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**FOOD CONSUMPTION BEHAVIOR OF DIABETES
PATIENTS IN THE FAMILY CONTEXT**

NALIN MONGKHONSI

**With compliments
of**

บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

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Thesis

Entitled

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IN THE FAMILY CONTEXT

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The purpose of this research was to investigate the food consumption behavior of diabetic patients in the light of family context and factors affecting consumption behavior - demographics, family factors and the family's role in appropriate health management for diabetic patients. Cross-sectional survey research was used for this study. 260 study subjects were selected from the diabetic out-patient clinic at the Burapha University Hospital. Information on the place of each patient in the family structure, role of family member and the food consumption behavior of the family and the subjects was obtained through interview questionnaires that were developed and tested for reliability by the researcher. Data was analyzed using the SPSS/PC⁺ Program and presented as frequencies, percentages, arithmetic means and standard deviations. Inferential statistics such as students' t-test and One-way analysis of variance were used. Determination of factors affecting food consumption behavior was done by using stepwise multiple regression analysis.

The results of the study show that generally food consumption behavior of diabetic patients in the family context is indicated at moderate risk level. There is no statistically significant effect from sex, age, marital status, education, income, duration of having diabetes, attitude, family's type and status at the family. The family's role in the management of food suitable for diabetic patients, the role of housekeeper, and the relationships among family members, were found to have a significant effect on the patients food consumption behavior. All three factors could explain the variation in food consumption behavior of diabetic patients in the family context. It is suggested that the potential role of the family in caring for diabetic patients and controlling daily nutrition should be emphasized and made known to medical practitioners.

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นลิน มงคลศรี : ครอบครัวกับการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวาน
(FOOD CONSUMPTION BEHAVIOR OF DIABETES PATIENTS IN
THE FAMILY CONTEXT)

คณะกรรมการควบคุมวิทยานิพนธ์: ประสิทธิ์ ลิระพันธ์, Ph.D., มัลลิกา มดีโก, ศศ.ค. 128 หน้า.

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาพฤติกรรมการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวาน และปัจจัยที่มีอิทธิพลต่อพฤติกรรมการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวาน ซึ่งประกอบด้วย ลักษณะสังคมประชากร องค์ประกอบของครอบครัว บทบาทหน้าที่ของครอบครัวในการจัดการด้านอาหารที่เหมาะสมกับผู้ป่วยเบาหวาน โดยใช้วิธีการศึกษาเชิงสำรวจจากตัวอย่างที่เป็นผู้ป่วยเบาหวาน โรงพยาบาลมหาวิทยาลัยบูรพาจำนวน 260 คน ที่มีการสุ่มแบบช่วงเวลา การเก็บรวบรวมข้อมูลนั้นใช้แบบสัมภาษณ์ที่ผู้วิจัยสร้างและพัฒนาขึ้น ซึ่งได้ค่าทดสอบความเชื่อมั่น (Reliability) ของพฤติกรรมการบริโภคอาหารในชีวิตประจำวัน ความสัมพันธ์ในครอบครัว และบทบาทของครอบครัวในการจัดการด้านอาหารที่เหมาะสมกับผู้ป่วยเบาหวาน เท่ากับ 0.75, 0.86 และ 0.93 ตามลำดับ ข้อมูลที่ได้รับนำมาวิเคราะห์โดยใช้โปรแกรม SPSS/PC สถิติที่ใช้ ได้แก่ ร้อยละ, ค่าเฉลี่ยเลขคณิต, ส่วนเบี่ยงเบนมาตรฐาน, เปรียบเทียบค่าเฉลี่ยระหว่างกลุ่มตัวอย่าง (t -test) (One-Way analysis of variance) และวิเคราะห์การถดถอยพหุ

ผลการวิจัยพบว่า ผู้ป่วยเบาหวานมีพฤติกรรมการบริโภคอาหารในชีวิตประจำวันในระดับเสี่ยงปานกลาง อีกทั้งบทบาทของครอบครัวในการจัดการด้านอาหารที่เหมาะสมกับโรคและความสัมพันธ์ในครอบครัวพบว่าอยู่ในระดับปานกลางเช่นเดียวกัน นอกจากนี้ยังพบว่าความแตกต่างทาง เพศ อายุ สถานภาพสมรส การศึกษาฐานะเศรษฐกิจ ระยะเวลาที่แพทย์วินิจฉัยว่าเป็นเบาหวาน ความคิดเห็นต่อความรุนแรงของโรค รูปแบบครอบครัวและสถานภาพทางเศรษฐกิจของผู้ป่วย ไม่มีความสัมพันธ์กับพฤติกรรมการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวาน ส่วนบทบาทของครอบครัวในการจัดการด้านอาหารที่เหมาะสมกับโรค การไม่ได้ประกอบอาชีพ และความสัมพันธ์ในครอบครัวมีความสัมพันธ์กับพฤติกรรมการบริโภคอาหารอย่างมีนัยสำคัญทางสถิติต่อพฤติกรรมการบริโภคอาหาร และสามารถพยากรณ์พฤติกรรมการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวานได้ร้อยละ 25.7 โดยบทบาทของครอบครัวในการจัดการด้านอาหารที่เหมาะสมกับโรคสามารถทำนายพฤติกรรมการบริโภคอาหารในชีวิตประจำวันของผู้ป่วยเบาหวานได้ถึงร้อยละ 19.7 ดังนั้นจึงเสนอแนะให้สร้างความตระหนักและส่งเสริมให้เห็นถึงศักยภาพของครอบครัวในเรื่องการดูแลผู้ป่วยเรื้อรังแก่ครอบครัวและบุคลากรทางการแพทย์ โดยเฉพาะในเรื่องการควบคุมอาหารและนำศักยภาพของครอบครัวที่มีอยู่มาใช้ให้เกิดประโยชน์

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CHAPTER 1

INTRODUCTION

1.1 Background of the problem.

At present, only one concept to explain the risk behavior of diabetes is not enough. Several concepts such as social, culture and biomedical concepts are used. Gordon (1977:497-499) reported that a diabetic patient who could not control blood sugar level has twice more chance to heart and cardiovascular system than ordinary people, 25 times to cataract, 17 times to diabetes nephopathy and 5 times to loss of limb by amputation. Nitiyanan (1995:19) also revealed that 38.4% of diabetic patient has hypertension, 32.1% diabetic retinopathy, 3.8% myocarditis, and amputation at leg and arm is 1.3% and 0.3%, respectively. Pathogenesis of chronic diabetic complication is the result of uncontrolled sugar level in the blood.

It is a fact that food is essential to life. The food consumption of a diabetic patient is not only for being of life style but also includes malaise control. Since the patient has abnormal metabolism, the food consumed is sensitive to the sugar level in the blood stream. Therefore, the selection of food that does not affect the blood sugar level will help attenuate severity and decrease complications. In addition, it also makes the patient healthy. (Sridama, 2000:43. Intarumpan, 1997:5) Food controlling of the diabetic patient, hence, acts as buffer between diabetes and complications. Appropriate food consumption can reduce chance of complications.

Food controlling is important for all diabetic patients. Case studies, however, revealed that most of the diabetic patients could not control the food they had. (Miller, 1982: 28, Tantayotai, 1982: 25, Siritharangsri, 1983: 54) At the same time, most patients still preferred to consume food that led to high fluctuation of the blood sugar level, especially sweet and sugar added food products. (Leerapan, 1997:155, Kongkamnead, 1993: 54, Siritharangsri, 1983:169) Sugar, when consumed, can lead to a rapid increase in the blood sugar level resulting in difficulty in disease control. (Matterson, Mc Cornell, 1988:300) Despite the fact that most diabetic patients know

the benefits of food controlling, to bring into practice is difficult. Because the food consumption is not only for health, but also involve social acceptance. Food consumption behaviour of a person is always controlled by society and culture. The effects of society and culture can be clearly seen from the foods consumed in four regions of Thailand which have different preparation methods and tastes. Occasionally, food consumption means achievement, relationship and royalty of family members or persons involve.

The food consumption behaviour of a Thai family has strong influence on disease control since the main course is usually rice which is served with dishes eaten with rice. Every member of the family usually shares the same dishes eaten with rice. Types and tastes of such dishes depend on preference of the family members. If a family has the food consumption behaviour which contrast to controlling diabetes, e.g. sweet and fatty foods, the food controlling of the diabetic patient in that family is inevitably affected. Therefore, one can say that family plays a very important role in disease control.

The management of food consumption of a diabetic patient in a family can be viewed using social science theory of Talcott Parsons. Family, as a social, comprises of several structures which have relationship and duty to satisfy the members of the family. A duty the family has to carry out is preparation of food to satisfy the need of the members in the family. When the family has a diabetic patient, the food preparation behaviour of the family has to be adapted. Both patient and family must has the same objective, i.e. prevent the symptom from increasing severity. The food consumption behaviour of the patient and the family has to be integrated to maintain an equilibrium within the family. Role of the family in appropriate food preparation for the diabetic patient and the family is, therefore, important and necessary for controlling the food consumption behaviour of the patient.

From changes of society and economic, however, it is undeniable that the family has been affected. The effects on structure, role and relationship in the family will cause the family to maintain the role as the appropriate food provider for the diabetic patient in the family is still in doubt. It is questionable that the present role of family is enhancing or hindering the appropriate food provider for the diabetic patient. According to reviewed literatures, it is found that the knowledge on the role of family

in food controlling of a diabetic patient in the family is still very limited. This make the researcher interests in role of the family in food consumption behaviour of diabetic patient in family context.

Understanding present conditions of a person or a family in food consumption behaviour of a diabetic patient is a strategy to prevent complications and reduce the problem. This strategy comes along with the 8th (1997-2001) and the 9th (2002-2006) National Economic and Social Development Plans which concentrate and rely on the family institute to solve social and economic problems, especially caring of chronic illness. In addition, it also creates knowledge about the role of family in caring of diabetic patient, which is now very limited, and points to the direction that enhance the family and the diabetic patient in the family to look after themselves. This strategy will act as a shield that prevent complications of the diabetic patient and extends collaboration from medical system to the patient, family and community. It is also an alternative method which can reduce problems and hindrances now occurring in the present medical system. Such problems and hindrances are the reach to the medical system, drug problem, over use of medical technology etc. Which can reduce the expense of the family, social and the country.

1.2 Research question.

What is the food consumption behaviour of diabetic patients in family context and which factors affect such behaviour.

1.3 Research objectives.

1. Study the food consumption behaviour of diabetic patients in the view of family context.
2. Study the social characters and factors of the family of the diabetic patient. These factors are sex, age, marital status, education, occupation, economic level of the family, years of diagnosis diabetes, severity of the disease, type of the family, status of the patient in the family, family relationship and role of family in preparing food for the diabetic patient.

3. Study the relationships between sex, age, marital status, education, occupation, economic level of the family, years of diagnosis diabetes, severity of the disease, character of the family, status of the patient in the family, family relationship and role of family in preparing food for the diabetic patient.

4. Study the ability to predict how many previously mentioned parameters affect the food consumption behaviour of diabetic patients in the family context.

1.4 Hypotheses of the research.

1. Differences in population and social characteristics (sex, age, marital status, education, occupation, economic level of the family, years of diagnosis as diabetes, severity of the disease, type of family, status of the patient in the family, family relationship and role of family in preparing food for the diabetic patient) have different relationship to the food consumption controlling behaviour in daily life of the diabetic patient.

2. Differences in family component (type of family, relationship in the family, and role of family in preparing food for the diabetic patient) have different relationship to the food controlling behaviour in daily life of the diabetic patients.

3. Population and social characteristics (sex, age, marital status, education, occupation, economic level of the family, years of diagnosis diabetes, severity of the disease, type of family, status of the patient in the family, family relationship and role of family in preparing food for the diabetic patient) can be used to predict the food controlling behaviour in daily life of the diabetic patients.

1.5 Benefits of the research.

1. Let us know the food consumption behaviour of diabetic patients in the family context including factors affect such behaviour. The knowledge can be use as basis for medical staffs in understanding the food consumption behaviour in daily life of the diabetic patient. It also puts importance on the role of family in food preparation for the diabetic patient and making awareness to the medical staffs in promoting family potential in understanding the food consumption behaviour of the

patient. The knowledge can be use to make a suitable plan for the diabetic patient and his/her family. This will encourage the family to increase the efficiency in food preparation.

2. Let us know the importance of the family on the food consumption behaviour of the diabetic patient whether the family supports the consumption of suitable foods for the diabetic patient or not. This knowledge can be used to predict the food controlling behaviour of the patient and leads to concrete potential development of the patient and his/her family in controlling the food consumed. This can reduce the complications which may occur. The concrete potential development eads to the reduction in problems and hindrances. Such problems and hindrances are the reach to the medical system, problem with drug usage, over use of medical technology etc. Which can reduce the expense of the family, social and the country.

1.6 Scope of the research.

This research is a cross-sectional survey research concentrates on the food consumption behaviour of diabetic patients in the view of family context. The research scope is limited to the diabetic patients who come to receive treatment at the diabetes clinic, out patient department, Burapha University Hospital, Cholburi province.

1.7 Operation definitions.

Diabetic patient : The patient which is diagnosed as noninsulin dependent diabetes. The patient must continuously follow the treatment at the diabetes clinic for at least 1 year.

Years of diagnosis diabetes : The period of time from the day diabetes is diagnosed to present.

Family : A group of at least 2 persons which live in the same accommodation as the diabetic patient for more than one year. They should have relationship by inheritance, marriage, law or social dependent. The family is divided into 2 type i.e. single family and extended family.

Single family : The family which comprises of members which has relationship for only 2 generations i.e. father, mother, and unmarried children, including servant.

Extended family : The family which comprises of members which has relationship for more than 2 generations. Apart from those mentioned in single family, also includes relatives such as grandparent, uncle, aunt, grandchildren.

Food consumption behaviour : The behaviour of diabetic patient in daily life that affects the blood sugar level. Such behaviour is having fatty/oily food, carbohydrate, sweet drinks, sweet fruits and vegetable including food controlling before and after blood sample taking. The food consumption behaviour can be categorised into 3 degrees i.e. very risk, medium risk, and low risk.

Very risk food consumption behaviour : The patient does not give importance to controlling having fatty/oily foods, carbohydrate etc. including food controlling before and after blood sample taking. The patient will have the total food consumption behaviour score lower than $\bar{x} - SD$

Medium risk food consumption behaviour : The patient have some care on the importance of controlling having fatty/oily foods, carbohydrate etc. including foods controlling before and after blood sample taking. The patient will have the total food consumption behaviour score equals to $\bar{x} \pm SD$

Low risk food consumption behaviour : The patient strictly care on the importance of controlling having fatty/oily foods, carbohydrate etc. including foods controlling before and after blood sample taking. The patient will have the total food consumption behaviour score higher than $\bar{x} + SD$

Role of family in providing suitable foods for diabetic patient : The activity of the members of the family in preparing food for the diabetic patient. The activity begins from food providing, preparation, processing, and consumption, including changing food consumption behaviour of the members in the family.

Family relationship : Feeling and interaction among the members of the family and the diabetic patient. Such feeling and interaction are communication, family activity, love between family members, and help. The relationship may be in the form of love, communication, advice, providing material, money and time.

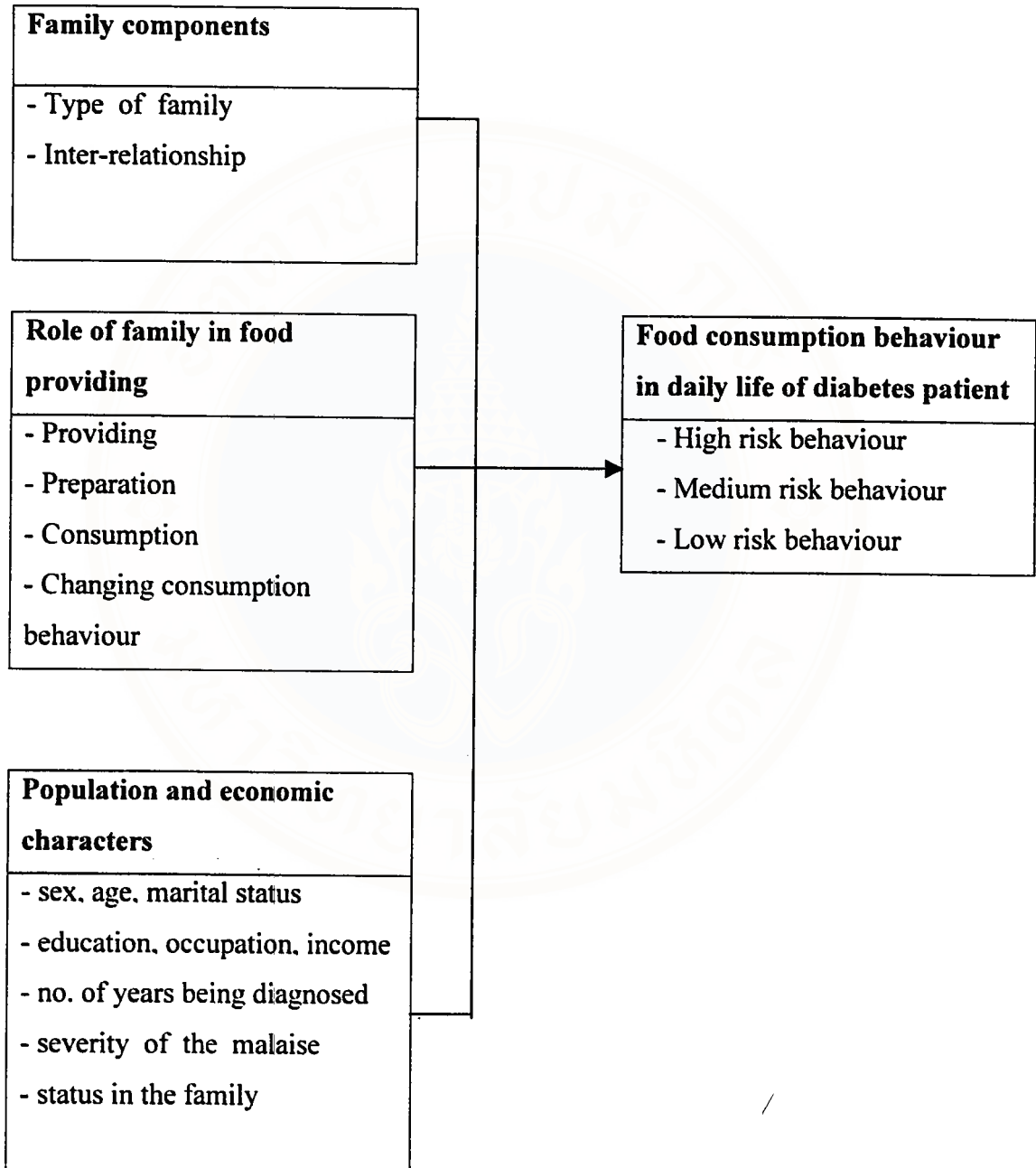
1.8 Conceptual framework.

From the aforementioned concepts and theories including relate literatures about the role of family in the food consumption behaviour of diabetic patient in the family context, it can be noticed that the family components and procedures in providing suitable foods for the diabetic patient of the family are likely to be major important factors in enhancing health of both the patient and the members of the family. The relationship among the members of the family in the form of communication, family activity is also likely to be another important factor that affects the food consumption in daily life of diabetic patient.

One point that should be noted here and should not be looked over in building the frame of the conceptual framework is the social and economic characters of the diabetic patient. Such social and economic characters are sex, age, marital status, education, occupation, family income, years of diagnosis diabetes, severity of the disease, type of the family, status of the patient in the family, family relationship and role of family in preparing food for the patient, have different relationship to the food consumption controlling behaviour of diabetic patients in family context. These characters cause discrepancies from a patient to another patient and should be considered as important factors that affect the food consumption in daily life of the diabetic patient.

The relationship between the person and the family components is shown in block diagram on the following page.

Conceptual Framework



CHAPTER 2

LITERATURE REVIEW

The study of family and the food consumption behaviour of diabetic patients in family context is the study about the food consumption behaviour in daily of diabetic patients in family context , under the conditions of relationship between the patient and his/her own family. The researcher has studied through publications and related research works and can summarised the direction of the study in the following sections :

- 2.1 Situation of diabetes.
- 2.2 Social concept about family.
- 2.3 Food consumption of Thai family.
- 2.4 Family and food consumption in daily life of diabetic patient.

