetic education program was first provided to American diabetic patients in 1975. The program was reviewed by National Diabetes Advisory Board in 1986. Diabetic education requires a team approach. The key team members are nurses, physicians and nutritionists. The benefits of diabetic education in the treatment of diabetes mellitus, especially in those with NIDDM are improvements of self-care practices, metabolic control, emotional well being and weight reduction (Heather, 1993).

In Thailand, there are few qualified diabetes nurse educators who can teach Thai diabetic patients. The development of a proper self care education model for Thai diabetes patients with low literacy is still needed to cope with the lack of adequately trained nurse educators. Achananuparp and colleagues performed a study of self-care education program for diabetes in five hospitals in the north, the northeast and the central parts of Thailand. The intervention included group and individual consultations with pamphlets and four volumes of video tapes about diabetic education which were produced to be the tools for teaching 140 patients in the intervention group and 151 patients in the control group. There was a statistically significant change of body mass index ($p < 0.05$). HbA_{1c} and fasting plasma glucose levels did not change.

In the proposed study the improvement in self care ability focused on a team approach among nurses, dietitians and physicians, it is very important in patient education and management to improve the problem situation. A successful educational program does not occur by accident, it is carefully planned by a skilled health care team and then executed with home health care activity. Such a program will be able to help patients' satisfaction by having active participation in self care. Education based on home health care can improve self care ability in the poorly controlled NIDDM patient. Providers must have sufficient information on the subject. Having sufficient information contributes to adequate and effective of patient's need as an integral part of quality health care programs.

2.6 MECHANISM OF THE SOLUTION

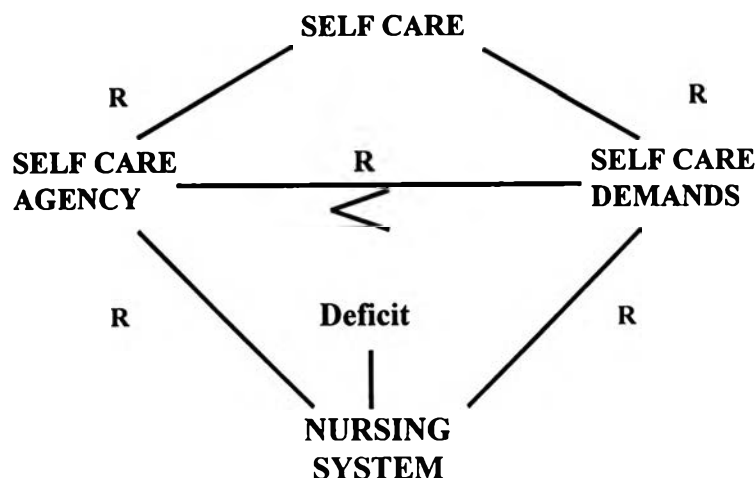
The strategy to control blood sugar level has two sides, the patient side and the health care provider side. On the patient side: the program aims to promote the patients' adequate continuous self care especially in nutritional control, regular exercise, appropriate use of medicine, hygiene care, prevention of complications such as foot ulcers. Care for mental health is also necessary. Patients should know how to reduce anxiety and stress in daily living. They should know how to adapt their lifestyle to the disease in order to prevent complications.

On the health care provider side, it is necessary to improve the attitude of the providers in order to change the use of technology to be more humane. The nurses are in a position to develop systems of care for people in the community based on health maintenance and promotion as well as care in the home. So, they can respond to the need for self care by teaching, advising, supporting, motivating, training and co-ordinating with other health team members.

According to the principle of Orem (1995), " a requirement for nursing in an adult is the absence of the ability to maintain continuously that amount and quality of self care in recovering from disease, or in coping with their effects. " The main purpose of the proposed study is to address system of care based on Orem's nursing theory, its clinical applicability to home health care for improving self care ability of the poorly controlled diabetic patient who should have skill for self care to promote themselves to have quality of life, due to maintain their health and security.

