UNIVERSITI PUTRA MALAYSIA

SELF-CARE PRACTICES OF PATIENTS WITH DIABETES TYPE 2

NAZWATI BINTI TAJRI

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ABSTRACT

BACKGROUND: Type 2 diabetes mellitus is defined as a heterogeneous, multifactorial, and polygenic disease characterized by a defect in insulin's secretion and action (Hayden, 2003). The number of the population who has diabetes is increasing and become global problem that need serious action. This matter concerns not only because of the increasing number of diabetes but risk of complication such as retinopathy, nephropathy and is associated with macro vascular diseases (Mafauzy, 2005). It is caused by increasing in obesity, population growth, aging, urbanization and physical inactivity (Wild. 2004). Thus, blood sugar control, health-related quality of life, and self-care behaviours are important indicators to reflect health outcomes among individuals with diabetes. **OBJECTIVES**: General objective of this study is determining the self-care practices of patient with diabetes type 2. Associations between the relevant factors, including socio demography and knowledge, and self-care practices were examined. **METHODS:** A cross sectional study was undertaken. Data were collected from 120 diabetic adults at "Klinik Kesihatan Kuang". A 32-item questionnaire was used to assess diabetes-related knowledge and self-care practices regarding diet, medication, physical activity and self-monitoring of blood glucose (SMBG). Descriptive statistical analysis was carried out to determine socio-demography, knowledge and glycaemic level characteristics. Chi-square test was used to determine associations between dependent variables and independent variables with p- value ≤ 0.05 considered as statistically significant. **RESULTS:** The total of 120 respondents participated in the study, which of 55.8% females and 44.2% males. The findings of this study found that majority of respondent were poor practice (90.8%). In term of knowledge majority respondent have good knowledge on medication (99.2%), followed by diet (86.7%) and exercise (73.3%). In term of glycaemic level more than half respondent was poor control (68.3%). Significant association were found between socio demographic and practice on age ($p \leq 0.05$) and gender ($p \leq 0.05$), association between knowledge and practice on medication adherence ($p \leq 0.01$) and exercise ($p \leq 0.036$), association between glyaemic level and practice ($p \leq 0.01$). **CONCLUSION:** The finding of this study indicated that more than half of the respondents are female with good knowledge on medication, diet and exercise. However majority of the respondent had poor self-care practice and poor control of glycaemic level. This could be attributed to by factors such as limited education, age and duration of diabetes. Nevertheless, this study has provided an important basis for future interventional studies to improve the present approach to diabetes education and management in Malaysia.

KEYWORDS: Diabetes, glycaemic level, self-care practices

AKTIVITI PENJAGAAN DIRI DIKALANGAN PESAKIT DIABETIK JENIS KE 2

ABSTRAK

LATAR BELAKANG: Diabetes mellitus jenis ke 2 ditakrifkan sebagai satu penyakit heterogen, multifactorial, dan polygenic dicirikan oleh kecacatan dalam rembesan dan tindakan insulin (Hayden, 2003). Bilangan penduduk yang mempunyai diabetes semakin meningkat dan ia menjadi masalah global yang memerlukan tindakan serius. Perkara ini melibatkan bukan sahaja kerana peningkatan bilangan kencing manis tetapi risiko komplikasi seperti retinopati, nefropati dan dikaitkan dengan penyakit vaskular makro (Mafauzy, 2005). Ia disebabkan oleh peningkatan jumlah kegemukan, pertumbuhan penduduk, penuaan, kemodenan dan fizikal yang tidak aktif (Wild. 2004). Oleh itu, kawalan gula dalam darah, yang berkaitan dengan kesihatan kualiti hidup dan penjagaan diri tingkah laku adalah penunjuk penting untuk menggambarkan hasil kesihatan di kalangan individu yang mengidap diabetes. **OBJEKTIF:** Menentukan amalan penjagaan diri pesakit dengan diabetes jenis 2. Hubungkait antara faktor-faktor yang berkaitan, termasuk sosio demografi dan pengetahuan, dan amalan penjagaan diri. **KAEDAH:** Kajian rentas telah dijalankan. Data telah dikumpulkan daripada 120 orang dewasa diabetes di "Klinik Kesihatan Kuang". A 34-item soal selidik telah digunakan untuk menilai pengetahuan yang berkaitan dengan diabetes dan amalan penjagaan kendiri mengenai pemakanan, ubat-ubatan, aktiviti fizikal dan pemantauan sendiri glukosa dalam darah (SMBG). **ANALISIS**, statistik deskriptif telah dijalankan untuk menentukan sosio-demografi, pengetahuan dan ciri-ciri tahap glisemik. Ujian chi-square telah digunakan untuk menentukan persatuan antara pemboleh ubah bersandar dan pemboleh ubah tak bersandar dengan p-nilai $\leq$ 0.05 dianggap sebagai statistik yang signifikan. **RESULTS:** 120 orang responden mengambil bahagian dalam kajian ini, perempuan 55.8% dan 44.2% lelaki. Hasil kajian ini mendapati kebanyakan responden rendah tahap penjagaan diri (90.8%). Kebanyakan responden mempunyai pengetahuan yang baik pada ubat-ubatan (99.2%), diikuti oleh diet (86.7%) dan latihan (73.3%). Dari segi tahap glisemik, lebih daripada separuh responden adalah rendah kawalan glysemik (68.3%). Kaitan di antara sosio demografi dan amalan kepada umur ($p \leq 0.05$) dan jantina ($p \leq 0.05$), kaitan antara pengetahuan dan amalan pada kepatuhan ubat ($p \leq 0.01$) dan senaman ($p \leq 0{,}036$), kaitan antara tahap glyaemic dan amalan ($p \leq 0.01$). **KESIMPULAN:** Hasil kajian ini menunjukkan bahawa lebih separuh daripada responden wanita dengan pengetahuan yang baik mengenai ubat-ubatan, diet dan senaman. Bagaimanapun,Kebanykan respondent rendah dalam penjagaan diri dan kawalan glysemik. Ini mungkin disebabkan oleh faktor-faktor seperti umur pendidikan, dan tempoh diabetes. Walau bagaimanapun, kajian ini telah menyediakan asas yang penting untuk kajian masa depan untuk memperbaiki pendekatan yang sedia ada bagi meningkatkan pendidikan diabetes dan pengurusan di Malaysia.