2.1 Situation of diabetes.

Diabetes is not a new disease. The oldest record was dated about 1550 B.C. A Greek physician is the first person who named "diabetes" (Jarupunya, 1994:2). The study in the causes and treatment of diabetes began in the late 18th century. Even though the study continues to the present day, a method to permanently cure the disease is yet to be found.

Diabetes is the most frequently found among the abnormal of endocrine gland and can be found in every race. (Siritharangsri, 1996:16) In 1994, it was estimated that the global diabetic patient was about 100 million. (Shaw et al., 1999:1-9) The reports in the past ten years clearly shown the increase in the number of new patients. (Harris, 1998:21) It is also predicted that in the year 2010, the number of diabetic patients will reach 215 million people. (Mccarty and Zimet, 1994) In Thailand, the first national survey was carried out in 1965 in Bangkok metropolitan area by the Society of Diabetes of Thailand. The survey showed that about 2.3% of the people

investigated was diabetes. The next survey carried out in the following year (1966) by the same society, among 322,953 persons national wide, found 8,110 patients or 2.5%. Another national survey in 1987 found that among 1.7 million people interviewed 2.8% was diabetes. The statistical reports of the ministry of public health also show an increase in the number of diabetic patients each year. On the other hand, between 1991-1995 the number of diabetic patients increases from 38,921 to 53,760 cases. The public health survey in 1995 showed that the number of death from diabetes was 3,583 cases or 9.82 cases per day. In addition, the survey of Chooprophawun, 1996 found that female has tendency to be diabetes 1.5-2 times than male. When geographical area is bring into consideration, it is found that the central region has the highest incident rate, 2.95% following by the southern region, 2.62%. In the north-eastern and the north regions found only 2.18% and 1.88%, respectively. It is also found that the number of diabetes cases in municipal area is higher than outside the municipal area in every region.

2.1.1 Epidemic of diabetes

At present, the concept of epidemic to find factors causing the disease has been widely studied. Factors in personal level and risk behaviour have been linked together. This concept tries to identify the spread and causes of the disease in order to be able to control and prevent more new cases.

The epidemic of diabetes has effects on the cause and the spread in the population. The epidemic of diabetes is created from an interaction among 3 factors : 1) Population factor 2) Agent factor and 3) Environmental and social factor. In a normal condition all 3 factors are at an equilibrium, therefore, no spread or new case. If a factor losses its equilibrium, the disease can develop.

Diabetes can be classified into 2 types according to the difference in insulin level in the body a) Insulin-dependent diabetes and b) Noninsulin-dependent diabetes.

a) Insulin-dependent diabetes : This type of diabetes is caused by the low amount or non-existence of the beta cells in the pancreas. Thus, the insulin level in the blood stream of the patient is very low. The patient is normally thin. The symptom is sudden and severe. The patient must receive insulin injection every day

otherwise complications may occur and leads to death. The main cause of this type of diabetes is heredity. Therefore, most patients are children or adolescence or in adults below 40 years.

b) Noninsulin-dependent diabetes : This type of diabetes is caused by the malfunction of the beta cells in the pancreas. In a fat person, the amount of detected insulin is normal, but the insulin can not work properly or defect due to low insulin receptor in the muscle of the patient. Therefore, the level of insulin in blood stream of the patient may at normal, lower or higher than the average level. The patient does not need insulin injection. Some patients do not show any symptom at all but can be detected unintentionally. The symptom gradually appears and is not so sever. If the patient becomes very stress, however, the symptom can be very sever. This type of diabetes is usually found in the adults age from 40 years and above. Most patients is fat or used to fat before. Some patients gain weight rapidly 1-2 years earlier before the symptom is detected. More than half of the patients is female and usually found in the family with at least one direct relative is noninsulin-dependent diabetic patient. More than 90% of the diabetic patients is noninsulin-dependent diabetic patients (Poole,1986: 26-36). The reviewed literatures show that there are several factors concern with the noninsulin-dependent diabetes. These factors are :

1. Demographic factor.

Heredity : It is found that if parents are diabetes, the children can have some defect at the beta cell in the pancreas i.e. low amount or ver weak. This leads to an abnormal insulin level in the blood stream. The chance to become diabetes is therefore high. The studies from identical twins show that if one of the twin becomes noninsulin-independent diabetes, the other one will become too. In the family which a family member is noninsulin-dependent diabetic patient, the other family members will have chance 10-30% higher than the family without a diabetic patient.

Sex : Difference in sex and diabetes. A study showed that female has more chance (1.5-2 times) to become diabetes than male. (Chooprophawun, 1996:161) A factor that may cause female to become diabetes more than male is pregnancy. It is found that several pregnancy has relationship with diabetes because each pregnancy reduces sugar tolerance of the woman.

Age : A report (Harris S.,1998:11) showed that age and diabetes has relationship. The elder has less sugar tolerance than the younger. On the other hand, in the population age between 18-44 years old the chance that diabetic patients can be found is 1.5% while in the populations age between 45-65 years old the chance increases to 6%. Among the populations age 65 and higher, the chance further increases up to 11%.

Race : It has been reported that the Pima and Papago Indians in Arizona has the prevalence of diabetes is as high as 50%. (Plaengvittaya, 1996:50) The prevalence changes according to the geographical area. For example, about 2.1% of the India people becomes is diabetic patients. (Ahuja, 1979:29-38) In Singapore the prevalence is 8.9%. (Dowse et al., 1990:390-396) In South Africa the prevalence is 5% (Omar et al., 1985:67-6) In Fiji, the prevalence of the disease is 13% (Zimmet et al., 1983 :673-88)

2. Agent factor.

The agent factors that cause diabetes are :

Body Mass Index : Body mass index is the relationship between height and weight of a person. Past studies show that the body mass index has strong relationship with noninsulin dependent diabetes. Some reports said that a fat person has 3 more times chance to become diabetes than a thin person. This is due to the body of the fat person requires more insulin to metabolise sugar and the insulin resistance is not good.

Infection : Some infection such as bacteria, virus or some chemicals when enter the body can destroy the cell of the pancreas. The pancreas, therefore, can not produce enough insulin for the body. This causes the body not be able to metabolise sugar as usual.

High level of some hormones : The high level of some hormone can cause diabetes since these hormone can inhibit the function of insulin hormone. Examples of insulin inhibition hormones are Growth Hormone, Corticosteroid, Glucagon, Thyroxine, Cortisol and Catecholamine.

Abnormality of pancreas : Pancreas is the home of beta cells that produce insulin hormone. If the pancreas has some abnormality at the beta cells, the blood

sugar level can be affected. In the patient who is alcoholic, the chronic pancreas tites can be resulted. And this causes the increase in the blood sugar level.

3. Environmental factor

Environment in agricultural and industrial society is a factor affecting the prevalence of diabetes. In an agricultural society, most of the population are agriculturists or farmers. The use of labour saving devices is not widely covered every work. Most of the farmers have to use their own force. This is a good exercise method. In addition, their job is not hurry. The atmosphere and the food are better than those living in metropolitan area. The combination of these factors result in healthy body. On the contrary, the industrial society is full of stress, hurry, too much labour saving technology, lack of exercise, consumption of easily available carbohydrate and fat. Living in such environment plus heredity factor cause diabetes to become more common in the industrial society than in the agricultural society.

Considering differences in food consumption behaviour of people in urban and countryside area, it is found that the people in the urban area usually obtain food from buying while the people still grow by themselves, though the proportion is growing smaller. (Jongleepun, 1994:14) The behaviour of the people in the urban area which want convenience leads to the consumption of precooked or cooked food. These foods usually contain lower natural fibre content than natural food. The food consumption behaviour of the people in the urban area becomes more similar to the western style. (Choonhasawatkul, 1999:9) The national survey of food consumption of Thai family in 1960 showed that on the average the Thai people got energy from carbohydrate, fat, and protein about 80%, 9%, and 10.9 respectively. Another survey carried out in 1986 found that the ratio of carbohydrate, fat, and protein have changed to 66.8%, 21.8%, and 11.5% respectively. Both surveys showed that in 26 years, the proportion of food consumed by the Thai people has changed significantly. Especially, the consumption of fat has increased about 11.1%. The patient has tendency to adipose. In addition, it is found that the carbohydrate had by the people in the urban area is different from the carbohydrate the people in the countryside have. The people in the urban area tend to consume sugar and soft drink more than the people in the countryside area. The national nutritional survey of the food

consumption pattern in 1986 found that the people in the urban area consume sugar more than the people in the countryside area at the ratio of 12.9:1. The people in the countryside area consume natural flour and carbohydrate more than the people in the urban area at the ratio of 360:298.6. Those living in the urban or industrial area are forced to live with factors leading to diabetes. Such factors are consumption of food more than necessity, lack of exercise, and stress. Such changes relate to the prevalence of diabetes. In Taiwan, it is found that the prevalence of diabetes of the countryside area is 4.7% while in the urban area the prevalence increases to 7.6%. (Tai et al., 1987:49-53) In India, the prevalence in the countryside area is 1.5% while in the urban area is 2.1%. (Ahuja, 1979:29-38) In Papua New Guinea, the prevalence in the countryside area is 6.4 and in the urban area is 14.3. (Martin et al., 1980:74) The study of Lang (1989:305-328) using anthropology method of the people in Dakota who believe that the long life is caused by living in harmony with nature e.g. have only natural food. When the White came with technology, the living pattern of the native changes. More tinned food is consumed and lot of labour saving equipment is used. This results in the increase in the prevalence of diabetes. Diabetes is, therefore, considered as the disease comes with the White.

In conclusion, the increase incident rate of diabetes does not only have heredity as the main factor, but also includes the changes in social structures resulting from economic development. The social and economic factors force the people to live within unfriendly environment such as lack of exercise, stress etc. The combination of these factors finally lead to diabetes.

2.1.2 Complications of diabetic patient and prevention.

Diabetes is noninfectious and chronic. It is caused by the malfunction of the pancreas which produces insulin. This causes the metabolism of carbohydrate becomes abnormal which results in hyperglycaemia. (Intarumpan, 1985:58, Sridama, 2000:1) The excess sugar is removed via urine. In 1985, the World Health Organisation has set criteria for diabetes as the hyperglycaemia at the level of 126 mg/dl or higher after an overnight fast, at least twice within a close period of time.

The patient who can not control the blood sugar level will have difficulty in regualting the symptom. The complications, hence, follow.

The complications in a diabetic patient is very important and danger. Any severe symptoms following are usually caused by the complications. On the other hand, fatality or amputation is mostly occurred from the complications. The complication found can be classified into 2 categories : acute complications and chronic complications.

2.1.2.1 Acute complications : This type of complications occur very quickly and severely. Unless prompt action the patient may die. The complication that occurs is hypoglycaemia. The hypoglycemia occurs when the blood sugar level is lower than 40 mg/ml. The brain is quickly affected from the hypoglycaemia. The patient will feel dizzy, faint, swoon. The major causes are the over dose of antisaccharine, the reduction of food consumed or the postpone of meal, and the excessive exercise.

Hyperglycemic hyperosmolar nonketotic coma occurs when the patient is unhealthy, have too much carbohydrate, do not drink enough of water, problem with pancreatitis, nephritis, or unknown causes.

Diabetic ketoacidosis occurs when the blood sugar level is higher than 270 mg/dl. Sugar found in urine is equal to or higher than 2%. Ketone also present in the urine. The patient will feel very thirsty, frequent urinate, dehydrate, vomit, debility, drowsy, choke, thermopolyphoeic. In the severe case the patient may loss consciousness.

2.1.2.2 Chronic complications : This type of complications occurs when the patient is hyperglycaemia steadily. Accompany with prolong diagnosed diabetes, the patient has problems with several organs. Especially the problem with the artery stenosis due to change in the metabolism of fat cause the levels of cholesterol, triglyceride, and uric acid increase. (Tantanana, 1991:197-201) The following organs become degenerate :

1. **Hearth and blood vessel :** Change in the blood vessel of diabetic patients is a important problem. Especially when the blood vessel becomes hardening resulting in myocarditis. It is found that myocardiolysis in diabetic patients is about 2-3 times

higher than average. About 5-10% of the patients come across hearth failure (Ballard, 1999:455)

2. Nervous system : Diabetes can cause several malfunctions of the nervous system. For example, acroanaesthesia and thermalgia. It is reported that about 25% of diabetic patients showed the above symptoms.

3. Eyes : Diabetic retinopathy usually occurs with diabetic patient with years of diagnosed diabetes more than 30 years. About 70% has pathosis at retina which can result in blindness. The chance is about 20 times higher than ordinary persons. (Tantan. 1988:199)

4. Kidney and urogenital system : The most important danger is renal failure.

5. Blood vessel system : In case diabetes is not properly controlled, hyperglycaemia or blood ketone accumulation, the blood system can show several abnormal conditions. For example, the life of the red blood cell is shorten, blood platelet can easily bind together. In addition, polymorphonuclear white blood cell can not properly function. Therefore, the patient immune is low. Infection of staphylococcus, streptococcus, tuberculosis, fungi becomes easier.

In 1985, Bild et al. has studied diabetic patients in the USA. They found that the diabetic patients have more chance to be amputated 15 times higher than ordinary people. Another study in 1996 by Ban Phae Hospital, Thailand on 158 noninsulin-dependent patients age between 32-82 years found that about 30.38% has complications at eye, 8.23% has complications at kidney, and 8.23% has complications at the hearth system. The study also showed that about 30.38% of the diabetic patients has high cholesterol level i.e. more than 240 mg/dl. This level is considered danger. Strict control of the blood sugar level can prevent the mentioned complications.

2.1.2.3 Complication prevention and cure of diabetes

It is known that diabetes has no absolute cure. The treatment is performed by controlling and stabilizing the symptoms of the patient to prevent the complications. At present the complications can be excluded by keeping the blood sugar level at or near the normal level, food control, exercise, and taking medicine. The diabetic

patient in the first stage can avoid the complications if he/she receives a proper treatment and health guide line.

The treatment of diabetes, at present, aims at :

1. To treat the patient from symptom developed from hyperglycaemia. Such symptoms are weakness, poly urea, and poly thirsty.
2. To prevent the patient from complications that can be avoided. Such complications are ulcer at foot, blindness, hearth attack, renal failure etc.
3. To prevent side effects from the medicine being taken. Such effect is hypoglycaemia.
4. To make patient has health and good quality life.

The treatment to achieve the objectives mentioned above has the following guidelines for treatment and disease control :

1. Food control : Food control is considered to be the most important factor in diabetes treatment. The proper food control can bring the blood sugar level back to normal level. About 80% of non-insulin dependent patients who could control food can prevent complications. (Plaengvittaya, 1991:28) The food control must be carried out with drug treatment and exercise. The food control, apart from bringing the blood sugar level back to normal level, also helps the control of the triglyceride level and brings the weight of the patient back to an ideal body weight.

2. Exercise : A proper exercise will promote the use of sugar in the blood stream by muscle. For the insulin dependent patients, the muscle will be able to better adsorb the injected insulin. The exercise also promotes healthy body, prevents complications especially at the hearth, reduces the triglyceride and the body weight.

3. Drug : The use of some drugs such as sulfonyl urea and biguanide is common in the non-insulin dependent patients who have no acute complication.

4. Self care : The diabetic patients can self care themselves if they have enough knowledge about diabetes and can apply the knowledge to control the blood sugar level at or near the normal level.

In conclusion, diabetes is caused from the malfunction of the carbohydrate metabolism system of the body which results in hyperglycaemia and deterioration of several organs. In a severe case, severe complications can occur which results in dead. The prevention and treatment are food control, exercise, and drug taking

altogether. The food control is considered to be the most important factor. A proper food control can reduce the risk of complications.

2.1.3 Food control of diabetic patients

From the fact that diabetes is caused from the malfunction of the carbohydrate metabolism system of the body. Having food can result in hyperglycaemia or hypoglycaemia, both leading to severe and dangerous complications. The proper food control can reduce the complications and risk. The patients that have to take medicine or insulin have to control the food consumed concurrently. Treatment by drug without a proper food control results in difficulties in disease control. (Komint, 1995: 5) Hence, the food control is important and necessary for every diabetic patient. Nutritionist has determined that the food the patient consumed each day should satisfy the following criteria (Intarumpan, 1988:35 . Sunbboon, Sridama, 2000:43)

1. To control the blood sugar level at the normal level.
2. To receive right and adequate nutrition.
3. To control the body weight at an ideal body weight.
4. To prevent complications.
5. To make the patient healthy and be able to carry out daily activity.

At present, the criteria for the food for a diabetic patient is not so complicate as before. Too strict food control results in deteriorate of the patient due to too many problems with the metabolism of the body. After the discovery of insulin, the diabetic patient can have the food similar to ordinary people but some food have to be controlled. (Intarumpan, 1989:5-19) Since, the diabetic patient has to receive the necessary nutrients, the patient should have diversity of food. The food control criterion that set the amount of carbohydrate at 55-60%, protein at 12-20%, and fat at 20% has the detail described in the next paragraph.

The patient should have the carbohydrate that results in a slow increase in the blood sugar level. Such food are flours, cereals etc. The high natural fibre containing food can slow the rate of sugar absorption to blood stream. At present, the food control does not limit the amount of rice consumed as far as the patient does not fat. (Wichauanrat, 1989:32) The carbohydrate that the patient should avoid is the

carbohydrate that can be easily absorbed such as sugar, soft drink, honey, sweets, ice cream, including adding more sugar to the meal. These things cause rapid hyperglycaemia and hypoglycaemia and difficulty in controlling the blood sugar level. In addition, these sweet foods give high energy per unit mass. The patient when has these foods receives a lot of energy with only a small amount taken without feeling full. Therefore, the patient can have more other foods. The consequence is the patient becomes easily fat. The past study showed that fatness related to non-insulin dependent diabetes by causing tissue to become insulin resistance. (Poole, 1986:32, Zimmet, 1988:259)

Protein is a necessary nutrient for human body. Protein helps the growth and repairs the damage. The patient should receive 10-20% of the total energy from protein. The protein sources should be fish, meat without fat, protein from white egg and plants. The patient should avoid having liver, kidney, or yolk to prevent high cholesterol. A study showed that having protein without blood sugar level control would overload the kidney. The complications at the kidney will become easily. Therefore, having just enough amount of protein can prevent any complication of the kidney.

Fat is an important source of energy and help the absorption of some vitamins to the body. Each day the patient should receive about 30% of the total energy from fat. It is found that many diabetic patients have high triglyceride level. The patient, hence, should have unsaturated fat from plants such as corn, sunflower, soybean etc. The fat from animal and some plants such as palm and coconut is plenty of saturated fat. Thus, they should be avoided. The patient also should avoid fried food, or fatty/oily food.

To control the blood sugar level, apart from reduce the amount of fat and sugar consumed, having high fibre diet can slow the rate of sugar absorption. This attenuates the change in glucose and cholesterol level in the blood stream. The response to insulin also becomes better. (Perderson:1982:5-529) Vegetables with non-dissolve fibre also promote the movement of food through the intestine. The patient who still requires sweetness may use non-nutritive sweetener to sweeten the food.

The popular sweetener consumed at present is non-nutritive sweetener. Such non-nutritive sweeteners are saccharin cyclamate and apartame. These sweeteners are about 10-100 times sweeter than sugar. Therefore, using only a minute amount can achieve the desired sweetness. The energy from the non-nutritive sweeteners is only 1-2 calorie. The safety of these non-nutritive sweeteners, at present, is still debatable. It has been reported that an experiment with animals showed that saccharin cyclamate may be a carcinogen and can cause mutant. Apartame is reported as capable to cause Neuro-endocrine system which can lead to tumor at the brain. Even though apartame is officially accepted, the patient should consider not to use regularly. (Nithiyanan and Sathit, 1987:30) The food control of each diabetic patient depends on the energy requirement and the condition of each patient. At present, the food control is not so strict as before. The patient can have rice and flour as any normal people. The increase of the blood sugar level does not totally depend on the amount of carbohydrate consumed, but depends on the total energy received from carbohydrate, protein and fat consumed each day. If the energy received is higher than the requirement of the body, the blood sugar level will increase. The control of the energy obtained from food at the level the body needs can keep the blood sugar level at the normal level. (Intarumpan, 1985:107)

Energy requirement of the patient depends on age, body size, and daily activity. The body size can be calculated from an index called "body mass index" as follows :

Body Mass Index = Body weight in kilogram/Height in metre

The body mass index should be between 18.5-24.9. A person with the body mass index below 18.5 is classified as thin while the person with the body mass index above 24.9 is classified as fat. At normal condition, the body should receive about 30 calories per kilogram. In addition Wiboonyanond (1996:30) has reported the energy and food needed by diabetic patients as follows :

1. The patient whose the body mass index is above the standard, middle age, or elder people, should receive approximately 1,000 to 1,600 kilocalorie per day.
2. The patient whose the body mass index is in the standard level, should receive approximately 1,400 to 1,800 kilocalorie per day.