Dorothea Orem's theory of self care has significance for home health care. The health focus of Orem's self-care theory is on individuals and families to maintain a state of wellness. Accordingly self care is the practice of activities that are initiated and performed for oneself to maintain life, health, and well-being. Self care requisites are categorized by Orem such as universal self care requisites are common to all human beings, developmental self care requisites are including the provision of care to prevent the occurrence of deleterious effects of certain conditions on human development, and health deviation self-care requisites exist for person who are ill. These self-care requisites are the focus of health-related behaviors of individuals, families, and communities. Self care agency is the complex acquired ability to meet one's continuing requirements for care that regulates life processes, maintains or promotes integrity of human structure and functioning and human development, and promotes well-being. Self-care deficits occur when individuals can no longer meet their self-care requisites. Nurses must have the ability to view their patients as self care and to diagnose patients' abilities to engage in continuous and effective care. Orem presents a model to show the conceptual framework for nursing practice, it is shown in Figure 2.6 .

FIGURE 2.6 : A conceptual framework of nursing



Source : Used with permission from Orem, D.E. (1991) St. Louis: Mosby, p.64.

(R = relationship; < = deficit relationship, current or projected.)

The figure shows that when the overall self care demands is greater than self care agency, there is an increase in the self care deficit. Orem's theory views care as something to be performed by both nurses and patients (Rice R, 1992). Orem (1995) describes nursing, a helping art, as "the complex ability to accomplish or to contribute to the accomplishment of a person's usual and therapeutic self care by compensating for or aiding in overcoming the physical or psychic conditions or disabilities that cause the person (1) to be unable to act, (2) to refrain from acting, or (3) to act ineffectively in self care." Three nursing systems, are multidimensional and are viewed as; (1) wholly compensatory, if the patient requires complete nursing care and is unable to assist with health needs, (2) partly compensatory, if the patient and nurse can both perform some of the health care activities, and (3) supportive educative, when nurses

are able to assist patients to make their own decisions and take actions to fulfill self care requisites. (Rice R, 1992).

The focus of Orem's theory is that individuals have self-care activities which help them with their self-care health practices. If their ability is not sufficient to meet the self-care demands, then limitations of self-care result and the nurse's assistance will be needed. The nurse, according to Orem, designs and controls nursing systems and assists individuals with any limitations in ability for self care, helps to maximize self care potential and to improve health and well-being. (Dier D,1986).

To accomplish the goal of the proposed study nurses must be able to accept individuals, families, and groups as a part of being in specific of development and particular status of diabetic patients' health and well-being. The education model, based on home health care is essential that the nursing administration of a home health care be knowledgeable of the benefits of self care and have the personnel necessary to design nursing system.

2.7 THE PROPOSED INTERVENTION

The education based on home health care is the proposed program in this study, the model is a part of comprehensive, total health education to promote, maintain or restore health and should be individualized to the patient's needs, which is concerned with Orem's self-care deficit theory of nursing.

Home health care is that component of a continuum of comprehensive health care whereby health services are provided to individuals and families in their places of residence for the purpose of promoting, maintaining or restoring health, or maximizing the level of independence, while minimizing the effects of disability and illness, including terminal illness. Service appropriate to the needs of the individual patient and family are planned, coordinated, and made available by providers organized for the delivery home care (Allen D, 1983). The purpose of home care is to provide patients with the support, treatment, information, and understanding they need to successfully manage their health care needs at home. The home health care role is defined as follows; (Cherryholness, 1986; McDonald, 1982 ; Stanhope & Laneaster, 1984).

1. Direct care : This role is necessary for activities that cannot be done by patients. For example, taking blood samples, injections, wound dressing, bladder catheterization, or other complicated nursing care (McDonald, 1981; Stanhope & Lancasted, 1984). Patient assessment, physical examination, implementation and monitoring of nursing plans and educating the patients and their relatives are a part of the activities of the nurse. These are explained more fully below.

1.1 General assessment of patient condition : The nurse should have capacity to make an assessment of the patient's condition and environment. This is needed for adjustment of the plan for patients care, to establish the frequency of visits, reconsider

the assessment, and if necessary, readmission. The issues for assessment are as follows:(Rovinski & Zastocki,1989; Walsh, Person,& Wieck, 1987).

➤ The satisfaction for home health care: What is the motivation and potential in self care to support home health care ? The factors associated with the satisfaction, include culture, religion, education level, profession, life style, physical fitness, and health problem or side effect of treatment and psychosocial factor.

➤ Social supports for patients: such as family members, friends, religious society, are important factors to assist in modifying the knowledge, behavior and practice of patient.

➤ Patient environment which may be an opportunity or threat for modification of their behavior. This includes, climate, geographical area, home quality.