KATA KUNCI: Diabetes, paras glycemia, aktiviti penjagaan diri.

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LIST OF ABBREVIATION

<	Less than
>	More than
≤	As same as/less than
≥	As same as/more than
=	Equal to
%	Percentage
DM	Diabetes mellitus
SMBG	Self monitoring blood glucose

CHAPTER 1

INTRODUCTION

Type 2 diabetes is the most prevalent form of diabetes, which appears later in life. It has been estimated that the prevalence of diabetes would increase by 35% between 1995 and 2025 (Dongsheng et al., 2009). Estimated number of people with diabetes will increase between 2000 and 2030 is ranging from 171 million to 366 million worldwide (Wild et al., 2004). World Health Organization state that 346 million people worldwide have diabetes where estimated of 3.4 million people died in 2004. The number of diabetes death is estimated to be increasing between 2005 and 2030 Diabetes is also a major cause of morbidity and mortality (Shaw et al., 2010).

Diabetes is a chronic disease. It occurs when the insulin (hormone that controls blood sugar) produced by the pancreas is not enough, or when the insulin produced was not been effectively used by the body. The term diabetes describes metabolic disorders, characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both, and the effects of diabetes mellitus consist of long-term damage, dysfunction and failure of various organs (WHO, 1999). Diabetes is divided into three categories which are diabetes type 1, diabetes type 2 and gestational diabetes. Diabetes Type 1 is characterized by hyperglycaemia due mainly to absolute insulin insufficiency while Diabetes Type 2 is related to relative insulin deficiency and insulin resistance (WHO, 1999). Meanwhile, Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy (Metzger, 1998). No country is free of diabetes. In the United States, Diabetes

mellitus is the sixth leading cause of death and in year 200, about 65% of deaths are associated with heart diseases or stroke (Evans, 2010). In 2007, 23.6 million people, or 7.8% of the U.S. population had DM (Xinzhi et al., 2010).

In other country such as Korea, in 2008, diabetes is ranked fourth as cause of death and the prevalence of people with diabetes in Korea were 22.4 per 100,000 persons. This effect increased medical cost of type 2 diabetes in Korea (Haejung et al., 2009). In Malaysia, the prevalence of diabetes is increasing every year. Malaysian National Health Morbidity Survey III state, the occurrence of diabetes mellitus was 11.6% were 7.0% is known diabetes and 4.5% is newly diagnosed (Letchumanan et al., 2006). This raise in cases may be due to the lifestyle changes of socioeconomic, changes in dietary habits and overweight children. (Anuar, 2000). Many factor influenced this massive increase in diabetes. The number of people with diabetes is increasing because of various factors such as population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity (Wild et al., 2004). Malaysian society follow the path of urbanization, industrialization and motorization which resulted the population becoming more overweight or obese and sedentary (Mnistery of Health Malaysia, 2006). Nowadays, Malaysian are living longer because of the improvements in diets, nutrition intake and advances in medical fields which lengthen the lifespan of Malaysian to the age 65 years and over (Poi et al., 2004). Because of that, the number of people with diabetes has also increased. (Wild et al., 2004).

1.0 Problem Statement

Diabetes is a common disease in Malaysia and the number of diabetes patients with severe complication is increasing every year. Its increment is up to 11% in 2006 (Tan & Magarey, 2008). The problem with diabetes is that it contributes complication where the number of diabetes patients with complication is increasing every year. Studies in Malaysia indicated a high prevalence of sub-optimal control and that diabetes complication are common (Tan & Magarey, 2008). Some of the complications of diabetes mellitus are heart diseases, stroke and kidney failure. Another complication is retinopathy which is associated with macro vascular diseases (Mafauzy, 2005). All of these complications are the leading causes of blindness (Davidson et al, 2010). Vascular complications are common among Malaysians with diabetes, according to the National Renal Registry. They have reported that 57% of all the patients who required dialysis in Malaysia did so because of nephropathy. (Lim & Lim, 2006). Previous studies done in Malaysia reported that the majority of these individuals had poor glycaemic control regardless of types of diabetes, age or treatment centers. (Ismail et al., 2001). This would means that the Diabetes Mellitus is the dire cause of morbidity and mortality associated with complication (Jenhani et al, 2005).