In conclusion, the direction of the food control for diabetic patient at present, is not so strict as before. The present food control aims at limiting amount of foods containing sugar such as soft drink, very sweet fruits, fat containing foods such as fried food and coconut milk. The food control also covers the amount of foods consumed daily, which should not exceed the requirement of the body. In this study, the researcher has used questionnaire and interviewed the diabetic patients about the amount and frequency of foods consumed per week, the amount of food consumed per day, and fructosamine.

The food consumption concerns not only the nutrients required by the body, but also involves the social life of the patient. On the other word, the consumption of food one has to learn from baby to adult. The criteria which one should or should not be taken, the taste which should be, are the result of culture and social life of human.

2.1.4.1 Population factors that affect the food consumption behaviour.

The population factors such as sex, age, occupation, educational background, and income are factors create differences among people. These differences may affect the food consumption behaviour of the diabetic patient. From literature review, the role of population factors on the food consumption behaviour can be summarised below.

Sex and the food consumption behaviour : The concept of social and culture on shows that the difference in sex has significant effects on the food consumption behaviour, especially the status and tradition. For example, male which is the superior status, frequently has better food than female, the inferior status. Male normally has food containing fat, meat, milk, cream, and sugar more than female. While female normally has vegetable, cereal etc. which are natural carbohydrate (Rosenberg, 1980:185) The natural carbohydrate has a lot of natural fibre which affects the food control of diabetic patients. Therefore, the difference in sex has effect on the food control behaviour of diabetic patients.

In addition, the role of social which determines the wife to prepare food for the family, the wife tends to flavour the food according to the need of the husband and children more than the need of herself. The wife has to taste the food until the taste

satisfies the need of the family member. With this reason, the wife has difficulty in control the food consumed. The study of Prasarnpran (1992:80) showed that sex has no relationship to the food control. Another study in the same year by Manokulanand (1992:52) showed a different result. The latter study revealed that the female has better food control behaviour than the male. Therefore, sex is an interesting parameter in studying the food control behaviour of diabetic patient in the family context.

Age and the food consumption behaviour : Age has a direct effect on the food consumption behaviour of the people. It is found that the elder has several changes, especially the ability to feel the taste of the food. The children have a lot of taste buds and the number decrease as one grow up. A report on the survey of noncommunicable disease of the Thai people by The Ministry of Public Health in the year 1996 showed that about 80% of the citizen between 15-59 years has 3 meals per day. The young tends to have snack between each meal more than the old. When the old tends to have foods with stronger taste than the young. The report also revealed that the citizen ages between 15-34 years tends to frequently have very sweet food more than the citizen ages between 35-59 years (47.95 versus 38.1%). The 15-34 years group also tends to have more fatty food than the 35-59 years (28.4% versus 23.7%). The survey also showed that the 35-59 years group has tendency to have boiled food than the 15-34 years group (54.5% versus 46.9%). For the roasted or fried food, the 15-34 years group has more than the 35-59 years group.

Educational background and the food consumption behaviour : Educational background can be counted as a factor affects the food consumption behaviour of people. A high educated person has better knowledge about the food. An educated housewife can select appropriate food for the family and can influence the food consumption behaviour of the family members. (Fleck, 1981:25) The study of Prasarnpran (1992), however, found that the educational background has no relation to the food control behaviour of a person. The educational background factor, hence, is considered as an interesting factor to be studied in this research.

Occupation and the food consumption behaviour : Occupation is a factor affecting the food consumption behaviour. The occupations which have no specific working hours such as merchant, agriculturist etc. cause the person to have irregular

meal time. (Jansiri, 1992:52) The need for food also depends on the occupation. For example, the labour need a substantial food to meet the demand of work carried out. The difference in the occupation, hence, is an interesting factor to be investigated.

Income and the food consumption behaviour : Income of the family is a factor leading to the happiness of the family. The income is a factor involving in the decision of choosing food for the family. The family with high income has more chance to have better foods. But this does not mean that the high income family will always have appropriate nutrient foods. The survey of the National Statistical Department between 1968-1969 among the family in the countryside and the urban found that the low income family spent about 64.7% of their income on food. The family with the income in the range 15,000-17,999 bath spent about 53.4% of their income on food. While the family with the income higher than 60,000 bath spent only 38.2% of their income on food. On the average, a family spent more than 50% of the family's income on food. The high income family can buy food with better quality than the low income family. (Rochjanaburanond, 1976:45-49) The fraction spent on the food by the high income family is low while the low income family is high. The poor has no enough income to provide sufficient food for the family member. (Jansiri, 1995:109) However, the study of Prasarnpran (1992) found that the family income has no relationship to the food controlling behaviour. In this study, therefore, the effect of income on the food consumption behaviour of diabetic patients is included in the study.

The study of Saengkun (1990) on the dining out of the citizen in the urban area and the study of Srilaor (1999) on the fat consumption of hearth disease patients found that the population factors such as sex, age, the number of member in the family, educational background, occupation, and income have effects on the food consumption behaviour.

In conclusion, the population factors such as sex, age, occupation, income, and educational background cause the differences among the diabetic patients. These factors are likely to have effects on the food controlling behaviour of the diabetic patients. Not only the population factors, but also the severity of the disease which cause the difference in the decision made by the diabetic patients on the food controlling behaviour.

Apart from the difference on the population factors, another interesting factor is the family of the patient. Since the family is the unit which is closest to the patient and is the fundamental institute of the human. A person must has relationship with his/her family from born to die. The family also provides food for the family members. The food consumption of the diabetic patients, therefore, needs the help of the family in controlling the food consumed by the patients. Family, hence, is considered as an important factor on the success of the food control.

2.2 Sociology concept of family.

Family is a social institute which is the oldest and at the fundamental of the human society. It is believed that the family institute occurred since the ancient time before any institutes. The family institute still plays significant roles over the family members. Such roles are setting moral, guidelines, and social standard for the new members of the social. (Wantayont, 1986:1) On the other hand, each member of the family plays his/her role closely relates with each other.

2.2.1 Definition of "Family"

The continuous changes in social and economic inevitably affect the structure of the family. The original family structures are single and extended family. At present, the family has more structures than before. The definition of "family" at present, therefore, has more explanations than before. The family subcommittee of The National Committee on Woman Promotion advised that "family" is group of persons bind together by emotion and life dependent, including social and economic, has relationship via law and heredity. Some families may have some exceptional. (National committee on woman promotion, 1994:37-38)

"Family", according to the official Thai dictionary, (1982:168) means a group of people who live in the same house i.e. husband, wife, and children. The definition is rather brief and clear but can not cover all type of family.

According to the attitude of sociology, the "family" means the persons who have relationship by heredity or marriage. According to this attitude, the family contains parent and children.

According to the attitude of anthropology, the "family" means a group of people including relatives who share the same house, the persons who relate via heredity and/or law. The family members have interactions in the form of love, care, support etc. Such members are father, mother, husband, wife, relatives, or temporary tenants. (Ramitanondh, 1999:7, Pookbunmee, 1987:24)

Pongsapich (1994:11) has said that before attempting to define the definition of family, one should open mind. To defined the composition of a family needs not to specific the persons within the family. The members in a family may no be relative. For example, in the case of AIDS epidemic, as the death toll from AIDS increases, the family may reduce to the relative or non-relative. The person who takes care the patient may not be the patient's relative and share the same house.

From the attitudes about the definition of "family" mentioned above, it can be seen that the definition of "family" has reflected an important character, type of relationship among the family members and types of family. The relationship among the family members has roots from love, understanding, and binding. The types of family can be classified as follows : (National committee on woman promotion, 1994: 41-43)

Nuclear family : A nuclear family comprises of people in 2 generations. There are 2 important form : biological and social forms. The nuclear family in the biological form means the family in which a couple has child/children. While the nuclear family in the social form means a couple who married by law but without a child, or a couple who live with each other with/without children. The nuclear family in the social form is commonly found in the present western social, including the Thai family in the urban area. In the future, the nuclear family tends to have more forms due to social and economic changes. The type of family usually has freedom but lack interaction with relatives.

Extended family : An extended family comprises of people in 3 generations or more i.e. grandparent, parent, and children. Or comprises of nuclear family and relatives such as grandparent who share the same house or area. The extended family

may not be a large family but may comprise only parent, children, and a grandparent. This type of family usually has plenty of warmth but lack of freedom since the elder usually acts as the head of the family. The extended family usually found in the agriculture society.

Reorganized family : A reorganized family occurs from a new marriage or living together after one used to have a spouse before. If there are several new marriages, or new marriage in an extended family, the relationship within the family will become more complex. Sometime, the reorganized family also includes the family in which the persons with the same sex live altogether, and/or several nuclear families which live altogether, or a group of single persons who depend on each other depending on the situation.

In conclusion, at present the "family" has been defined by several definitions according to the changes of the family. The definition used in this research is "a group of persons who share the same house, either permanently or temporary". That group of persons has relationship via marriage or heredity and has responsibility in providing food for the diabetic patients. In the present study, the family is classified into 3 categories : nuclear, extended, and reorganized family.

2.2.2 Role and responsibility of the family.

Talcot Parsons purposed that a social is like a system comprises of several sub-system interacting with each other to maintain the integrity and equilibrium of the total system. In order for a social system to maintain its existence, the social system must have the main 4 functions as follows :

1. Constantly function to achieve the goal attainment.
2. Have function adaptation according to the situation.
3. Have function integration to achieve the goal attainment and
4. Have latency to counter stress and prevent to break down of the system.

The structure-function theory looks at the family as an important fundamental system of the social that create social value and standard of the social. The aim of this research is to investigate the role of family on the behaviour of the diabetic patients in order to analyse the relationship in the form of role and interaction such as husband,

wife, parent and children, including inside and outside interaction under different circumstances.

In addition, another main responsibility of the family institute is to give birth for a new generation to maintain the human being, including the teaching of the new member to compile with the social rule. The economic responsibility of the family is to legally work and save to maintain enough resource for the family. Another important responsibility is to take care of the health and give response to the fundamental needs (food, cloth, medicine, and accommodation) of the family members. The family members, therefore, have own functions to maintain the existence of the family.

The role of family in take caring of the health of the patient is an important role since the evolution of human. This role may be as small as slight illness up to complex disease. In addition, the family members also reduce the tasks to be carried out by the patient, takes part in health care, first aid, and medical selection and decision. (Mutiko, 1992:117) It can be seen that the care of the patient in the family needs interactions among family members. A patient in a family means burden and problem which the family members have to bring back to normal situation.

The function of family also changes with time. In the past, a family is a complete economic unit which can sustain itself (self-contained unit). On the other word, the family can provide the members income, education, emotion need, and daily requirement. At present, some functions of the family have been transferred to other social units such as health care. The functions that still attach to the family are the response to the fundamental requirement of the family members, i.e. food, clothes, accommodation, and drug.

Even though at the present time the role of family on the health care of the family members has been transferred to the medical institute, the pattern of illness has been changed from communicable disease to chronic diseases. This causes problems in the caring of chronic disease patients. (Tangcharoensathien, 1991:1) The treatment of chronic diseases requires continuity until the end of the patient's life. The patient without complication tends to stay at his/her home rather than at a hospital. At present, however, it is found that a number of chronic disease patients have to receive at the hospital due to complications. This causes problem with the patient care load of

the hospital staffs and the new policy of the hospital which want to increase the circulation rate of the stay-in patient. (Prasarnathikom, 1992:1) Because of these problems, the present medical treatment aims at the role of family in take caring of the patient at home. The diabetic patients like other patients which do not show any apparent symptom. But if the patient does not properly control his/her behaviour, especially the food consumption, a very severe complication can occur. If the family which, at the present, acts as the food provider and preparation for the diabetic patient, involves in the controlling of the food consumed by the diabetic patient, the chance of a complication to occur can be reduced.

The function of the family members usually follows the status in the family. The family status is attached to each member. For example, great-grandparent, grandparent, parent etc. Each status has its own role and function. The father status, for example, has to find income for the family while the mother status has to prepare food for the family. The role and function of each status among families can vary according to social, economic and culture of each family. However, if each member functions according to the role assigned, the family can live in happiness.

2.2.3 Relationship among the family members

Relationship among the family members relates to emotion. It also attaches to the status in the family. The relationship among the family member means unity, love, understanding, giving, forgiving, and interaction between husband-wife, parent-children, and relative. Any family with good relationship will always have happiness. On the other word, the relationship among the family members is the root of the happiness in life. (Saengsingkaew, 1993:10) It can be said that family is the beginning of the social life. The background of the family affects the health and illness of the family members. Living in a warm family creates health cooperation. Weiss (Weiss, R., 1974:17-26) has purposed that the relationship among the family members should comprise of the following factors :

1. Closeness which leads to warmness and security
2. Activity cooperation which leads to information and experience exchange, including advise, warning, and encouraging.

3. Responsible to each other.
4. Acceptance the capability limit of each family member.
5. Help and giving

However, the relation among the family members may be in the form of love, or hate. Grandall (1980:410-411) purposed that the primary relationship within a family comprises of the following factor.

1. Number of Role : There are several numbers of role in the family such as father, mother, dependents, assistance, etc. The members of the family, therefore, have several forms of interaction.

2. Communication : The communication in a family is usually a open type. The family members discuss with each other, advise, or exchange idea.

3. Emotion : There are several types of emotion in the family, such as love, warmness, angry and conflict.

4. Transferability : Transferability occur with a specific person and can not be easily transfer to another person. It is an interaction between specific persons, such as between parents and children.

In conclusion, the relationship within a family is naturally occurred from the roles of the family members. The family in which the family members have plenty of love will bring help and care to the family.

2.3 Food consumption behaviour of Thai family.

Thailand is agricultural country. In the past, the food consumption of the Thai family depended on the food produced in the family's land. Most of the food consumed were natural cereal grown in the area. The cooking and seasoning depended on the local culture. This led to the origin of food consumption culture originated via the food providing mechanism of the family.

2.3.1 Role of family as food provider.

Family can be counted as a factor influencing the food consumption behaviour in daily life since the beginning of the human society. The family is a melting pot

which blends the human behaviour. A person will have or will not have a food depends on the family background. For example, a fat person may have a family background which does not have any control on the food to be consumed. Sweets are always available. Each family member usually has similar food consumption pattern whether type, taste, cooking, and amount. (Boonprakob, 1994:39)

The role of family in cooking food for the family members begins from food providing, cooking, flavouring, and having. Normally the person who takes care these tasks is housewife. In some families, less common, these roles are taken by the head of the family. The food providing role begins from finding or buying food from any available sources e.g. stores, market, supermarket. Some foods, such as fruits and vegetables, may come directly from the producers. The source of food also covers the food shared between relative and neighbour. In addition, the type of food consumed depends on season. The food according to the season usually has better quality and taste than the food outside its season.

Most of the people in the city obtain food from buying at a market. The food bought at the market may be ready made or fresh foods. The raw materials are passed through cooking processes to suit the type and taste required. The cooking process depends on the experience, culture, and beliefs transferred via family and social.

Cooking includes any processes that make the food ready to be consumed. (Tungchoorut, 1984:97) The cooking process is counted as a culture. As can be seen from the foods from different parts of Thailand which have different types and tastes. For example, the food from the southern part is commonly hot while the food from the northern part is commonly mild. The north-easterner prefer salty and hot foods while the people in the central part like sweet foods and used lot of coconut milk in cooking. (Veerawaitaya and Damapong, 1999:45)

Food processing or cooking method can increase the energy of the food cooked. For example, the fried foods and the foods that use coconut milk in cooking. These foods increase the triglyceride level which is danger to the diabetic patients. The adding of sugar or having preserved fruits, even in a small amount, give very high energy. They can increase the body weight and blood sugar level. Fatty meats, very sweet fruits, fried foods, sweets, and coconut milk containing foods all cause fatness and increase the blood sugar level.

At present there are a lot of semi-ready to eat foods in the market. Typical of these foods is tinned food, noodle, boil rice. These foods need very short time to prepare. The cooked foods sold in fast food stores are mostly high fat, oily, and sugar containing foods. This type of food can be easily kept for a period of time and still look good after warming. If the diabetic patient has the high fat and sugar containing food frequently, the disease control will be difficult. (Choonhasawatkul, 1999:9) Therefore, the person who acts as the food provider of the family should prepare a suitable food for the diabetic patient in his/her family.

In conclusion, the role of family in food providing and preparing is very important and affects the food consumption behaviour of the family members due to the fact that in many families the family members still have meals altogether. The tendency of a diabetic patient to strict to the food control programmed or not, hence, depends strongly on the family role.

2.3.2 Food consumption behaviour in daily life of Thai family.

Most of the Thai family have rice as a main dish for three meals. The rice may be normal or sticky rice. Each meal usually has 2-3 dishes having with rice, depends on the economic status and time. The dishes having with rice enhance taste and nutrient of the meal. The dishes having with rice come from several sources such as meat, fish, egg, vegetable etc. The taste and preparation method depends on the requirement of the family members. If the family members prefer oily food, the dishes having with rice are tended to be prepared in such way. (Intarumpan, 1994:50) The pattern of a Thai meal is to share the dishes having with rich while each member has own rice dish. During the meal time, the family members usually have conversation to strengthen the relationship. After each meal, some families may have sweets and fruits according to popular and economic of each family. The sweets may be prepared according to some special occasions. The major ingredients of the Thai sweets are flour, sugar, coconut milk or coconut.

Apart from the pattern of having food, the status of each family member also relates to the food consumed. In some culture such as Chinese, father, mother and the eldest son are the first group to have meal. The daughter-in-law, though being a cook

herself, will have meal later. In some Thai family, there is tradition that the rice just finish cooked must be served to the head of the family. In some tradition, the older will have meal before the younger. (Saihoo, 1984:161)

Considering the nutrient of Thai food, the nutrient experts accept that the Thai food has complete 5 set of nutrients in equilibrium. The amount of flour, sugar, and fat is not too high. In addition, the present of natural fibre help slow the absorption rate of fat from the food eaten. The rotation of food allows the consumer to have adequate nutrients. (Hongvivatana, 19981: 9-13)

In conclusion, from the pattern of food cooking and dining in the family, it can be seen that the family significantly influences the food control behaviour of the diabetic patient in the family. If the family support the food control programme by providing and preparing suitable foods for the diabetic patient, it will encourage the diabetic patient to strict to the food control programme.

2.3.3 Effects of social changes on the food consumption behaviour of Thai family.

The changes in society, economic and the advances in technology make the world looks smaller than before. An obvious result is the living patterns of people in different parts of the world tend to blend altogether. The food consumption culture is inevitably affected by such changes. Any changes in the food consumption pattern, therefore, follow the changes in social, economic, and political atmosphere at that time. (Ramitanondh, 1997:2) As can be seen from the foods had by Thai families at present. One can see that the foods have varieties of origin. A meal may comprise of ordinary Thai food, fried eggs, fried sausages, or a big piece of fried beef.

Such changes determine the culture of food and the direction of food business. The food that is prepared only in house has been mass produced and distributed. The living in a society that have to race with time make the consumer to require convenience and time saving food preparation method. In Thailand, it is found that the populations in the urban area tend to have carbohydrate from sugar more than the people in the country at the ratio of 12.9:9.1. The people in the countryside tend to have carbohydrate from rice and flour more than the people in the urban area at the



ratio of 360:298.6. In addition, the economic constraints force more women to work outside. This reduce the time and labour for preparing food for the family. As can be seen from the research of Uttamawathin who found that a lot of family do not cook. About 50% of the people in Bangkok buy cooked foods from markets and about 36.3% have meals at fast food centres. The cooked foods sold in the markets and fast food centres normally are high fat menu. Due to these foods will look nice after being warmed. The consumers, due to these facts, receive fatty foods which affect their health. (Choonhasawatkul, 1999:9)

The Thai family is severely affected from the economic and social strategic plans of Thailand which follow the current of the global direction. An important effect occurred on the Thai family is the change from an agricultural society to an industrial society. A lot of people move from farm and countryside to become labourer in manufacturing plants. (Sriareeya, 1996:19-23) The effects on the Thai family are obvious and continuous. The Thai family institute continuous changes from the extended family form to the nuclear family form. The national population survey in 1990 found that the number of family was 12.2 millions with the average size of 4.4 persons. The number of children per family reduced from 6 children at 30 years earlier to 2 children per family at present. About 1 in 4 family has their own land while about 50% of the farmers are labourer in farm. 1 in 8 is unemployed. (The National Statistical Department, 1994) People from every part of Thailand moved to live and work in Bangkok. In 1981, the average number of residence in Bangkok was 3.314 people per square kilometer. (Arnold and Boonprathueng, 1976: 11, Goldsteel and Goldsteel, 1994: 23-24) The main cause of movement during the period 1962-1980 was the economic factors. (Junrutritwong, 1983:393)

The importance of family on human being can not be denied. "Family" is the institute that everyone put hope on solving every social problem. but the economic changes at present has influenced the economic structure and the relationship in the family. These situation changes can affect the role of family in looking after the diabetic patients in the family. The family may or may not support the preparation of suitable foods for the diabetic patients in the family.