1.2 Teaching : This is necessary for home health care. Education should start in the hospital and continue at home (Wocher, 1994). When the patient and family have knowledge of self care, they will be confident and satisfied (Milder, 1994). The success of education is that the patient and family can set the plan and decide for appropriate self care at home . The nurse's role is supportive.

2. Indirect care : These include counseling and coordinating continuous care for the patient.

2.1 Counseling : The nurse can provide counseling not only in the health but also in other areas, such as socioeconomic problems. However, if the counseling is beyond the capacity of nurse's role, the patient can request an appointment with a specialist.

2.2 Co-ordination : The nurse for home health care should be a good communicator and able to coordinate with other sectors, such as social workers and nutritionists. So that the patients' problem can be solved effectively (Rice, 1992; Stanhope & Laneash, 1984).

Education based on home health care in this study is the delivery of quality nursing care to patients in their home environment. The patient's caregiver or family and home environment are viewed as critical elements of a successful plan of care. A holistic assessment of patient/caregiver needs within the home milieu is emphasized. It is recognized that patient/caregiver cooperation and self-determination for optimal health or the best level of functioning are important to achieving successful self care management at home.

The goal of care for DM patient at home is to facilitate the patients capacity in self care so that they can have normal appointments with health team. The health team, including physicians, nurses and other health workers should be constituted from

people who are able to work with people of different socio-economic status and from different social groups. The home health team's role is that of facilitator of home independent through patient education, and case management. The success of the case management plan is dependent on the ability of the nurse to use the nursing process to develop a plan of education that best fits the individual needs of the patients, the patient's family, or caregiver. The first step in the development of the plan of education is the patient and family assessment. The nursing process, including 5 phases, such as assessment, nursing diagnosis, planning, implementation, and evaluation (Rice R, 1992). They are explained as below:

Assessment phase is the data-gathering phase of model to be used as a resource for the collection of data and for obtaining other information. The health team must be able to perform an in-depth holistic assessment of the patient, family, and home environment. Components of the assessment phase include:

- Assessment interview primarily collects subjective data from the patient's responses to questions, but nonverbal cues should also be noted. This is an important step in the establishment of nurse-patient relationships.
- Historical database. An important element of the historical database is the socio-environmental assessment such as; the patient's economic status and living conditions. Learning, communication and coping style of patients families should be identified. Each person's role in the household should be considered when developing the plan of care.
- Medication assessment. Identifies past patterns of health history and illness, the presence of risk factors and the patient's medicines; provides

verification of the name, dosage, and frequency of administration of each medicine. The medical assessment should be reviewed on each visit to note changes in dosage frequency, or type. Changes should be prescribed by the physician in the patient's record. Consequently, changes in the medication regimen become a basis for new teaching.

- ⇒ Physical assessment. This assessment consists of an evaluation of the patient's health status and should identify any functional limitations that the patient may experience in performing daily activities.
- ⇒ Spiritual assessment. The mental health assessment is typically performed in conjunction with the physical assessment.

In reporting assessment findings to the physicians, nurses primarily report deviations from the patient's baseline status. In home care nurses should never hesitate to notify the physician of assessment findings, which should be placed in the medical record.

Diagnosing phase A nursing diagnosis is a clear, concise statement of the patient's health status. It reflects the patient's healthy and unhealthy responses and the supporting factors for each response (Pinnell N,1986). The identification of nursing diagnoses serves as the basis for the nursing care plan, it includes knowledge deficit, activity intolerance, and self-care deficit (NANDA, 1996).

Planning phase The patient care plan is established by the nurse and the team which includes physicians, and pharmacists. The first step is the establishment of priorities. The team should work together to identify the immediate concerns and patient needs. The next step is the identification of goals and outcome of care which should reflect the nursing diagnosis. Goals give direction to the nursing interventions and pace activity within the patient care plan (Antone T, 1994 and Pinnell N, 1986). It is important that the patient and family be involved in the planning process. The plan is modified as needed depending on the patient's condition until the goals are met and the patient is discharged.

Implementing phase This phase should integrate the plan of care into the patient's environment. Patients are able to take on the responsibilities for self care management. They acquire knowledge, judgment, and confidence, through team support and encouragement.