2.4 Family and the food consumption behaviour of diabetic patients in family context.

The review of previous knowledge, both idea and theory, shown earlier shows that there are several factors likely to have effects on the food consumption behaviour of the diabetic patients in the family context. These factors are sex, age, marital status, occupation, education, economic, years diagnosed as diabetes, patient attitude on severity of the disease, and status of the patient in the family. These factors cause difference among each diabetic patients. Such differences are factors to be concerned in the study of the food consumption behaviour of the diabetic patients.

Another factor that can not be overlooked is the family factor. Since the family is the first institute that implants social value to each person. The attitude of each people in selecting what to have depends on the experience in childhood. It is said that human always asks for the food according to experience in childhood. Most family flavours the food according to the taste the family members get use to. When the family has a diabetic patient, the role of family in providing suitable foods for the diabetic patient is very necessary and important. The role of family begins from food providing, preparation, cooking, and having. If each step supports the food control programme of the patient, the chance for complications to occur will be greatly reduced. Above all, if the family members change their food consumption behaviour to synchronize with the patient, this will benefit the health of each member. The relationship among the family members is also another factor that can have effect on the food consumption behaviour of the patients. From all of the mentioned reasons, the research has put the framework on the food consumption behaviour of diabetic patients in the family context using both personal factors and family factors.

CHAPTER 3

RESEARCH METHODOLOGY

This study is a survey research to examine the food consumption behaviour of diabetic patients in the family context. The research also study roles and functions of family in food providing for the diabetic patients whether how much the family promote or hindrance the consumption of suitable foods of the patients. The methodology of this study can be described in the next paragraphs.

3.1 Populations and sample size.

The populations studied in this study are the diabetic patients who come to received treatment at the out patient department, Burapha University Hospital, Cholburi Province, in the year 2001. The diabetes clinic is opened two days per week, between 7.30-12.00 on Tuesday and Thursday. The number of diabetic patients is between 30-50 per day. The data base of the year 2000 showed that 720 diabetic patients came to received treatment at the clinic.

3.1.1 Sample size.

The sample size of this study is calculated from the number of the diabetic patients who came to receive treatment in the year 2000 (720 cases). The error of the sample is set at 5% (0.05) or the sample has the confidence level of 95%. The number of the smallest sample size which can be accepted as the representative of the total diabetic patients is determined from the following formula (Yamane, 1973:725)

$$n = \frac{N}{1 + N(e)^2}$$

where

n = number of sample

N = Total number of population

e = acceptable error (here is 0.05 or 95%)

therefore $n = 720 / (1 + 720(0.0025)) = 257$ patients

To prevent loss of sampling data the researcher adjusted sample size upto 260.

3.1.2 The studied sample and sample selection.

The sample studied in this research was selected from the people who came to received treatment at the Burapha University Hospital, Cholburi province. The researcher has determined the characters of the sample as follows :

1. The patient must be a non-insulin dependent diabetes.
2. The patient must continuously come to receive treatment at the Burapha University Hospital not less than 1 year.
3. The patient must not have any severe complications such as sudden hearth attack, paralysis, hyperthyroid etc.
4. The patient must not be pregnant.
5. The patient must have good consciousness, no hearing or communication problem, and actively involve in the interrogation.

The patients were sampled from different period of time i.e. January-March, April-June, July-September, and October-December. Since the diabetic patients in each period have very similar characters, the patients in a period can represent the patients in the other periods. In this study, the researcher interrogated the diabetic patients who came to receive treatment between Tuesday 7th August 2001 and Tuesday 11th September 2001 on Tuesday and Thursday during 7.30-12.00 each week. The interrogation finished after 260 diabetic patients were interrogated.

3.2 The research tools.

The research tools comprise of :

1. The patient records of diabetic patients.
2. Questionnaire. The questionnaire used in this study comprises of 4 parts as follows :

Part 1. Population and social characters.

Part 2. Role of family in providing suitable foods for the diabetic patients.

Part 3. Data on the food consumption behaviour in daily life of the diabetic patients.

Part 4. Data on relationship within the patient's family.

3.2.1 Content and parameters used in the study.

The content of questionnaire and the parameters used in the study of the role of family in the food controlling behaviour of diabetic patients are based on the literature reviewed and related researches. The questionnaire comprises of the following sections.

Section 1 : Population and social characters

This section comprises of 12 multiple choice questions. The questions are about sex, age, marital status, occupation, education background, economic level, years diagnosed as diabetes, the number of family members, type of family, and the status in the family.

Section 2 : Role of family in providing suitable foods for the diabetic patients.

This section comprises of 23 questions as follows :

The first nine questions ask about the role of family in providing suitable foods for the diabetic patients.

The questions number 10-13 ask about the food preparation method.

The role of family on the consumption of suitable foods for the diabetic patients is asked in question number 14-16.

Seven questions, number 17-23, ask about the changes in the food consumption behaviour after being diagnosed as diabetes.

The questions number 3, 4, 8, 10, 12, 15, 16, 21 and 22 are positive.

The questions number 1, 2, 5-7, 9, 11, 14, 17-20 and 23 are negative.

Section 3 : The food consumption behaviour in daily life of diabetic patients.

This section comprises of 20 questions as follows :

Six questions (2-4, 7, 19 and 20) ask about the consumption of flour, sugar, and fat.

Seven questions (1, 5, 6, 10-12 and 18) ask about the consumption of soft drinks and snacks between meals.

Four questions (8, 9, 13 and 14) ask about the consumption of vegetables and fruits.

Three questions (15-17) are about the controlling of food before and after the blood sample taking.

The positive questions are the questions number 1, 2, 5, 8, 13, 14 and 16.

The negative questions are the questions number 3, 4, 6, 7, 9-12, 15 and 17-20.

Section 4 : The relationship within the family.

This section comprises of 20 questions as follows :

Four questions on the communication within the family. These are the questions number 1-4.

Questions 5-9 ask about time spent on the family's activities.

Questions 11-16 ask about the love and harmony within the family.

The help of the family member is asked in questions number 10 and 17-20.

The positive questions are the questions number 1, 2, 6, 8, 9, 13-15 and 17-20.

The negative questions are the questions number 3-5, 7, 10-12 and 16.

3.2.2 The build of the tool.

Step 1 : The objective of the questionnaire is to find information on the food consumption behaviour of diabetic patients in family context. The researcher has reviewed literatures, documents, books etc. to gather previous information on types of family, economic background, relationship within family, role of family, and the food consumption behaviour in daily life of diabetic patients.

Step 2 : The researcher has preliminary interviewed with some diabetic patients about their food consumption behaviour in daily life. The structure and framework of the questionnaire are determined from the information gathered in this step. The questionnaire was adjusted, where necessary, to cover the behaviour to be measured, and to consistence with the hypotheses and objective of the research work.

Step 3 : Determine the number of questions required to cover all the areas interested. Then, determine the form and type of questionnaire. Set criteria for scoring and translating. In this step, the questionnaire must be complete, effective, and reliable.

After all the procedures described above, the questionnaire obtained comprises of 4 parts as follows :

Part 1 : This part aims at the social and family of the sample populations. The questions are multiple choice type all of which are about sex, age, education, occupation, marital status, economic level, years diagnosed as diabetes, attitude on

severity, number of members in the family, type of family, and the status of diabetic patient in the family.

Part 2 : This part is about the role of family in providing suitable foods for the diabetic patient. There are both positive and negative questions. The form of question is Likert scale. The diabetic patient is requested to answer only one from the following 4 choices: totally agree, agree, disagree, totally disagree. Each answer has the following score :

Answer	Positive question	Negative question
Totally agree	4 score	1 score
Agree	3 score	2 score
Disagree	2 score	3 score
Totally disagree	1 score	4 score

The evaluation of the role family on the food consumption of diabetic patient is carried out from 23 questions. The risk behaviour is categorised into groups using mean and standard deviation $\bar{x} \pm SD$. It is found that the mean is 61.74 and the standard deviation is 7.11. From these data, the risk behaviour of the diabetic patients is categorised into 3 groups as follows :

Role of family in providing food for diabetic patient.	score
Need improvement	38.00 - 54.62
Average	54.63 - 68.85
Good	68.66 - 87.00

Part 3 : This part concerns the food consumption behaviour in daily life of the diabetic patients. There are four answers that the diabetic patients can be used for the questions : always, sometime, rarely, and never. Each answer has the following meaning :

Answer	Meaning
Always	The patient always carries out such activity.
Sometimes	The patient sometimes carries out such activity.
Rarely	The patient rarely carried out such activity
Never	The patient never carried out such activity

Each answer has the following score :

Answer	Positive question	Negative question
Always	4 score	1 score
Sometimes	3 score	2 score
Rarely	2 score	3 score
Never	1 score	4 score

The evaluation of the food consumption behaviour in daily life of diabetic patient is carried out from 20 questions. The risk behaviour is categorised into groups using mean and standard deviation $\bar{x} \pm SD$. It is found that the mean is 61.27 and the standard deviation is 7.44. From these data, the risk behaviour of the diabetic patients is categorised into 3 groups as follows :

Role of family in providing food for diabetic patient.	score
Need improvement	38.00 - 53.82
Average	53.83 - 68.70
Good	68.71 - 77.00

The risk behaviour of diabetic patients in the food consumption has interval measurement level.

Part 4 : Relationship within family.

The relationship within family means feeling and interaction among the family members in the form of love, communication, advice, family activity, help, economic, and time.

The form of question is Likert scale. There are four answers that the diabetic patients can be used for the questions. The choice "not true" means the question is not correct. The choice "partial" means the question is partially correct. The choice "frequently" means the question is frequently correct. And the choice "mostly" means the question is always correct. Each answer has the following score :

Answer	Positive question	Negative question
Not true	4 score	1 score
Partial	3 score	2 score
Frequently	2 score	3 score
Mostly	1 score	4 score

The evaluation of the food consumption behaviour in daily life of diabetic patient is carried out from 20 questions. The risk behaviour is categorised in to groups using mean and standard deviation $\bar{x} \pm SD$. It is found that the mean is 65.45 and the standard deviation is 5.57. From these data, the risk behaviour of the diabetic patients is categorised into 3 groups as follows :

Role of family in providing food for diabetic patient.	score
Need improvement	32.00 - 55.87
Average	55.88 - 75.02
Good	75.03 - 80.00

The relationship within family of diabetic patients has interval measurement level.

3.2.3 The quality assurance of the tool.

The validity of the questionnaire was firstly checked by thesis advisor and expertise in the field to confirm that the questionnaire covers all the interested aspects.

After the questionnaire was modified according to the comments from the expertise, the questionnaire was tried out with 5 diabetic patients. Then the language of the questionnaire was modified to prevent misunderstanding between the researcher and the diabetic patients. After the first language modification, the questionnaire was tried out again with another 10 diabetic patients. Then the sequence of the questions in the questionnaire was rearranged. After the question rearrange, the questionnaire was tried out again with another 30 diabetic patients.

The results obtained from the last try out were checked for reliability. The checked parameters were the food consumption behaviour of diabetic patients in family context, the role of family in providing food, and the relationship within the patient family. The validity of the analysis was calculated using Cronbach's alpha coefficient method. It is found that the questionnaire has the following validity.

1. The food consumption behaviour of diabetic patients in family context has the validity equals to 0.75.
2. The role of family in providing food has the validity equals to 0.86.
3. The relationship within the patient family has the validity equals to 0.93.

3.3 The data collection.

The researcher has obtained a letter from the graduated school of Mahidol University to ask the director of the Burapha University Hospital for permission to collect data. The data collection period was between 6.00-12.00 from 7th August 2001 to 11th September 2001.

After the permission has been granted, the researcher has met the head of the nursing department to explain the detail procedures. Then, the researcher has asked for cooperation from the head of the out patient department and related officers.

The service of the diabetes clinic begins from the registration of the diabetic patients. The blood sample taking is carried out between 7.30-9.00. The next steps are the weight and blood pressure checking. After that the patients can have breakfast

and come back to receive the results and make the next appointment with the doctors. From the beginning to the end takes about 3-4 hours.

There are additional 4 assistance help collecting the data. All assistance were trained before allowing to question the patients. The data collection has the following procedures :

1. The researcher asked for name and history of the diabetic patients to identify the interested subjects and to prevent repeat data collection.

2. Ask for information from the patient. The researcher began by introducing and explaining the objective of the study. The interview began after the patients agreed to cooperate. The patient could ask for more explanation if he/she did not understand any question.

The data collection began on Tuesday 7th August 2001 between 6.00-12.00. In the first days, the collection was rather slow due to the assistance did not accustom to the questionnaire. The questionnaire took about 25-30 minutes per one patient. After the assistance began to get use to the questionnaire, the time reduced to 20 minutes per patient. In the first period, the collection was carried out during the time the patients were waiting for the call from the doctor which took about 30-60 minutes. It was found that this time was not appropriate since several patients were called before the interview was completed. In the next week, the interview was planned to begin from 6.00 o'clock at the examination room where all the diabetic patients must be taken blood sample here. The research teams could collect about 40-60 cases per week. It took about 5 weeks to collect 260 cases. The interview ended on Tuesday 11th September 2001. Then, the data were complied and analysed.

3.4 Compiling and analyses

The researcher has prepared a code book of all questionnaire. The data are analysed using a microcomputer and a software named "Statistic Package for the Social Science (SPSS/Pc⁺). The significant level is set at 0.05. The data analyses procedures are as follows :

1. Use descriptive statistic to determine frequency, percentage, mean, standard deviation, and maximum and minimum to analyse personal and family data. The data analysed are sex, age, marital status, educational level, occupation, economic level, years diagnosed as diabetes, severity of the disease, status of the patient in his/her family, the number of family members, type of family, relationship within the patient family, role of family in providing and preparation of food, and food consumption behaviour of diabetic patients.

2. Analyse relationship between the independent variables that have two level of measurement (i.e. sex and type of family) and the food consumption behaviour of diabetic patients in family context (dependent variable) using student t-test. Analysis of variance (ANOVA) is used when the independent variables are more than two level of measurement (i.e. age, marital status, educational level, occupation, economic level, years diagnosed as diabetes, severity of the disease, status of the patient in his/her family, the number of family members, relationship within the patient's family, and role of family in providing and preparation of food).

3. Analyse the influences of the independent variables which have interval scale measurement (age, educational level, income, years diagnosed as diabetes, attitude on severity of disease, relationship within the patient's family, and role of family in providing and preparation of food) whether they have or have no effects on the food consumption behaviour of diabetic patients. The analyse is carried out using stepwise multiple regression analysis because nearly all the analysed variables have the measurement level as interval scale. Several independent variables have the same dependent variable. In addition, the stepwise multiple regression analysis still has an advantage that it can show the effects of several independent variables on the same dependent variable simultaneously.

Data must be checked to agree with the rules of multiple regression analysis prior to analyse according to the following assumptions :

First, all the variables must have interval scale. Any variable which does not have interval scale must be changed into dichotomy.

Second, the distribution of residual must be normal distribution by checking the residual with Kolmogorov-Smirnov test.

Third, there must not be auto-correlation. On the other word, there is no correlation among residuals which can be checked from Dubin-Watson test.

Fourth, the variance of residual is homocedasticity and the dependent variables have linear relationship with independent variables. This can be tested by plotting between the residual and the predicted value.

Fifth, the independent variables must not have multicollinearity which can be tested by finding correlation among the independent variables.

After the data pass the agreements described above, the multi-regression statistical analyses is brought into action.

3.5 The translation of correlation coefficients.

The correlation coefficient has the value from 0.00 to 1.00 in either positive or negative directions. The size of the correlation coefficient can be considered from the absolute value. The plus or minus symbol indicates only the direction. The significant level of the correlation coefficients can be considered after testing. Since in the step-wise multiple analyses, the variables to be calculated must have measurement level in interval scale or above. In case the independent variable is nominal scale, the variable must be changed into dummy variables. The value of the dummy variables will be either 0 or 1 only. (Sujitrarut, 2001:160)

From the formula : $D = G - 1$

where D = Number of dummy variable

G = Number of groups of independent variables

Table of dummy variable.

Parameters	Original code	Dummy variable				
		D1	D2	D3	D4	D5
Sex	1. Male	0				
	2. Female	1				
Marital status	1. Single, Widow, Divorced, Separate	0				
	2. Married	1				
Occupation	1. Unemployed	1	0	0	0	
	2. Agriculturist	0	1	0	0	
	3. Employee	0	0	1	0	
	4. Merchant	0	0	0	1	
	5. Government service, Government entrepreneur	0	0	0	0	
Economic status of the family	1. Poor	1	0	0		
	2. Just enough	0	1	0		
	3. Middle class	0	0	1		
	4. Rich	0	0	0		
Attitude on severity of the disease	1. Not severe	1	0	0		
	2. Moderate	0	1	0		
	3. Very severe	0	0	1		
	4. Don't know	0	0	0		

CHAPTER 4

RESULTS

The study of family and the food consumption behaviour of diabetes patient in family context was carried out using questionnaire. The data were gathered from the diabetes patients who came to receive treatment at the Diabetes clinic, Out patient department, Burapha University Hospital. The number of the diabetes patients interviewed is 260. The data were analysed using SPSS/PC⁺ software. The analysis are presented in 4 sections as follows:

4.1 Population and social characters of the sample.

4.2 Food consumption behaviour in daily life of diabetes patient, role of family in providing suitable for the diabetes patient, and relationship within the family.

4.3 Relationship between food consumption behaviour in daily life of diabetes patient and factors affecting.

4.4 Factors affect food consumption behaviour in daily life of diabetes patient.

4.1 Population and social characters of the sample.

4.1.1 Population and social characters of the sample

The majority of the diabetes patients interviewed are female (71.5%). Male is accounted for only 28.5%. Most of the patients age between 61-70 years (35.8%). The average age of the patients is 60.7 years. About two third of the patients is married (66.5%). The average marriage time is 23 years. The rest is found to be widow, divorce, separate, and single.

Considering educational background of the diabetes patients, it is found that the majority of the diabetes patients has finished compulsory course (elementary level and higher). 68.1% finished elementary level. Only 17.7% never attended school. More than half (53.1%) of the patient is head of family/housewife.

Even though most of the diabetes patient do not work, the economic level of most families is just more than enough and just enough for their daily life consumption, 46.3% and 41.3%, respectively. The rest are in the group of the rich and the poor people, 9.3% and 3.1%, respectively. The results are summarised in Table 1 on the next page.

Table 1 Number and percentage of diabetes patients. Classified by population and social characters.

Population and social characters	No.	%
Sex		
Male	74	28.5
Female	186	71.5
Total	260	100.0
Age		
Less than 51 years	49	18.8
51 - 60 years	76	29.2
61 - 70 years	93	35.8
71 years and over	42	16.2
Total	260	100.0
Mean 60.71 S.D. 10.07 Min 31 Max 84		
Marital status		
Single	16	6.2
Widow, Divorce, Separate	71	27.3
Married	173	66.5
Total	260	100.0
Marriage period		
Less than 10 years	12	4.6
10-20 years	13	5.0
21-30 years	38	14.7
31-40 years	55	21.1
More than 40 years	55	21.1
Total	173	66.5
Mean 23.19 S.D. 19.32		

Table 1 Number and percentage of diabetes patients. Classified by population and social characters (continue)

Population and social characters	No.	%
Academic background		
Never attend school	46	17.7
Primary school	177	68.1
Secondary school	18	6.9
Lower than bachelor degree	2	0.8
Bachelor degree	13	5.0
Higher than bachelor degree	4	1.5
Total	260	100.0
Occupations		
Head of family, housewife	138	53.1
Retired government service employee	12	4.6
Agriculturist	11	4.2
Fishery	3	1.2
Employee	30	11.5
Merchant	10	3.8
Government service employee	3	1.2
Employee of government interprise	51	19.6
Others	2	0.8
Total	260	100.0
Family income		
Rich	9	3.1
Middle class	120	46.3
Just enough	107	41.3
Poor	24	9.3
Total	260	100.0

4.1.2 Diabetes related data

It is found that the minimum years of diagnosis diabetes is 1 year and the maximum is 35 years. The majority of years of diagnosis diabetes lies below 5 years (47.3%). The average value is 8.1 years.

Next is to consider the attitude of the patients on the severity of the disease. It is found that 42.7% and 40.8% of the patients think that diabetes is not so severe and moderately severe, respectively. Only 12.7% believe that diabetes has very severe effect.

Considering the attitude on disability such as amputation, blindness, paralyzed, etc. cause from diabetes. It is found that most of the patients (63.5%) do not think that diabetes can cause disability. Only 13.0% know that diabetes can cause disability. Most of the patients (77.3%), know that diabetes can not be cured. Just only 10.8% believe that diabetes can be cured and only 11.9% have no idea. The results are summarised in Table 2.

4.1.3 Family components

Most of the diabetic patients at Burapha University Hospital live in family. The number of member in family is between 2-6. The average family member is 4.

In addition, it is found that most of the patient live in extended family (58.5%). 41.5% lives in single family. And only 3.1% stay alone.

It is found that 51.5% of the patient hold the status as great grandparent and grandparent of the families. Following by father/mother and husband/wife, 31.4% and 6.2%, respectively. The results are shown in Table 3.

Table 2 Number and percentage of diabetic patients classified by years of diagnosis diabetes, and attitudes.

Diabetes related data	No.	%
Years of diagnosis diabetes		
Less than 5 years	123	47.3
5 - 10 years	77	29.6
11 - 16 years	25	9.6
17- 22 years	29	11.2
more than 22 years	6	2.3
Total	260	100.0
Mean 8.1 S.D. 6.81 Min 1 Max 35		
Attitude on severity of diabetes		
Not severe	111	42.7
Moderate	106	40.8
Very severe	33	12.7
Don't know	10	3.8
Total	260	100.0
Attitude on disability cause from diabetes		
Diabetes can cause disability	34	13.1
Diabetes can not cause disability	165	63.5
Don't know	61	23.5
Total	260	100.0
Attitude on treatment		
Diabetes can not be cured	201	77.3
Diabetes can be cured	28	10.8
Don't know	31	11.9
Total	260	100.0

Table 3 Number and percentage of diabetes patients classified by family components.

Data on family	No.	%
Number of members in family		
1	9	3.5
2 - 6	197	75.8
7 - 10	53	20.5
more than 10	3	1.2
Total	260	100.0
Mean 4.2 S.D. 2.4 min 1 max 20		
Family type		
Single family	108	41.5
Extended family	152	58.5
Total	260	100.0
Status of the patient in the family		
Great grand parent	8	3.1
Grand parent	133	51.2
Father/Mother	82	31.5
Uncle/Aunt	7	2.7
Offspring	1	0.4
Brother/Sister	3	1.2
Spouse	17	6.5
Other	9	3.5
Total	260	100.0

4.2 Food consumption behaviour in daily life of diabetes patient, role of family in providing suitable food for diabetes patient, and relationship within family.

4.2.1 Food consumption behaviour in daily life of diabetes patient

It is found that most of the diabetes patients have medium risk food consumption behaviour (68.8%). The patients who have high risk and low risk behaviour are 15.8% and 15.4%, respectively.

Considering the food consumed in daily life, 70% of the diabetes patients consume moderate amount of carbohydrate, sugar, and fat. The amount consumed by 16.9% and 13.1% of the patients are high and low, respectively.

Considering having snack and sweet beverage between meal, it is found that 70.0% of the diabetes patients taking in moderate amount. 17.7% and 12.3% consume in low and high amount, respectively.

Considering the vegetable and fruit consumption behaviour, it is found that 66.5% of the diabetes patients consume in moderate level. 19.6% slightly consumed vegetable and fruit. Just only 13.8% rely heavily on vegetable and fruit.

Considering the food controlling behaviour before and after the blood sample taking, it is found that most of the patients have moderate food control behaviour (65.8%). Following by those that rarely control food (18.1%). Only 16.2% of the diabetes patients strictly control the food they have.

The results are summarised in Table 4.

4.2.2 Food controlling behaviour before and after blood sample taking.

It is found that 38.1% of the patient take drug with strict food control. Followed by those take drug but do not control food (26.2%). It is also found that 56.2% of the patient have considered food control when they found that their blood sugar level increased. 46.5% of the patients, even though the blood sugar level is normal, still strictly continue food controlling. The results are shown in Table 5.

Table 4 Number, percentage, mean, and standard deviation of food consumption behaviour in daily life of diabetes patient. (Total number = 260)

Food consumption behaviour of diabetes patient	No.	%
Food consumption behaviour		
Very risk (score 38.00 - 53.82)	41	15.8
Moderate risk (score 53.83 - 68.70)	179	68.8
Low risk (Score 68.71 - 77.00)	40	15.4
Total	260	100.0
Mean 61.27 S.D.7.44 min 38 max 77		
Carbohydrate, sugar and fat consumption		
High (very risk)	44	16.9
Moderate	182	70.0
Low	34	13.1
Mean 18.2 S.D.3.05 min 6 max 24		
Snack and sweet, sweet drink consumption		
High (very risk)	32	12.3
Moderate	182	70.0
Low	46	17.7
Mean 22.20 S.D.3.49 min 10 max 28		
Fruit and vegetable consumption		
Low	51	19.6
Moderate	173	66.5
High	16	13.8
Mean 12.20 S.D.2.08 min 7 max 16		
Food controlling behaviour before and after blood sample taking		
Low strict	47	18.1
Moderate strict	171	65.8
Very strict	42	16.2
Mean 8.17 S.D.2.33 min 3 max 12		

Table 5 Number and percentage of food controlling behaviour before and after blood sample taking.

Food controlling behaviour	No.	%
Drug taken and food controlling		
Drug taken only, no food controlling	68	26.2
Drug taken with some food controlling	53	20.4
Drug taken with frequent food controlling	40	15.4
Drug taken with strict food controlling	99	38.1
Total	260	100.0
Food controlling attitude when blood sugar level is high		
No plan to control	44	16.9
Some food control	29	11.2
Frequent food control	41	15.8
Strict food control	146	56.2
Total	260	100.0
Food controlling attitude when blood sugar level is normal		
No plan to control	51	19.6
Some food control	33	12.7
Frequent food control	55	21.2
Strict food control	121	46.5
Total	260	100.0

4.2.3 Consumption of sweet and beverage containing sugar.

Consumption of sweet and beverage that contain sugar is a behaviour that can lead to an increase in blood sugar level. It is found that 48.8% of the patients moderately consume sweet and beverage containing sugar. Only 4.6% slightly consumed. And only 4.6% of the patient barely consumed. Most of the patient (68.5%) do not have sweet or snack during watching television or at leisure. While 3.8% of the patient moderately consume.

For noodle consumption, it should be noted here that the number of the patients who add more sugar in the noodle is just slightly higher than the number of the patients who do not add, 52.3% and 47.7% respectively. 28.1% of the patients add more sugar into their noodle every time. 15.8% and 5.8% of the patients seldom and frequently add sugar into their noodle.

Considering fruit containing sugar of the patient, it is found that the number of diabetes patients having fruit after meal is higher than the number of diabetes patients who do not have fruit (69.4% versus 30.4%). 29.6% of the diabetes patients have some fruits after meal while 19.6% of the patients frequently have fruit after meal. In addition, when the season of sweet fruit arrives, it is found that as high as 81.1% of the diabetes patient consume sweet fruit. Only a few do not have. 38.5% of the diabetes patients barely have sweet fruit after meal while 13.1% have every time.

The number of diabetes patients who drink sweet beverage and do not drink is found to be about the same (51.2% and 48.8%, respectively). Among the diabetes patients who drink, 26.5%, 17.3%, and 7.3% drink slightly, heavy, and moderately, respectively. 86.5% of the diabetes patients say that they do not drink alcohol. Just only 1.9% say that they drink nearly everyday in a week. When joining party, it is found that the number of patients who do not drink sweet beverage and alcoholic food and the number of patients who drink is about the same (52.7% and 47.3%, respectively)

For toffee, it is found that 63.0% of the diabetes patients do not have. While 8.1% have every day. The results are summarised in Table 6.

Table 6 Number and percentage of consuming food and beverage that contain sugar.

Consumption of food and beverage that contain sugar	No.	%
Sweet and dessert consumption frequency after meal		
Never	77	29.6
Barely	127	48.8
Seldom	44	19.6
Frequent	12	4.6
Total	260	100.0
Consumption of snack at leisure		
No	178	68.5
Barely	47	18.1
Seldom	10	3.8
Frequent	25	9.6
Total	260	100.0
Addition of sugar into noodle		
No	124	47.7
Sometime	41	15.8
Frequent	22	8.5
Always	73	28.1
Total	260	100.0
Consumption of fruit after meal		
Never	79	30.4
Barely	77	29.6
Seldom	53	20.4
Frequent	51	19.6
Total	260	100.0

Table 6 Number and percentage of consuming food and beverage that contain sugar. (continue)

Consumption of food and beverage that contain sugar	No.	%
Consumption of sweet fruit according to season		
No	47	18.1
Barely	100	38.5
Sometime	79	30.4
Frequent	34	13.1
Total	260	100.0
Consumption of sweet beverage		
No	127	48.8
Little	69	26.5
Moderate	19	7.3
Heavy	45	17.3
Total	260	100.0
Consumption of alcohol		
No	225	86.5
Little	22	8.5
Moderate	8	3.1
Heavy	5	1.9
Total	260	100.0
Consumption of all kinds of sweet drink/beverage at party		
No	137	52.7
Sometime	74	28.5
Frequent	22	8.5
Always	27	10.4
Total	260	100.0

Table 6 Number and percentage of consuming food and beverage that contain sugar. (continue)

Consumption of food and beverage that contain sugar	No.	%
Consumption of toffee		
No	164	63.0
Barely	46	17.7
Sometime	29	11.2
Daily	21	8.1
Total	260	100.0

4.2.4 Role of family in providing suitable food for diabetes patient.

It is found that the majority of the families play moderate role in preparation suitable food for diabetes patient (69.2%). The number of families that play high and low role is about the same (15.4%).

Considering role of family in providing suitable food for diabetes patient, it is found that the majority of the families play moderate role (67.7%). Following by those play low and high role, 19.2% and 13.1%, respectively.

Considering role of family in cooking suitable food, it is found that found that the majority of the families play moderate role (75.8%). Following by those play low and high role, 13.1% and 11.2%, respectively.

Considering role of family in food having, it is found that found that the majority of the families play low role (42.3%). Following by those play moderate and high role, 41.2% and 16.5%, respectively.

Considering role of family in food consumption behaviour changing, it is found that found that the majority of the families play moderate role (72.3%). Following by those play high and low role, 13.1% and 13.1%, respectively.

All the results are summarised in Table 7.

Table 7 Number, percentage, mean, and standard deviation classified by role of family in providing suitable food for diabetes patient.

Role of family on	No.	%
Food preparation for diabetes patient		
Low (score 38.00 - 54.62)	40	15.4
Moderate (score 54.63 - 68.85)	180	69.2
High (score 68.86 - 87.00)	40	15.4
Total	260	100.0
Mean 61.74 S.D. 7.11 min 38 max 87		
Food providing		
Low	50	19.2
Moderate	176	67.7
High	34	13.1
Total	260	100.0
Mean 25.7 S.D. 3.4 min 16 max 33		
Food flavouring		
Low	34	13.1
Moderate	197	75.8
High	29	11.2
Total	260	100.0
Mean 10.5 S.D.1.8 min 6 max 16		
Food having		
Low	110	42.3
Moderate	107	41.2
High	43	16.5
Total	260	100.0
Mean 7 S.D. 1.6 min 3 max 12		

Table 7 Number, percentage, mean, and standard deviation classified by role of family in providing suitable food for diabetic patient. (continue)

Role of family on	No.	%
Food consumption behaviour changing		
No effect	34	13.1
Moderate effect	188	72.3
Strong effect	38	14.6
Total	260	100.0
Mean 19.3 S.D. 3.1 min 10 max 28		

4.2.5 Role of cooking activity of family.

It is found that most of the diabetic patients' family prefers to cook by themselves (44.2%) rather than buying cooked food. Followed by those cook every day (36.9%). It is also found that 1.9% of the families do not cook at all. More than half of the person who cook for the family is the diabetic patient (52.7%). Followed by spouse and daughter (20.0% both). It is also found that 35.4% of the sampling family prefer any taste, 19.2% and 15.4% prefer mild and sweet tastes, respectively. The results are summarised in Table 8.



Table 8 Number, percentage, mean, and standard deviation of cooking activity in family.

Cooking activity	No.	%
Cooking in family		
No cooking at all	5	1.9
Buying more than cooking	44	16.9
Cooking more than buying	115	44.3
Cook everyday	96	36.9
Total	260	100.0
The person who cook		
The patient	137	52.7
Spouse	52	20.0
Daughter	52	20.0
Son	5	1.9
Servant	2	0.8
Others	12	4.6
Total	260	100.0
Taste of cooked food		
Sour	20	7.7
Sweet	40	15.4
Salty	35	13.5
Hot	23	8.8
Mild	50	19.2
Mix	92	35.4
Total	260	100.0

4.2.6 Number of meals consumed by patient and family.

It is found that the majority of the diabetes patients have 3 meals per day (73.8%). 22.7% has only 2 meals and only 3.5% has only one meal per day. It is also found that most of the diabetes patients have dinner with his/her family (71.5%). On the other hand, 32.8% of the diabetes patients have one meal with family per day. 28.3% and 10.3% have two and three meals with his/her family per day. The meal that most of the diabetes patients have with his/her family is dinner (29.6%). Followed by those have breakfast and lunch (27.7%), and those have three meals (10.4%). The results are shown in Table 9.

4.2.7 Relationship within family.

It is found that the relationship within most of the family is at moderate level (76.5%). Followed by those at low (15.9%) and high (8.5%) level. (Table 10)

Considering communication frequency within family, it is found that most of the communication within family is at moderate level (62.3%). Followed by those at high (23.1%) and low (14.6%) level.

Considering time spent for family activity, it is found that most of the family spent moderate time for family activity (67.3%). While the percentages of family spend high and low period of time for family activity are about the same (16.5% and 16.2%, respectively).

Examining love and warmth among family members found that 83.8% of the family has love and warmth at moderate level. The rest is at low level.

Considering help among family members, it is found that most of the family (83.1%) provide help and warmth at high level. Only 16.9% is at low level.

Table 9 Number and percentage of meal consumed by patient in family.

Food consumption of the patient in family	No.	%
Number of meal consumed per day		
1 meal		
Breakfast	2	0.8
Lunch	2	0.8
Dinner	5	1.9
2 meals		
Breakfast & lunch	13	5.0
Breakfast & dinner	32	12.3
Lunch & dinner	14	5.4
3 meals	192	73.8
Total	260	100.0
Meal with family member		
Never	74	28.5
Always	186	71.5
Total	260	100.0
Meal that have with family		
Breakfast	5	1.8
Lunch	3	1.5
Dinner	77	29.5
Breakfast & lunch	72	27.6
Breakfast & dinner	2	0.8
Breakfast, lunch, and dinner	27	10.3
Total	186	71.5

Table 10 Number, percentage, mean, and standard deviation classified by relationship within family.

Relationship with in family	No.	%
Level of relationship		
Low (score 32.00 - 55.8)	39	15.0
Moderate (score 55.88 - 75.02)	199	76.5
High (score 75.03 - 80.00)	22	8.5
Total	260	100.0
Mean 65.45 S.D. 5.57 min 32 max 80		
Communication frequency within family		
Low	38	14.6
Moderate	162	62.3
High	60	23.1
Total	260	100.0
Mean 12.7 S.D.2.1 min 2.1 max 16		
Time spent for family activity		
Low	42	16.2
Moderate	175	67.3
High	43	16.5
Total	260	100.0
Mean 15.2 S.D. 3.4 min 5 max 20		
Love and warmness of family members		
Low	42	16.2
High	218	83.8
Total	260	100.0
Mean 20.7 S.D. 3.38 min 9 max 24		
Help among family members		
Low	44	16.9
High	216	83.1
Total	260	100.0
Mean 16.7 S.D. 3.3 min 5 max 20		

4.3 Relationship between food consumption behaviour in daily life of diabetes patient and factors affecting.

This research investigates relationship between population and social characters, family component, and role of family in providing suitable food for diabetes patient. The research wants to clarify whether differences in those factors cause differences in food consumption behaviour in daily life of diabetes patient or not.

4.3.1 Effects of population and social characters (sex, age, marital status, educational background, occupation, economic background) on food consumption behaviour in daily life of diabetes patient.

The relationship between sex and food consumption behaviour of diabetes patient in family context is tested using statistical analysis (t-test). It is found that the significant of sex on the risk in the consumption food of diabetes patients in family context is at p-value = 0.15. Female has low risk in consumption food in daily life than male. (61.98 versus 59.50). The results are shown in Table 11 below.

Table 11 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by sex.

Sex	No.	Mean	S.D.	t-value	p-value
Male	74	59.50	8.52	-2.448	0.015
Female	186	61.98	6.89		
Total	260				

Significant p = .05

When examining relationship between sex and the food consumption behaviour of diabetes patients, the patients are divided into 4 groups according to their ages : less than 51 years, 51-60 years, 61-70 years, and 70 years and older. It is found that the group of 70 years and older has the highest mean score. The groups less than 51 years and 61-70 years have about the same score. While the group 51-60 years has the lowest score. When the difference in food consumption behaviour in daily life is statistically tested, no significant difference is found. The results are summarised in Table 12.

The next step is to examine the relationship between marital status and the food consumption behaviour of diabetes patients in family context. It is found that the diabetes patient who is single has the highest mean score. Followed by those married, widow, divorced, and separate, respectively. When the results are statistically tested, however, no clear difference can be identified. The results are summarised in Table 12 below.

Table 12 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by age and marital status.

Population and social characters	No.	Mean	S.D.	F	sig of F
Age					
Lower than 51 years	49	61.22	7.87	0.466	0.706
51- 60 years	76	60.95	7.52		
61 - 70 years	93	61.01	7.24		
Higher than 70 years	42	62.50	7.44		
Total	260	61.27	7.44		
Marital status					
Single	16	61.75	7.89	0.047	0.954
Married	173	61.29	7.49		
Widow, divorce, separate	71	61.13	7.31		
Total	260	61.27	7.44		

To find the relationship between educational background and the food consumption behaviour of diabetes patients in family context, the patients are divided into 4 groups according to their educational backgrounds i.e. never attend school, primary school, secondary school, and higher than secondary school. It is found that those finished secondary school have the highest mean score. Followed by those never attend school. But when the results are statistically tested, it is found that difference in educational background does not refer to difference in food consumption behaviour. The results are reported in Table 13.

To find the relationship between economic background and food consumption behaviour in daily life of diabetes patients, the patients are divided into 4 groups as follows : rich, middle class, just enough, and poor. It is found that the middle class group has the highest mean score. Followed by the poor. But when the results are statistically tested, it is found that difference in economic background does not refer to difference in food consumption behaviour. The results are reported in Table 13.

To find the relationship between the patients highest status in their families and food consumption behaviour in daily life of diabetes patients, the diabetes patients are also divided into 4 groups again according to their status i.e. great grandparent/grandparent, father/mother, spouse, and relative. It is found that the patients that hold the status as spouse have the highest mean score. Followed by those hold the status as relative. But when the results are statistically tested, no difference is found. The results are reported in Table 13 on the next page.

Table 13 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by educational background, economic background, and status of patient in family.