Evaluation phase This phase includes determining the patient's progress in meeting outcomes of care and achieving long-term goals. It measures the effectiveness of appropriate utilization of resources. "Outcome" refers to the hoped-for effect of an education effort on diabetes management and the overall quality of life for people with diabetes, focused on physiological improvements such as; how the change in knowledge and skills contribute to (1) better self care behavior, (2) improvements in blood glucose levels, (3) decreased complication, (4) reduced use of health care service and (5) improved quality of life . Once goals and outcomes of care are achieved, or it

has been determined that the patient no longer requires home care or is no longer appropriate for home health services, discharge from the home health services occurs.

Compliance with diabetic regimen is considered an important factor in diabetes mellitus. Self care activities are important contributors to diabetic care. The ability to engage in self care in this study includes having the ability to acquire knowledge; the ability to decide what to do; and the ability to act to achieve change. According to Orem,(1991) the goal of nursing is to assist patients to undertake self care in order to maintain life, health and well-being. Nurses must first assess patients' self care ability to engage in continuous and effective care. At any given time an individual has specific self care abilities as well as therapeutic self care demands. If there are more demands than abilities, nursing is needed. Orem's theory views care as something to be performed by both nurses and patients. The role of the nurse is to provide the education and support that help patients acquire the necessary abilities to perform self-care. The collaboration with diabetes team and the patients will provide guidance for the establishment and maintenance of quality diabetes self care education based on home health care.

The key personnel of the home health diabetic care team are nurses who serve to facilitate the continuity of care and quality of care. They have freedom to provide this care under the nurse professional licence and could be called Diabetes Nurse Specialist. Beyond the nursing care, they must act as educator, social worker nutritional, counselor, and coordinator of health information. All of these roles are

tools to achieve the goals, which include positive behavioral change and an increased quality of life for the patient. This is illustrated in Figure 2.7 .

Figure 2.7 : The roles of the diabetes nurse specialist.



Source : Heather Daly, Pat Clarke. The Diabetes Team. Diabetic Care: 1993;1-9.

The concept must be expanded to include hospitals and health center counselor teams, public health nurses, pharmacists, patients, family members and doctors. Every effort should be made to maintain communications that complement the management program. Education and support efforts must have common goals and objectives and provide non conflicting information. A special relationship between the patient and the health provider has shifted with special attention placed on patient education to optimize self care. The emphasis appears to have reached a point of equilibrium, with equal attention given to the training of health team caring for the person with diabetes. There is a reflection of the nature of diabetes and the changes in a patient's life.

This document will use the term education based on home health care to refer to the process whereby individuals learn to manage their diabetes by themselves. This program will succeed only if there is clarification of purpose and method. Goals must be established which express the needs of both the patients and members of the staff, and the community at large must perceive that the general good is served.

It is hoped that the diabetes education based on home health care that are evolving as part of multifaceted diabetes management efforts provided by skilled health care teams will be able to help patients reach higher levels of adherence, metabolic control, and satisfaction by leading to even more active participation in self care at home. Therefore, this intervention is expected to be accessible to improve self care ability and health status in the poorly controlled NIDDM patients.

2.8. CONCLUSION

People with diabetes must make life-style changes, yet their failure to accept these changes may lead to inadequate diabetes control. The education of people with diabetes can be thought of as the process of providing them with experiences that favorably influence their understandings, attitudes, and practices related to living well. At its best, an education program empowers those with diabetes to achieve optimal self-management of their condition (C. Ronald Kalin, 1994).

The key personnel of home health care team in this study are nurses, they must first assess patients' self care ability to engage in continuous and effective care.

Education based on home health care is one of the most comprehensive forms of care and covers health promotion, prevention, cure and rehabilitation at home. It is carefully planned by the health care team and then executed by that team, targeting that person's specific needs. The goal is to help patients with diabetes gain the knowledge and skills that enable them to care for themselves and develop the attitudes that will enable them to make behavioral changes. To provide effective self care for diabetes, patients must understand and accept their responsibilities and be willing in the capability of accomplishing the necessary tasks. Therefore, should develop the process of patient education based on home health care for promoting self care ability and become an essential component of quality health care.

This study is an attempt to develop the effective model to initiate improving self care ability in diabetes patients by using home health care applied nursing process as a tool for education . The researcher expected that this model could be availed to the diabetic education standard, particularly for promoting, maintaining, or restoring health.

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