Population and social characters	No.	Mean	S.D.	F	Sig of F
Educational background					
Never attend school	46	61.65	7.27	0.182	0.909
Primary school	177	61.06	7.40		
Secondary school	18	62.17	7.39		
Higher than secondary school	19	61.53	8.65		
Total	260	61.27	7.44		
Economic background					
Rich	9	65.56	6.44	1.792	0.149
Middle class	120	61.08	7.92		
Just enough	107	60.70	7.15		
Poor	27	63.21	5.96		
Total	260	61.27	7.44		
Status in family					
Great grandparent, grandparent	142	61.47	7.76	0.094	0.963
Father/mother	82	61.15	6.78		
Husband/wife	17	60.82	6.14		
Relative	19	60.74	9.10		
Total	260	61.27	7.44		

To analyse the effect of occupation on the food consumption behaviour of diabetes patients in family context, the diabetes patients are divided into 5 groups as follows : unemployment, agriculturist, employee, merchant, and government service. It is found that the unemployment group has the highest mean score. The employee group holds the second place. When the difference in the food consumption behaviour in daily is statistically tested, the difference at the significant level 0.019 is found. Therefore, the post Hoc-Comparison is further performed using Least-Significant Different (LSD) method. It is found that the pairs that have statistically significant difference are the unemployment and the merchant groups. And, it is found that the unemployment group has less risk than the merchant group. The results are shown in Table 14 below.

Table 14 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by occupation.

Occupation	No.	Mean	S.D.	F	Sig of F
Unemployment	150	62.39	6.92	2.997	0.019
Agriculturist	14	58.43	7.75		
Employee	13	61.41	6.73		
Merchant	51	58.69	8.53		
Government service	32	61.23	7.75		
Total	260	61.27	7.44		

Next step is to examine years of diagnosis diabetes. The difference in the mean score is analysed by dividing the patients into 4 groups according to years of diagnosis diabetes. These 4 groups are (a) less than 5 year, (b) 5-10 years, (c) 11-16 years, and (d) more than 16 years. It is found that the group of 11-16 years has the highest mean score. The group less than 5 years hold the second place. When the results are statistically tested, it is found that each group has no difference in food consumption behaviour. The results are summarised in Table 15.

When considering attitude of the patient on the severity of diabetes and the food consumption behaviour, the patients are divided into 4 groups according to their attitude i.e. very severe, moderate, not so severe, and don't know. It is found that the diabetes patients who have attitude in the moderate group has the highest mean score. Followed by those in the very severe group and the not so severe group, respectively. When the results are statistically tested, it is found that the patient with different attitude on the severity has no different in the food consumption behaviour. The results are also summarised in Table 15.

Table 15 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by years of diagnosis diabetes and attitude on severity.

Diabetes	No.	Mean	S.D.	F	Sig of F
Years of diagnosis diabetes					
Less than 5 years	123	61.64	7.54	1.381	0.249
5 - 10 years	77	60.23	7.16		
11 - 16 years	25	63.44	7.17		
More than 16 years	35	60.71	7.73		
Total	260	61.27	7.44		
Attitude on severity					
Not so severe	111	60.67	7.24	0.615	0.606
Moderate	106	61.92	7.33		
Very severe	33	61.58	9.01		
Don't know	10	60.10	5.00		
Total	260	61.27	7.00		

4.3.2 Comparison between mean score difference of food consumption behaviour in daily life of diabetes patient classified by type of family.

Here, the family is classified into 2 groups : single family and extended family. It is found that the mean score of the single family group is higher than the mean score of the extended family group. When the results are statistically tested, however, it is found that to be in a single or extended family does not significantly affect the food consumption behaviour of diabetes patient (p-value = 0.704). The results are shown in Table 16 below.

Table 16 Comparison between the mean score difference of the food consumption behaviour of diabetes patient in family context classified by type of family.

Family component	No.	Mean	S.D.	T	P-value
Type of family					
Single	108	61.45	6.95	0.380	0.704
Extend	152	61.13	7.78		
Total	260				

Next step is to compare between the mean score difference of the food consumption behaviour of diabetes patient in family context classified by relationship level within family. The mean score difference is analysed by dividing the relationship level within family into 3 level: low, moderate, and high. The statistical test found that the relationship level within family is significantly difference at the significant level of 0.029. The results, therefore, are further testes using post Hoc-Comparison and Least-Significant Different (LSD) methods. The tests show that the family with the high level of relationship has stronger influence on the food consumption behaviour than the family with the moderate level of relationship. (mean score 62.68 versus 61.62). The family with the moderate level of relationship also has stronger influence on the food consumption behaviour than the family with the low level of relationship. (mean score 61.62 versus 58.44). The results are shown in Table 17 below.

Table 17 Comparison between the mean score difference of the food consumption behaviour in of diabetes patient in family context classified by relationship level within family.

Relationship level within family	No.	Mean	S.D.	F	Sig of F
Low	39	58.44	8.48	3.591	0.029
Moderate	199	61.67	7.12		
High	22	62.68	7.44		
Total	260	61.27	7.44		

Pairs that have statistical significant 1,2;1,3

4.3.3 Role of family in providing suitable food for diabetes patient and food consumption behaviour in daily life of diabetes patient.

The mean score difference of the food consumption behaviour of diabetes patients according to the role of family in providing suitable food for the diabetes patient is analysed by dividing the role of family into 3 levels as follows: low, medium, and high appropriation. It is found that the family in the high appropriation group has the highest mean score. Followed by those in the moderate and low appropriation groups, respectively. The statistical test also indicates that the role of family in providing suitable food for diabetes patient has significant difference at significant level of 0.00. The data, therefore, are further tested by post Hoc-Comparison and Least-Significant Different (LSD) techniques. It is found that the family in the high appropriation group has the strongest influence on the food consumption behaviour of diabetes patients (mean score 66.43). Followed by those in the moderate (mean score 61.39) and low appropriation groups (mean score 55.58), respectively. The results are summarised in Table 18 below.

Table 18 Comparison between the mean score difference of the food consumption behaviour of diabetes patients in family context classified by role of family in food providing.

Role of family in food providing	No.	Mean	S.D.	F	Sig of F
Low appropriation	40	55.58	8.96	25.37	0.000
Medium appropriation	180	61.39	6.56		
High appropriation	40	66.43	5.40		
Total	260	61.27	7.44		

Pairs that have statistical significant 1,2;1,3;2,3

4.4 Factor affecting the food consumption behaviour of diabetes patients in family context.

In this research, the factors used in the influence analysis or the ability to predict influences of factors on the food consumption behaviour of diabetes patients in family context are sex, marital status, age, educational background of the patient, occupation, economic background of the family, family type, years of diagnosis diabetes, attitude on the severity, role of family in providing suitable food, and relationship within family. The results are analysed using stepwise multiple regression analysis. The statistical significant is set at the level of 0.05.

After the data are primarily analysed according to the assumption of multiple analysis (Appendix C). All the independent variables and dependent variables are then stepwise analysed. It is found that all the independent variables can predict the food consumption behaviour of diabetes patients in family context at the moderate level (Multiple R = 0.507). The standard error of the prediction is 6.45. The correctness of the prediction is at the statistical significant (Sig F) of 0.000. On the other hand, the equation can correctly predict the food consumption behaviour of diabetes patients in family context at the significant level of 0.000. The multiple regression analysis shows that role of family in providing suitable foods, occupation as head of family/housewife, and the relationship within family can cooperatively predict the food consumption behaviour of diabetes patients in family context at the level of 25.7% ($R^2=0.257$).

The first parameter influencing the food consumption behaviour of diabetes patients in family context is the role of family in providing suitable foods for the diabetes patients. This parameter can correctly 19.7% predict the behaviour ($R^2 = 0.197$, $t = 7.95$, $P = 0.000$). When the second parameter, occupation as head of family/housewife, is added, it is found that the correctness of the prediction increases to 23.3% ($R^2 = 0.233$, $t = 3.47$, $P = 0.001$). And when the third parameter, the relationship within family, is further added, it is found that the correctness of the prediction further increases to 25.7% ($R^2 = 0.257$, $t = 2.86$, $P = 0.004$). The analysis clearly shows that the role of family in providing suitable foods for the diabetes patients is the strongest parameter in influencing the risk behaviour of the food

consumption of diabetes patient in family context. The second and the third influencing parameter are occupation as head of family/housewife and the relationship within family, respectively. The regression coefficients of the first, second, and third influencing parameter are 0.43, 0.20 and 0.16, respectively. All three parameters also have positive relationship with the food consumption behaviour of diabetes patients in family context. The regression equation can be written as follows :

$$\text{Regression equation } y = a + b_1x_1 + b_2x_2 + b_3x_3$$

$$\text{or } y = 23.867 + 0.450(x_1) + 2.970(x_2) + 0.121(x_3)$$

where :

y = food consumption behaviour in daily life of diabetes patient.

a = constant

b_1 = regression coefficient of role of family in food providing/preparing

b_2 = regression coefficient of occupation head of family/housewife

b_3 = regression coefficient of relationship within family

x_1 = role of family in food providing/preparing

x_2 = occupation head of family/housewife

x_3 = relationship within family

From the above equation it can be concluded that the role of family in providing suitable foods for the diabetes patients, occupation as head of family/housewife, and the relationship within family have effects on the food consumption behaviour in daily life of diabetes patients. The parameters that were eliminated from the regression equation are sex, age, marital status, educational background, occupation agriculturist/employee/merchant/government service etc., years of diagnosis diabetes, attitude on severity, and type of family.

The result of this research is according to part of the initial hypotheses. The result confirms that the personal data such as occupation head of family/housewife, role of family in providing suitable foods for the diabetes patients, and the relationship within family have effects on the food consumption behaviour of diabetes patients in family context.

Table 19 Multiple regression coefficient between the prediction parameters and the food consumption behaviour in daily of diabetes patients.

Prediction parameter	R	R ²	B	Std. Err	Beta	t	p
Step 1							
Role of family in providing suitable food for diabetes patient.	0.444	0.197	0.465	0.058	0.444	7.958	0.000
Step 2							
Occupation, head of family/housewife.	0.483	0.233	0.470	0.057	0.450	8.2253	0.000
			2.84	0.821	0.189	466	0.001
Step 3							
Relationship within family.			0.450	0.057	0.430	7.904	0.000
			2.970	0.811	0.198	3.662	0.000
	0.507	0.257	0.121	0.042	0.156	2.867	0.004
constant = 23.87							

R = Overall prediction coefficient

R² = Prediction coefficient

b = Regression coefficient of the criteria variable

Beta = Standard regression coefficient

SE. = Standard error

CHAPTER 5

DISCUSSIONS

The study of the food consumption behaviour of diabetic patients in family context will be discussed in 4 parts as follows :

- 5.1 Family and the food consumption behaviour of diabetic patients in family context.
- 5.2 Population characters and family components related to diabetes.
- 5.3 Relationship between the food consumption behaviour of diabetic patients in family context and the social/population characters.
- 5.4 Discussion on the research procedures.

5.1 Family and the food consumption behaviour of diabetic patients in the family context.

5.1.1 Pattern of the food consumption behaviour of diabetic patients and the patient's family.

This study found that most of the diabetic patients have 3 meals per day. 71.5% of the diabetic patients have some meals with their family. The dinner is the most meal diabetic patients with their families. This finding reflects that the dinner is the time the family members have time for each other. This is due to the fact that the present economic situation forces the family members to work or study out of their homes. They, therefore, have to buy food at or near the office/school. It is estimated that about 3 million people (29.4%) in Bangkok do not have breakfast at home. For lunch and dinner the portions of people who do not have lunch or dinner at their homes increase to 35.6% and 35.5%, respectively. (Luengthongkum; 1999:1) Most of the employees and students have at least one meal outside their homes. (Department of Health; 1987:1) The having meal with each other is the time the family members to tighten their relation and advise to the diabetic patient. The food consumption behaviour of the diabetic patients is similar to the survey of the food

consumption behaviour of the Thai people (1996:30), i.e. have 3 meals per day, the food consumption behaviour of the breast feed mothers (Atthavee, 1999:100), and the food consumption behaviour of puberty woman (Saereesuchart, 2000:118).

5.1.2 The risks of the diabetic patients from the food consumption behaviour in family context.

The study found that the food consumption behaviour of diabetic patients is at the medium risk level. The diabetic patients have the following foods that cause risk.

The research found that the diabetic patients have reduced having foods prepare from flours. The sweets made from flours, however, are still had. The patients slightly have foods containing fat.

The reason why the diabetic patients have sweets made from flours more than foods made from flours may be due to misunderstanding. The medical staffs told the diabetic patients to reduce carbohydrate. Rice which is the main carbohydrate food of the Thai people is, therefore, strongly affected. Several sweets made from flours are not considered as carbohydrate foods. Since most of the sweets made from flours are soft and easily available, the diabetic patients still have them regularly.

About having snacks between meals, the research found that most of the diabetic patients have meals on time and just enough. No sweets, fruits, soft drinks or alcohol beverages is consumed after meals. In conclusion, the having snacks between meals behaviour of the diabetic patients are at the medium level. The reason why the diabetic patients moderately have snacks between meals is most of them are old people. For the old people, the tasting nervous system becomes deteriorate which decrease the desire to have snacks. Most of them, hence, do not prefer having snacks between meals.

The having natural fibre foods (i.e. vegetables and fruits) behaviour of the diabets patients is majority at the medium level. The majority of the diabetic patients prefer having non-sweet fruits. During the season of sweet fruits (durian, mango etc.) when the prices of these fruits are low, the diabetic patients can not resist having them. The diabetic patients gave reason that they just have these fruits for only a few weeks, and this should not cause any problem with their health. The research also found that most of the diabetic patients always have the high fibre containing

vegetables. Just only a few who do not have. The herbs and vegetables which are believed to have capability to cure diabetes are significantly consumed. The reason why such herbs and vegetables are significantly consumed is they are the common food usually consumed in Thai family.

The food consumption behaviour before and after the blood sample taking is mostly at the medium level. On the other word, the diabetic patients strictly take drugs concurrently with the food control. However, 26.2% of the diabetic patients take only drug without controlling the foods consumed. Moreover, some diabetic patients believe that the medicine prescribed by the doctor can effectively control the blood sugar level. The food control is no longer necessary. This idea reflects the fact that the modern medical system makes most people heavily rely on the treatment from medical staffs rather than themselves.

Even though the food control strongly affects the blood sugar level and the diabetic patients can carry out by themselves, they have no strong intention to perform. Some patients control the food only a few weeks before the blood sample taking because they do not want the medical staffs to blame them because of the blood sugar level becomes too high. This study shows that 35.8% of the diabetic patients take medicine while the food is slightly controlled. (Appendix B, Table 1) In addition, the diabetic patients will begin to control their foods after finding that the blood sugar level begins to increase. When the blood sugar level is normal, some diabetic patients still carry on the food control programme. Only 46.3% of the patients control the foods they have regularly.

5.1.3 The consumption of sweets and soft drinks of the diabetic patients.

This study found that the diabetic patients sometimes have sweets. For the foods that need flavouring, such as noodle, the diabetic patients prefer adding more sugar to the food. The majority of the diabetic patients have fruits after meals and have very sweet fruits according to the seasons. The percentages of the diabetic patients who drink and do not drink soft drinks are about the same. Most of the diabetic patients do not drink alcohol. When they have to attend a party, however, the numbers of the diabetic patients who drink and do not drink alcohol are about the same.

The research found that most of the diabetic patients still prefer sweet foods. The addict to the sweet taste of the diabetic patients is very danger. Since sugar can be easily absorbed and metabolised, the blood sugar level can rapidly increase and drop which leads to complications. (Plaengvittaya, 1988:17)

A cause that makes the diabetic patients to prefer the sweet taste is the past experience received from their families. The Thai tradition prefers adding sugar to the foods. The adding of sugar makes one prefers the sweet taste since from the young age and this habit is very difficult to change when they become older (Thaoprasert, 1984:94). In addition, since most of the diabetic patients holds the highest status in the family, the relatives do not dare to put any effort to control the foods the diabetic patients have. The reason is the relatives think that for the diabetic patients at this age, they finally have to die with or without the food control.

Though, the change in the food consumption behaviour is difficult to change, it does not mean that the behaviour can not be changed at all. The change in the food consumption behaviour need a powerful factor. (Hongvivatana, 1985:89) For example, the study of Siritharangsri (1991:157) who reported that 32.8% of the diabetic patients who prefer very sweet foods, have difficulty in controlling food and regular complications which need medical treatment, after changing their food consumption behaviour and involve in the analysis of the blood sugar level, could tell the cause of the high blood sugar level. This led to the food control by the diabetic patients themselves and make the patients ready bodily and mentally in looking after themselves. On the other word, the change in the food consumption behaviour can be done if the diabetic patients have intention and see the result.

5.2 Social/population characters and family components related to diabetes.

5.2.1 Population characters of the diabetic patients

The majority of the diabetic patients questioned are female and married. The majority of the them graduated only primary school level. Most of them hold status as head of the family and/or housewife. The economic level of most of the patients questioned is at the more than enough level.

The incident rate of diabetes in female is more common than in male. A reason is the pregnancy. Each pregnancy causes changes in hormones. The body of the woman will become less tolerance to the blood sugar changing. The chance to become diabetes of women, hence, is higher than men. (Wongthavornwat and Srimada, 2000:297) The survey of Chooprophawun, 1996:161 shows that female is about 1.5-2 times more chance to become diabetes than male. The reports of Skulphan (1992:100) and Phromprakarn (1998:121) show that the majority of the diabetic patients age between 61-70 years. This result agrees with the study of Siritharangsri (1996:158) and Phromprakarn (1998:121) who found that the majority of the diabetic patients aged between 64-74 years old. The epidemic data of the diabetes show that most of the diabetic patients are over 60 years old.

The present study found that most of the diabetic patients are married because they are old people. The majority of the diabetic patients graduated only primary school level. This is due to the fact that the majority of the diabetic patients are old female. At that time there was no school for female. The higher education was rather limited to male only. Female had less chance to enter school. Accompany with the social value at that time which did not promote the study of woman, therefore, most of the diabetic patients found at this time graduated only primary school level.

About the occupation of the diabetic patients, the research found that most patients do not have any permanent pay-work. They hold the status as head of the family/housewife in their families. This finding agrees with the fact that most of the diabetic patients are over 60 years old. A person at this age, usually retired from his/her job. They tend to participate in the family tasks or takes care children.

The economic level of the majority of the diabetic patient investigated is at the just more than enough level. This reason is most of them have past the working

period of life. accompany with have no more children to take responsible. After retirement, therefore, the diabetic patients still have some saving. This finding agrees with the epidemic data which show that diabetes is not the malice of the poor people.

5.2.2 Years diagnosed as diabetes and the attitude on the severity.

Most of the diabetic patients questioned have been diagnosed as diabetes for less than 5 years. They understand that diabetes is chronic and can not be permanently cure. But they think that diabetes is not so severe and can not cause disability.

It is easily to understand why most of the diabetic patients believe that diabetes is chronic and can not be permanently cure. This reason is the diabetic patients have been received medical treatment for a long enough period of time.

The diabetic patients' attitudes that diabetes is not so severe and can not cause disability is rather deviated from the real severity of diabetes. This may be most of the diabetic patients have been diagnosed as diabetes for less than 5 years and complications have not yet developed.

Most of the patients (63.5%) believe that diabetes is not so severe and can not cause disability. Such patients' attitude indicates that most of the diabetic patients is less likely to aware complications. The attitude on severity depends on each person thought, they will not act to prevent any complications if they underestimate the severity of diabetes.

5.2.3 Family components of diabetic patients.

The survey found that most patients live in families having 2-6 persons. The majority of the diabetic patients' families are the extended type. (58.8% for extended type and 41.5% for nuclear type) Most of the diabetic patients hold status as grandparent in the family. The study confirms that the average size of the family becomes smaller since 80% of the patients interviewed has the number of family member not more than 6. Such change can be explained as follows.

First, the type of family does not change but the change is due to the family life cycle. The family life cycle begins with single type which will change to extended type. (Trungkasombut, 1998:5) A family begins with husband and wife who

live with each other until their children become adults. Then, their children will have their own family. At first, the family of the children may still live with their parents. The family in this period is extended type which comprises of family members in three generations i.e. grandparent, parent, and children.

In addition, the family may change according to the "system theory". This theory says that the type of the family can always change according to the social environment since the family is a minor component of the social system. At present, the family tends to become single type. The character of the family in Thailand has been continuously changing according to the national social and economic development plans in the past 40 years since the first plan was implemented in 1963. The economic policy that aims at the development of industrial changes the family structure and relationship within the family. The data of the National Statistical Department show that during the period 1960-1970 the average size of the family in Thailand decreased from 6.6 to 5.7 persons per family. And in the period 1980-1990, the average size has further decreased from 5.3 to 4.5 persons per family. A cause is the family planning began in the period of the third national economic and social development plan. (Ditsaroch and Wongsit, 1988:50) When the family becomes nuclear type, the number of persons in a family who the diabetic patient can ask for assistance is reduced. The national population survey of Thailand shows that at present 4.2% of Thai people age over 60 years old. This number keeps increasing. In addition, the incident rate of chronics is high among the old people. (Yodphet and Kumhomg, 1997:4) Such changes in the population structure can affect the look after of the old people and chronic patients in future.

5.2.4 Relationship with in the diabetic patients' family.

The strongest relationship of the social is the relationship of the family members. The survey found that the average relationship in the family of the diabetic patients is the medium level. The research found that most of the diabetic patients have good communication within their own families. When the patients do not feel comfort, however, they tend to avoid telling other family members. The family members still involve some family activities such as watching television and listening to radio. Co-operation is good during the festival period but usually is quite low. The

help in the form of materials is fairly good. When a family member becomes ill, the rest usually takes care.

The research found that the relationship in the family is decreasing but the relationship in the form of materials and money is increasing. This may be the influence of the economic development which force the family members to work outside. The family members have more freedom and less depend on each other. (Thanasunya, 1995:188)

In conclusion, the overall of the present relationship within the family of the diabetic patients is in the fairly good level. The time for family activities and communication, however, is rather low. Work is the factor causing the decrease of the relationship. (Trungkasombut, 1997:74) The relationship among the family members will become strengthen if the family can rearrange the time to increase family activities and communication.

5.2.5 Role of family in providing suitable foods for the diabetic patients.

Role of family in providing food is an important role that support the good food consumption behaviour of the diabetic patients. The role of family begins from providing, cooking, having, and changing the food consumption behaviour of the family members.

The study found that the average role of family in providing foods for the diabetic patients is the medium level. The majority of the families cook rather than buy. About half of the persons who cook for the family are the patients. The spouse and the daughter are the second. Some families buy cooked food, and sweet drinks. Most families do not give any suggestion about the foods to the diabetic patients.

The study found that the role of family on the take care of diabetic patients has been changed due to the present economic constraint. The family members have to work outside from the morning till the evening. The person who has to cook for the family is the diabetic patient due to he/she has retired from their works. The foods prepared by the diabetic patients are the food favoured by most of the family members rather than the diabetic patient. Therefore, most families do not prepare special foods for the diabetic patients.

The role of family during the having food with the diabetic patients is at the minimum level. This is due to most of the family members have only one meal with the diabetic patients. In addition, they do not give advice to the diabetic patients about having food. Most of the family members and the diabetic patients do not think that the food control is important because they see the diabetic patient has to take drugs and see doctor every month. If the blood sugar level becomes too high, the doctor will re-prescribe the medicine. The treatment, hence, depends on the use of medicine only without any involvement of the diabetic patients.

In conclusion, the family can maintain the role of family in the food providing for the diabetic patients at the medium level because most families still cook for themselves.

5.3 Food consumption behaviour of diabetic patients in social, population, and family components context.

5.3.1 Factor having no relation with the food consumption behaviour of diabetic patients.

The different analysis of the risk mean score of the food consumption behaviour of diabetic patients in the family context (classified by sex, age marital status, education, occupation, economic level, years of diagnosis diabetes, attitude on severity, type of family, status of the diabetic patient in family, role of family in providing suitable foods for the diabetic patients, and the relationship within the family) found that the difference in such parameters has no relationship with the food consumption behaviour of the diabetic patients. This is because such parameters have been with the diabetic patients before being diagnosed diabetes.

The examination of the difference in sex and the food consumption behaviour found that the female has better food control behaviour than the male. Being female or male, however, has no real relationship to the food control behaviour when other variables are involved.

Statistical test also shows that occupation, role of family in providing suitable foods for the diabetic patients, and the relationship within the family affect the food

consumption behaviour of diabetic patients with different degree. Holding status as head of family or housewife has lower risk behaviour than being merchant.

The examination of the role of family in providing suitable foods found that the patients living in the family highly acts properly in providing suitable foods have lower risk behaviour than those living in the family moderately and low acts properly, respectively.

Examining the relationship within the family found that the diabetic patients living in the family having good relationship have lower risk behaviour than the diabetic patients living in the family having moderate and low relationship, respectively.

5.3.2 Factors influencing and having capability to predict the food consumption behaviour of diabetic patients in family context.

The analyses of factors influencing the risk food consumption behaviour of diabetic patients in daily life found that the variables (a) the role of family in providing suitable foods for the diabetic patients, (b) the unemployment (c) holding status as head of the family/housewife status, and (c) the relationship within the patient family have influence on the food consumption behaviour in daily life of diabetic patients. The above mentioned variables can 25.7% correctly predict the food consumption behaviour of diabetic patients. The role of family in providing suitable foods for the diabetic patients is the most influencing variable followed by the unemployment, holding status as head of the family/housewife and the relationship within the patient family, respectively.

When the role of family in providing suitable foods for the diabetic patients and the relationship within the patient family are tested, either independently or under control of other variables, both variables have relationship with the food consumption behaviour of diabetic patients in family context. This finding shows the importance of family in looking after the diabetic patients.

Although the family is so affected by changes in economic and social structure that it cannot maintain the role as the suitable food provider for the diabetic patients as before, the remaining help of the family can still have influence on the food consumption behaviour of the diabetic patients. This finding agrees with the

functional sociology theory of Talcott Parsons. The members of the family have to response to the needs, at least the four basic needs, of the other members in the family. In addition, the family members still have to look after any patients of the family either independently or under the supervision of medical staffs. (Muttiko, 1992:150)

When a family member has problem, the other members has responsibility to give help. Especially when the member who has problem needs a food control programme. In Thai society, most of the foods consumed are cooked in the patient family and the family members usually have meal altogether. (Intarumpan; 1994:50) Therefore, the family has strong influence on the food control of the diabetic patient in the family. If the family prefers sweet foods, the taste of the foods prepared in the family tends to sweet. If the patient family has responsible for the foods had by the diabetic patient, the malice of the diabetic patient will become under control.

The good food control leads to less risk to complications and less medical expense. If the family has no proper food control programme for the diabetic patient, the patient will have high risk to severe complications. The study of Gordon (1977:497-499) showed that the diabetic patients who can not control the food will have more possibility to become heart failure two times higher than a normal people. The research of Nitiyanan (1995:19) also showed that among the diabetic patients investigated, 38.4% have high blood pressure, 32.1% will have diabetes retinopathy. The cause of these complications is the diabetic patients can not control their blood sugar level. Therefore, the role of family as the suitable food provider for the diabetic patients is important for the prevention and control of complications.

How the family can properly act as the provider of suitable foods for the diabetic patient depends on the relationship within the family. The relationship within the family, hence, is a variable influencing the food consumption behaviour of the diabetic patient. This study found that the good relationship within the family will lessen the risk of the diabetic patient. Living in a warm family can prevent diseases. (Weiss, 1974:17-26) Since the diabetic patient has to look after himself/herself for the rest of his/her life, The support of the family members is very important. The study found that most of the diabetic patients are strongly supported in the form of encouragement and advice. A suitable advice for the diabetic patient will encourage

and persuade the diabetic patient to look after himself/herself. (Skulphan, 1992:102; Chomsamut, 2000:89) Therefore, the relationship within the family is another factor influencing the food controlling behaviour of the diabetic patients.

The present society which give the priority to the economic value changes the role of family in providing suitable foods for the diabetic patients. The adult woman who used to work as housewife has to work outside to reduce the economic burden of the family. As can be seen from the study of Smitasiri et al. (1995:61-62) about factors affecting the culture of working women in Bangkok metropolitan area which shows that most of the working women have 3 meals per day. The breakfast is at the office, the lunch is near the office, and the dinner is at home with their families. The dinner is prepared by anybody else. Only a small part of the working woman prepared the dinner. A factor that made they change their behaviour from cooking by themselves to buying is the time limitation. The study of Tanphaijit et al. (1999:146) also found that the major responsibility of women is house tasks while they still have to work outside. That study agreed with the study of Noiheed (1997:64) who found that the head of the family give priority to the economic value higher than the other members of the family. The wife has the main responsible on the house tasks and children and still has to economically work in the ratio as near as the head of the family. These are the reasons why the women have less time to prepared foods for the family. Therefore, the preparation of food has tendency to belong to the diabetic patients who normally have plenty of time.

Since all three variables can 25.7% correctly predict the food consumption behaviour of diabetic patients, the rest of the correctness of the prediction must depends on other factors not included in this research and should be studied in the future.

The results obtained confirm the importance of the patient family, especially the role of family in providing suitable foods for the diabetic patients. Some variables such as unemployment or holding status as head of family/housewife can also predict the risk behaviour of the diabetic patients.

5.4 Discussion on research methodology.

This study is survey research which usually has disadvantages about the deepness, coverage, correctness, and precision of the data. Therefore, the tool of the research is very important. This study use structural questionnaire due to the constraint of the samples. During the interview, the researchers would read the questions for the diabetic patients.

Since the main body of the questionnaire has to cover the objectives of the research, before building the questionnaire the researcher has to build a framework to direct the structure of the questionnaire. Then, the questions are drafted based on knowledge from literatures and past experience of the researcher. Finally, the questionnaire is tried out and adjusted until the interview can proceed smoothly.

The try out has been performed for 4 times. Then the questionnaire is tested for confidential level. After bringing into real situation, however, it is found that the questionnaire still had some defects. For example, the number of questions is too high (85 questions). The interval scale of the answers is rather difficult for the patients to determine. The positive and negative questions which are mixed altogether made some patients confused. The high number of question, the interval scale of the answer, accompany with most of the diabetic patients interviewed are old age people, made some diabetic patients became bore. The answer, hence, may contain some deviation which may cause problem during the analyses later.

The time for collecting data is another topic to be concerned. Since the diabetic patients who came to the hospital need convenience and rapid check. The researcher, thus, had to interview while the diabetic patients were waiting for the blood sample taking. This is the time when the diabetic patients have nothing to worry about any call to see the doctor.

Since the time for interview is limited, the researcher can not work alone. In this research the researcher have 3 research assistances (1 undergraduate student and 2 nurse assistant staffs). The research assistances have been taught and trained to understand the questions, techniques, and interview steps. The research assistances have performed interview under a close supervise of the researcher.

The data analyses are divided into 2 parts. The first part is the general description of the data collected. The second part is the analyses to find relationship of the main factors. The analyses begin from considering the difference food consumption behaviour from the factor differences. Then, the prediction power and the correlation are analysed. This sequence is easily to understand.





CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This research is a "survey research" to study the food consumption behaviour of diabetic patients in family context and factors affecting such behaviour. The main objective study to examine the family components, role of family in food providing, population characters and food consumption behaviour of diabetic patients. The samples are purposive sampling from the diabetic patients who came to receive treatment at the out patient department of Burapha University Hospital, Choburi Province, between 7 August 2001 - 11 September 2001, total 260 cases.

The tool used in this research is the questionnaire. The questionnaire is divided into the following parts (a) population and social character (b) role of family in providing food for diabetic patient (c) food consumption behaviour of the diabetic patient and (c) relationship within the family. The questionnaire was tried out 4 times to adjust the questions. The reliability of the questionnaire on the role of family in providing food for the diabetic patient equals to 0.86. The reliability on the food consumption behaviour in daily life of diabetic patient equals to 0.75. The reliability on the relationship within family equals to 0.93. The questionnaire after the final adjustment has 82 questions which took about 20-30 minutes per patient to answer all the questions.

The collected data were analysed using SPSS/PC⁺ (statistic package for the social science personal computer plus). The analysis was performed by comparing t-test, one-way analysis of variance, and stepwise multiple regression analysis. The obtained conclusions are summarised in the next sections.

6.1 Conclusions.

6.1.1 Population and social characters.

The majority of the diabetic patients interviewed is female age between 61-70 years, the average age 60.1 years and married. The average marriage time is 23.19 years. The majority of the diabetic patients graduated only primary school level without any permanent occupation. Most of them hold status as housewife or head of the family. The economic level is at just enough with a small saving. The years diagnosed as diabetes is 5 years of lower, with the average of 8.1 years. The patients think that diabetes can not be permanently cure, but the severity is not so high and can not cause permanent disability.

6.1.2 The food consumption behaviour in daily life of diabetic patients.

Most of the diabetic patients questioned have 3 meals per day. They have at least one meal with his/her family. The meal that most patients have with their families is dinner. Many patients have flour, sugar, and fat. Fruits, snacks and soft drinks are also consumed between meals. The food controlling behaviour of the diabetic patients before and after the blood sampling taken is at the average level.

In conclusion, risk of the food consumption behaviour in daily of diabetic patients is at the middle, high and low levels, respectively.

6.1.3 Role of family in providing food for the diabetic patients.

The analysis of the role of family in providing food for the diabetic patients shows that, on the average, the role of family in buying, preparing, and cooking suitable foods for the diabetic patients is at the medium level. The role of family during having the meal is at the low level. Most families cook rather than buy. More than half of the person who cooks for the family is the patient.

6.1.4 Components of the diabetic patient family.

The number of family member in most diabetic patient family is between 2-6 persons. The maximum number is 20 and the minimum number is 1. The average value is 4. Most families are extended family. More than half of the diabetic patients hold the highest status as grandparent in their families. The highest status as offspring is at the lowest level.

More than 2 out of 3 of the family has the relationship within the family at the middle level. Itemise analysis shows that the communication within the family and the time spent on family activity are at the middle level. The love and help within the family are at the high level.

6.1.5 The food consumption behaviour of diabetic patients in family context and factors affecting relationship.

The different analyses of scores of the risk behaviour of the food consumption behaviour in daily life of diabetic patients show that the differences in age, marital status, education, occupation, economic level of the family, years diagnosed as diabetes, attitude of the diabetic patients on the severity, type of family, and the patient status in the family have no relationship with the food consumption behaviour of the diabetic patients.

The difference in sex, role of family in providing food, and relationship within the patient family differently affect the food consumption behaviour of the diabetic patients in the family context. The female has lower risk behaviour than the male at the significant level $p\text{-value} = 0.015$. When other parameters are taken into consideration, the sex has no true relationship with the food consumption behaviour of the diabetic patients in family context. The highly involve in preparing suitable foods for the diabetic patients of the family reduces the risk of the diabetic patients. The family which has relationship at the middle level has the average score of the food consumption behaviour higher than the family which has relationship at the low level.

6.1.6 Factors affecting and capable to predict the food consumption behaviour of diabetic patients in family context.

The study found that the factors affecting the food consumption behaviour of diabetic patients in family context are the role of family in providing suitable foods for the diabetic patients, the status as housewife and/or head of the family of the diabetic patients, and the relationship within the patient family. These three factors can predict the food consumption behaviour of diabetic patients at the level of 25.7% in the same direction.

The following independent variables are excluded from the multi-regression equation : sex, age, marital status, education, occupations (as agriculturist, employment, merchant, govern service), economic level, years diagnosed as diabetes, attitude of the severity, the patient status in the family, and type of family.

The results of this research confirm the role of family in providing suitable foods for the diabetic patients and the relationship within the family.

6.2 Recommendations.

6.2.1 Policy recommendations for the department of medicine and the ministry of public health

The research found that the family acting properly in providing foods for the diabetic patients and have good relationship reduces the risks of the diabetic patients. Therefore, the family must be promoted to aware this special role. The family should be encouraged not to add more sugar to the food prepared, especially the food for children. Because this will implant the habit of having sweet food which is difficult to change later. The family must be encouraged to cook the food in the family and pass the cooking tradition to the new generation. This will implant the good food consumption habit.

The family and the diabetic patients must be promoted to see the role of family in managing foods for the family members, including changing the food consumption habit of the family members. This will cause convenience in cooking and good for the health of the diabetic patients.

The medical staffs must be promoted and encouraged to aware the importance of the food controlling of the diabetic patient. The patients must be practiced to properly look after themselves which is an importance measure to control and prevent complications.

6.2.2 Recommendations for the hospital.

1. A medical team to visit the diabetic patient at the patient's home must be set up in order to understand the problem, including the daily activities of the diabetic patient and the family.

2. The diabetic patient must be encouraged to change the food consumption behaviour by himself/herself when the blood sugar level is abnormal. A regular discussion with the diabetic patient and the patient's family should be carried out to let the patient and the family to involve in finding and solving the causes of the problems.

3. The study found that the family members have limited time to prepare foods for the family. Therefore, the diabetic patients should be grouped by the help of the community. The grouping of diabetic patients will promote the patients to look after themselves. The community programme allows the diabetic patients to help, discuss, and exchange ideas for a better life.

4. Set up a learning programme about the controlling of food for the diabetic patients and the family in order to make the patient and the family to foresee the important role of family in the food controlling.

5. The knowledge on the proper food controlling for the diabetic patients and the patient's family must be widely publicised. The patient should also participate in the exercise rather than depends on the drug treatment only.

6. Since the study shows that the diabetic patients believe that diabetes is not severe and cannot cause disability. These wrong concepts cause the diabetic patients to neglect their health. Hence, the diabetes clinic should have a separate medical team to set up a complete programme for the treatment of the patients including education, exercise, and group therapy.

6.2.3 Recommendation for future works.

1. The food consumption behaviour of the diabetic patients should be quantitatively studied. The future study is to see the real daily life of the diabetic patients who have different occupations. The future study using a more specific questionnaire will pronounce the details of the food controlling problems.
2. The potential and the practical limit of the role of family on the health of the diabetic patients should be investigated.
3. The improve understanding of family determinates of preventive complication of diabetic patients so that there powerful influences can be help diabetic patients
4. The thinking process, service, treatment, and awareness on the food controlling of the diabetic patients of the medical staffs should be studied.
5. The study of the movement of groups of people in the community (e.g. the older, the diabetic patient) on the awareness of the food consumption behaviour should be performed.

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ควบคุมโรคพยาธิใบไม้ใน ตับ ใน โรคพยาธิใบไม้ในตับบริเวณนิสสัยกับแนวคิด และการแก้

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The background of the page features a large, faint watermark of the Mahidol University logo. The logo is circular and contains the university's name in Thai script: "มหาวิทยาลัยมหิดล" (Mahidol University) around the perimeter and "จุฬาลงกรณ์มหาวิทยาลัย" (Chulalongkorn University) at the top. In the center of the logo is a stylized emblem of a crown or a similar symbol.

Appendix A

Questionnaire

Questionnaire no. [][]

Questionnaire : Role of family in the food consumption behaviour of diabetic patients

Part 1. Basic personal and social data

Mark / in the box provided and fill in the blanks with appropriate answers

(For researcher only)

1. Sex sex.[]
1. Male 2. Female
2. Age years age.[][]
3. Marital status stat1.[]
1. Single 2. Married for years stat2.[][]
3. Divorce, separate 4. Other.....
4. Education edu.[]
1. Never attend school 2. Junior Elementary
3. Senior elementary 4. Junior high school
5. Senior high school 6. Certificate
7. Bachelor degree 8. Higher than bachelor degree
9. Other
5. Present occupation occ.[]
1. Head of family/housewife 2. Retired officer
3. Agriculturist 4. Fishery
5. Employee 6. Government service
7. Government enterprise 8. Merchant
9. Other (please specify)
6. Economic level of the family bug.[]
1. More than enough, high saving
2. More than enough, some saving
3. Just enough
4. Not enough
7. Years of diagnoses diabetes years time[]

8. Attitude on severity of diabetes severity1.[]
 1. Not so severe 2. Moderately severe
 3. Very severe 4. Other (please specify)
9. Do you think that diabetes can lead to disability severity2.[]
 1. No 2. Yes 3. Don't know
10. Do you think that diabetes can be cured severity3.[]
 1. No 2. Yes 3. Don't know
11. Number of persons usually live in your home and who are they.
 1. Spouse, children family1.[]
 2. Spouse, children, relative family2.[]
 3. Other (please specify)
12. Your highest status in your family (pleas specify only one) family3. []
 1. Great grandparent 2. Grand parent
 3. Father/Mother 4. Uncle/Aunt
 5. Offspring 6. Brother/Sister
 7. Other (please specify).....

Part 2. Role of family in providing suitable foods for diabetic patient.

1. The person who always make selection for the foods to be prepared D1.[]
 1. You 2. Your spouse
 3. Daughter/daughter in law 4. Son/son in law
 5. Servant/Employee 6. Other
2. How frequent your family member buy high energy one dish food for having for the other family members rol 1.[]
 1. Never 2. Seldom/1-2 times per week
 3. Frequent/3-5 times per week 4. Always
3. How frequent your family member buy coconut containing foods (e.g. curry) for having for the other family members rol 2.[]
 1. Never 2. Seldom
 3. Frequent 4. Always

13. Which kind of oil your family use in cooking. rol10.[]
1. Animal oil 2. Animal and vegetable oil
3. Palm/coconut oil 4. Soybean, Sunflower, Rice kernel
14. The most prefer taste of your family (answer only one) D4.[]
1. Sour 2. Sweet 3. Mild
4. Salty 5. Hot 6. All
15. Does your family add sugar in the food cooked? rol11.[]
1. No 2. Seldom/for some kind of food
3. Frequent 4. Always add to all foods
16. Does your family prepare separate diabetes foods for you? rol12.[]
1. Never 2. Seldom
3. Some times 4. Always
17. How frequent your family prepare vegetable foods? rol13.[]
1. Never 2. Seldom
3. Frequent 4. Always
18. How many meals you have per day? meals. And the meal you have
1. Breakfast 2. Lunch D5.[]
3. Dinner 4. All three meals D6.[]
19. Do you have meal with your family member? D7.[]
1. Never 2. Yes.
- If the answer is yes, the meal(s) you have with your family is/are D8.[]
1. Breakfast 2. Lunch
3. Dinner 4. All three meals
20. Does your family prefer fat/oily foods? And this make you have such food also?
1. Not true 2. Seldom rol14.[]
2. Frequent 4. Always
21. When you have sweets or dessert, your family member will rol15.[]
1. Know your like, and always provide for you.
2. Never say anything
3. Some times warn
4. Always warn

22. At the time of party or festivals, does your family prepare suitable diabetes foods for you?

1. Never

2. Seldom

rol.16[]

3. Frequent

4. Always

23. Does your family change their consumption on the following foods after knowing the you were diagnosed as diabetes?

Type of foods	Increase	Same	Decrease	Don't have	
1. Sweet foods					rol.17[]
2. Fried foods					rol.18[]
3. Sweet desserts					rol.19[]
4. Sweet fruits					rol.20[]
5. Non-sweet fruits					rol.21[]
6. Vegetables (leaf)					rol.22[]
7. Soft drinks, beverages					rol.23[]

Part 3. Questionnaire about the food consumption behaviour of diabetic patients in daily life.

Please select the answer that is closet to your behaviour and mark / in the appropriate box (only one per question).

Food consumption behaviour of diabetic patients in daily life	Always	Frequent	Few	Never
1. Having food just enough				
2. Limiting carbohydrate food				
3. Limiting carbohydrate sweet				
4. Having sweets				
5. Having meal on time				
6. Having sweet during free time				
7. Having fatty food				
8. Having mild taste fruits				
9. Having sweet fruits according to season				
10. Having sweet fruits after meal				
11. Having sweet drinks				
12. Having alcoholic beverages				
13. Having vegetables (leaf)				
14. Having vegetables that reduce blood sugar level				
15. Taking drug without food control				
16. Food control when blood sugar level increase				
17. Having sweet and fatty meal				
18. Having soft drinks at party				
19. Adding sugar to noodle				
20. Having toffee everyday				

Part 4. Questionnaire about relationship within family.

Relationship within family	Always	Moderate	Rarely	Never
1. Communication with family members				
2. Listening to complaints				
3. Never tell anybody when feel uneasy				
4. Blaming each other				
5. Never have dinner with family members				
6. Spend time with family members				
7. Living independently				
8. Always join family activity				
9. Trip with family members				
10. Nobody care when having problem				
11. Members make you feel alone				
12. Members always misunderstanding				
13. Members always caring each other				
14. Members prefer to closeness				
15. Members make you feel safe and warm				
16. When a severe problem occur in family, you make decision alone				
17. You have friend when you have to travel				
18. Members give you the thing you lack				
19. Members help your financial problem				
20. Members look after you when you ill				

The background of the page features a large, faint watermark of the Mahidol University seal. The seal is circular and contains the university's name in Thai script: "มหาวิทยาลัยมหิดล" (Mahidol University) around the perimeter and "จุฬาลงกรณ์มหาวิทยาลัย" (Chulalongkorn University) at the bottom. In the center of the seal is a traditional Thai emblem.

Appendix B

Statistical analysis

Table B-1 Number, percentage, mean, and standard deviation of risk behaviour in the food consumption behaviour of diabetic patients in family context.

Food consumption behaviour of diabetic patients in family context	Daily patient behaviour				\bar{x}	S.D
	Never	Few	Frequent	Always		
1. Having food just enough	12.7	15.4	21.5	50.4	3.10	1.08
2. Limiting carbohydrate food	21.2	19.2	26.2	33.5	2.72	1.14
3. Limiting carbohydrate sweet	32.7	44.6	12.7	10.0	3.00	.93
4. Having sweets	29.6	48.8	19.6	4.6	3.03	.81
5. Having meal on time	24.6	14.2	13.8	47.3	2.84	1.26
6. Having sweet during free time	68.5	18.1	3.8	9.6	3.45	.95
7. Having fatty food	41.9	43.8	9.2	5.0	3.23	.81
8. Having mild taste fruits	3.1	19.2	33.1	44.6	3.19	.85
9. Having sweet fruits according to season	18.1	38.5	30.4	13.1	2.62	.93
10. Having sweet fruits after meal	30.4	29.6	20.4	19.6	2.71	1.10
11. Having sweet drinks	48.8	26.5	7.3	17.3	3.07	1.12
12. Having alcoholic beverages	86.5	8.5	3.1	1.9	3.8	.58
13. Having vegetables (leaf)	3.5	16.9	30.8	48.8	3.25	.86
14. Having vegetables that reduce blood sugar level	4.6	18.5	35.4	41.5	3.14	.88
15. Taking drug without food control	38.1	15.4	20.4	26.2	2.65	1.23
16. Food control when blood sugar level increase	16.9	11.2	15.8	56.2	3.11	1.16
17. Having sweet and fatty meal	46.5	21.2	12.7	19.6	2.95	1.17
18. Having soft drinks at party	52.7	28.5	8.5	10.4	3.23	.99
19. Adding sugar to noodle	47.7	15.8	8.5	28.1	2.83	1.29
20. Having toffee everyday	63.0	17.7	11.2	8.1	3.36	.97

Table B-2 Number, percentage, mean, and standard deviation of role of family in preparing foods for diabetic patients.

Role of family in preparing foods for diabetic patients	Family action				\bar{x}	S.D
	Never	Seldom	Frequent	Always		
1. Buying high energy one dish foods	39.2	43.8	12.3	4.6	3.18	.82
2. Buying coconut milk foods	34.6	49.5	11.5	4.2	3.15	.78
3. Buying vegetables	23.8	21.9	25.8	28.5	2.59	1.14
4. Buying foods made from beans	15.0	43.5	29.2	12.3	2.39	.89
5. Buying sweets	17.7	46.5	26.5	9.2	2.73	.86
6. Buying sweets made from flour	36.2	36.9	19.6	7.3	3.02	.92
7. Providing sweet fruits according to seasons	16.9	34.2	29.6	19.2	2.49	.99
8. Providing un-sweet fruits	3.8	18.1	38.5	39.6	3.14	.85
9. Providing soft drinks	37.7	36.2	13.5	12.7	2.99	1.01
10. Use vegetable oil in cooking	1.5	20.4	26.9	51.2	3.28	.84
11. Add sugar in cooked food	15.8	46.2	13.8	24.4	2.53	1.03
12. Prepare food according to patient	83.1	2.7	8.5	5.8	1.37	.87
13. Cooking vegetable foods	.8	16.5	33.1	49.6	3.32	.77
14. Prefer fatty foods	41.2	40.0	12.7	6.2	3.16	.87
15. Giving notice when having sweet	18.1	34.2	21.2	26.5	2.56	1.07
16. Preparing foods for party	86.2	6.5	4.6	2.7	1.24	.66
Difference in family food consumption						
17. Having sweet foods	10.8	30.0	56.2	3.1	2.48	.73
18. Having fried foods	10.0	33.1	52.7	4.2	2.49	.73
19. Having sweets	10.4	33.8	51.9	3.8	2.51	.73
20. Having sweet fruits	7.3	29.6	56.5	6.5	2.38	.72
21. Having un-sweet fruits	3.1	17.3	58.8	20.8	2.97	.71
22. Having vegetables	3.1	5.4	54.2	37.3	3.26	.70
23. Drinking soft drinks	18.8	23.1	50.4	7.7	2.53	.88

Table B-3 Number, percentage, mean, and standard deviation of relationship within family.

Relationship within family	Action				\bar{x}	S.D
	Never	Low	Medium	High		
1. Communication with family members	2.7	10.4	16.9	70.0	3.54	.79
2. Listening to complaints	4.6	9.6	22.7	63.1	3.44	.85
3. Never tell anybody when feel uneasy	28.8	14.2	18.5	38.5	2.33	1.25
4. Blaming each other	60.8	27.3	8.5	3.5	3.45	.79
5. Never have dinner with family members	60.0	13.5	6.2	20.4	3.13	1.21
6. Spend time with family members	16.9	10.8	20.4	51.9	3.07	1.14
7. Living independently	47.3	17.3	15.8	19.6	2.92	1.19
8. Always join family activity	3.8	5.4	15.0	75.8	3.63	.76
9. Trip with family members	28.1	24.2	19.2	28.5	2.48	1.18
10. Nobody care when having problem	49.2	18.5	12.7	19.6	2.97	1.19
11. Members make you feel alone	73.5	15.4	5.8	5.4	3.57	.83
12. Members always misunderstanding	60.8	25.0	9.6	4.6	3.42	.85
13. Members always caring each other	2.7	4.6	16.9	75.8	3.66	.69
14. Members prefer to closeness	2.3	4.6	23.5	69.6	3.60	.69
15. Members make you feel safe and warm	2.3	2.7	22.3	72.7	3.65	.65
16. When a severe problem occur in family. you make decision alone	48.8	10.0	11.5	29.6	2.78	1.32
17. You have friend when you have to travel	11.5	10.4	13.8	64.2	3.31	1.06
18. Members give you the thing you lack	11.2	8.8	14.2	65.8	3.35	1.04
19. Members help your financial problem	6.9	10.4	17.3	65.4	3.41	.93
20. Members look after you when you ill	1.5	4.6	14.2	79.6	3.72	.62

The image features a large, faint watermark of the Mahidol University seal in the background. The seal is circular and contains the university's name in Thai script: "มหาวิทยาลัยมหิดล" (Mahidol University) at the top and "วิทยาลัยพยาบาล" (Faculty of Nursing) at the bottom. In the center of the seal is a five-tiered umbrella, a traditional symbol of royalty and authority.

Appendix C

Assumptions of statistical multiple regression analysis

APPENDIX C

Assumptions of statistical Multiple Regression Analysis (Nouris, M.J, 1986 :338-339, Sujirarat, 2541: 117)

1. The number of independent variable must be more than one and must have interval scale. If not, they must be converted to be dummy variable. The independent variable also must have interval scale.
2. Each independent variable must have normal distribution.
3. The average value of each independent variable must have linearity with dependent variable.
4. The variance of each dependent variable of each sum of independent variable must be constant. The data will be linearly group distributed along the zero scale while the residual will not decrease or increase along the prediction.
5. Each independent variable must not be highly multicollinearity.
6. The studied sample must be independent from each other to prevent autocorrealion.

C-1 The analysis of data use in statistical multiple regression analysis.

1. Normal distribution

This study has more than one independent variable. Since the distribution of every independent variable and independent variable is multivariate normal distribution, the residual must be transformed to standard Z-score (Z-resid) before testing. The test can be performed using 2 techniques.

1. Use Kolmogorov-Simrnov test. (Test the value of residual whether it has the average normal distribution equals to 0 or not. (ดุสิต สุจิราตน์, 2539:69,74)
2. Use histogram or normal probability plot.

2. Linearity

Test by plotting graph which can be carried out by 2 ways.

1. Plot graph between each pair of independent variable and dependent variable.

2. Plot graph between Z-resid and the predicted value obtained from the prediction in the form of standard Z-score (Z-presid).

3. Homocedasticity or Constant variance

Test by making scatter plot between Z-resid and Z-presid. The distribution of residual must be around the zero value.

4. Multicolinearity

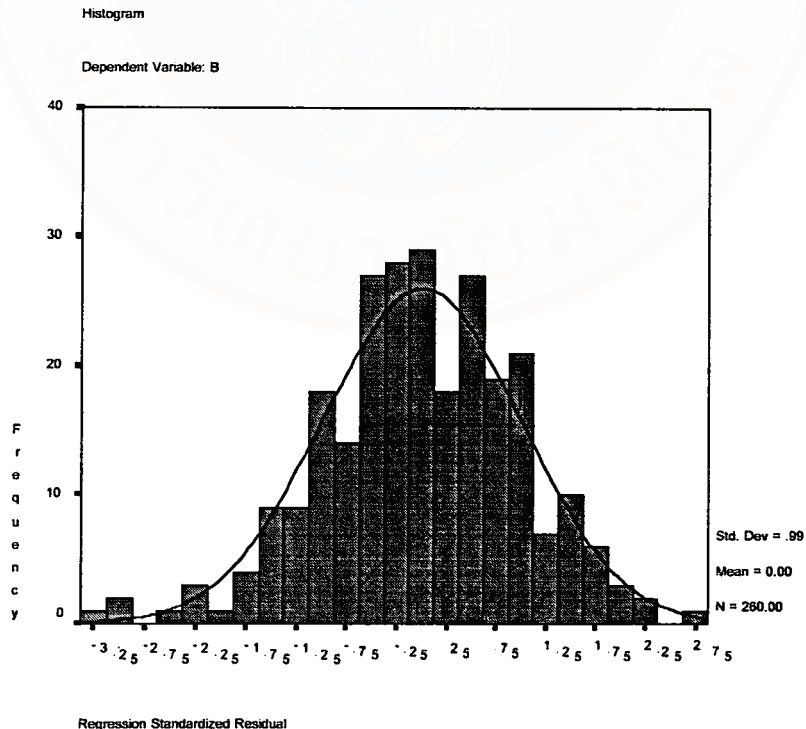
Test by examining correlation matrix of independent variables.

5. Autocorrelation

Test by examining the Dubin-Watson test value.

C-2 The result of the analysis

1. **Normal Distribution** : The obtained result is shown in the figure below.

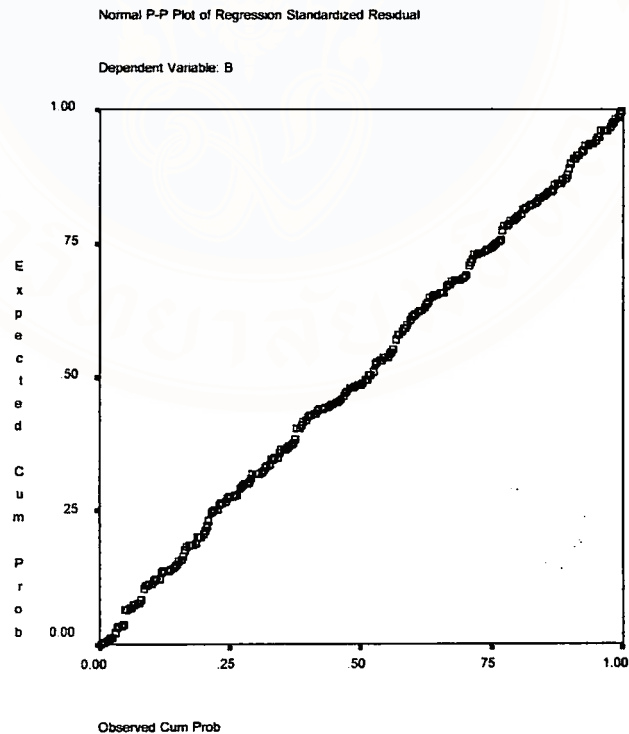


2. Test of Normality

	Kolmogorov-Smirnov		
	statistic	df	sig
B		260	.096

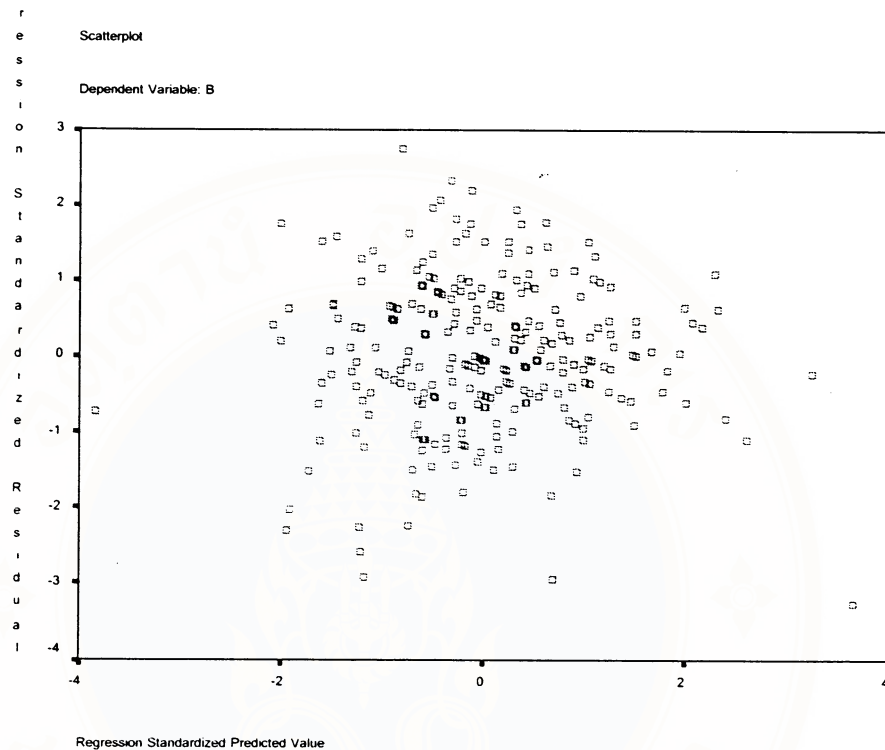
- a Test distribution is Normal.
- b Calculated from data.

2. Linearity



The test shows the linear relationship.

3. Constant variance Homocedasticity or Constant variance



From the constant variance homocedasticity or constant variance tests, it can be seen that the data group distribute along the zero horizontal line. The residual does not increase or decrease along the prediction.

4. Multicollinearity among the independent variables.

Table of multicollinearity among the independent variables.

Variables	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
1. Age	1.0														
2. Sex	-.01	1.0													
3. Marital status	-.14*	-.31**	1.0												
4. Education	-.26**	-.27**	.11	1.0											
5. Housewife	.48**	.02**	-.20**	-.26**	1.0										
6. Agriculturist	.05	-.15*	.17**	-.08	-.28**	1.0									
7. Employee	-.38**	-.13*	.04	-.07	-.44	.09	1.0								
8. Merchant	-.15*	-.03	.11	-.01	-.57**	-.12	-.19**	1.0							
9. Income	.04	.16*	-.19**	-.16**	.06	-.12	.01	.02	1.0						
10. Years of diagnosis diabetes	.32**	-.05	-.04	-.08	.18**	.06	.17**	-.02	.02	1.0					
11. Attitude on severity	.04	.10	.02	-.04	.07	.02	-.13	-.02	.02	.05	1.0				
12. Type of family	.01	.04	.10	-.06	.04	-.01	-.05	-.08	.04	-.08	-.04	1.0			
13. Role of family	-.08	.06	-.04	.03	-.03	-.03	.10	-.01	-.03	-.08	.04	-.17**	1.0		
14. Relationship	-.02	-.02	.21**	.04	-.06	-.04	-.01	-.08	-.10	-.10	.20**	-.01	.13*	1.0	
15. Food consumption behaviour	.03	.15*	.01	.01	.18**	-.09	.01	-.17**	-.01	-.03	-.03	-.01	.44**	.20**	1.0

* Significant level = 0.05 ** Significant level = 0.01 *** Significant level = 0.001

The test show that the independent variables have very low level of relationship. Therefore, the problem about multicollinearity does not occur.

5. Autocorrelation

Model	Durbin-Watson
1	1.720

The test found the value of Durbin-Watson test at 1.720 which lies in normal interval.
Therefore, there is no autocorrelation

BIOGRAPHY



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