Therefore, it is important for diabetes patients to control their glycaemic level to prevent complication by taking their medication as recommended as well as knowing what type of medication they are taking. Patients' adherence to medication, lifestyle changes and constant adherence to oral antidiabetic medications are also an important element in reaching the long-term glycaemic control (Al-Qazaz et al, 2011).

The main problem with diabetes patients is their lower adherence with self care such as low compliant with medication as recommended, less physical activity, not complying with diet plan and did not conduct their own self glucose monitoring. A study in Iran reported that only 6.3% of patients practiced self-monitoring blood glucose (Aghamollaei el al., 2003). One study has been done in Malaysia reported that only 15% of the subjects performed their own blood glucose monitoring (Tan & Magarey, 2008).

Patients must understand and have the knowledge about their medication, diet and must be fully aware of their condition. Several studies have shown that increasing frequency of self monitoring is strongly associated with successful achievement of dietary goals (Servick et al., 2010) & (Mahfuz & Awadalla., 2011).

Another major problem is the negative effects of diabetes towards the socio-economic level of the country. The economic burden to cater the diabetes patients' needs in Malaysia is rapidly escalating. One study estimated that the direct cost of outpatient treatment for the 60,000 diabetic patients registered with the Malaysian Ministry of Health amounted to approximately RM 14.5 million per year (Sadat et al., 2003). In 2007 the total estimated cost of diabetes care in United States was $ 174 billion in which $58 billion of it was used for treating the chronic complications of diabetes. (American Diabetes Association, 2007).

Many studies have shown that depression is also common among people with diabetes. (Peyrot et al., 2005). Depressive symptoms had been shown to be associated with poor self-care practices and glycaemic control and cause of depression of medication regimen, functional impairment and higher health care cost. (Lin et al., 2004).

The World Health Organization has announced that the average life expectancy of individuals with diabetes is shortened by 10- 15 years. Diabetes is one of the top ten leading causes of death in many countries around the world. The burden of mortality attributed to diabetes in the year 2000 was 209 million deaths, equivalent to 5.2% of all deaths globally. This situation was worsened by the fact that diabetes increased premature mortality. Among individuals aged 35-64 years with diabetes, 59% of their deaths were attributable to diabetes while among individuals with diabetes and to those older than 64 years, diabetic was accounted for 29% of all their deaths (WHO, 1999)

Diabetes is a fatal risk factor for more severe and progressive periodontal diseases, infections and lesions which resulting the destruction of tissues and supporting bone from the joints and attachment around the tooth. National survey in Taiwan reported that deaths because of oral and maxillofacial infection are getting more serious and worrying. Approximately 1 in every 150 cases admitted for oral and maxillofacial infections ended up with casualties and 67% of these deaths were patients with diabetes problem and were older than 40 years old. (Wong., 1999).

1.1 Objective

1.1.1 General objectives

To determine the self –care practices with type 2 diabetes with glycaemic control.

1.1.2 Specific objectives:

i. **To** determine the socio-demographic characteristic of the type 2 diabetic patients.

ii. To determine self-care practices of type diabetic patients

iii. To determine diabetes knowledge of type 2 diabetic patient

iv. To determine the glycaemic level of type 2 diabetic patients.

v. To determine the association between socio demographic and self-care practices of the type 2 diabetic patients.

vi. To determine the association between knowledge diabetic and self-care practices of type diabetic patient.

vii. To determine the association glycaemic level and self-care practices of type diabetic patient.

1.2 Null Hypothesis

Ho = There is no significant association between self-care practices and socio-demographic.

Ho = There is no significant association between self-care practices and knowledge.

Ho = There is no significant between self-care practices and glycaemic control.

1.3 Significant of Study

This study was designed to determine self-care practices among type 2 diabetic patients. This study may hopefully able to identify how diabetes patients care of themselves and how far do they understand self-care practices. Hence, the findings of the study could be used to assist health care providers to improve diabetic health

education that promotes diabetic patients' self-care practices, comply with medication and later on reduce diabetic complications. Nevertheless, this research could be used to guide further research studies.

1.4 Conceptual Framework

Conceptual framework in this study consist components of self-care practices which are diet taking, compliance to medication, physical activities and self monitoring of blood level. This study also shows the relationship between self-care practices and socio demographic, relationship between self-care practices and knowledge, and relationship between self-care practices and glycaemic control. Dependent variable is self-care practices; meanwhile, independent variables are demographic, knowledge and glycaemic control. In addition, this conceptual framework shows how the variables affect the self-care practices as well as how self-care practice affects the glycaemic control.

1.4.1 Conceptual Frame Work Diagram

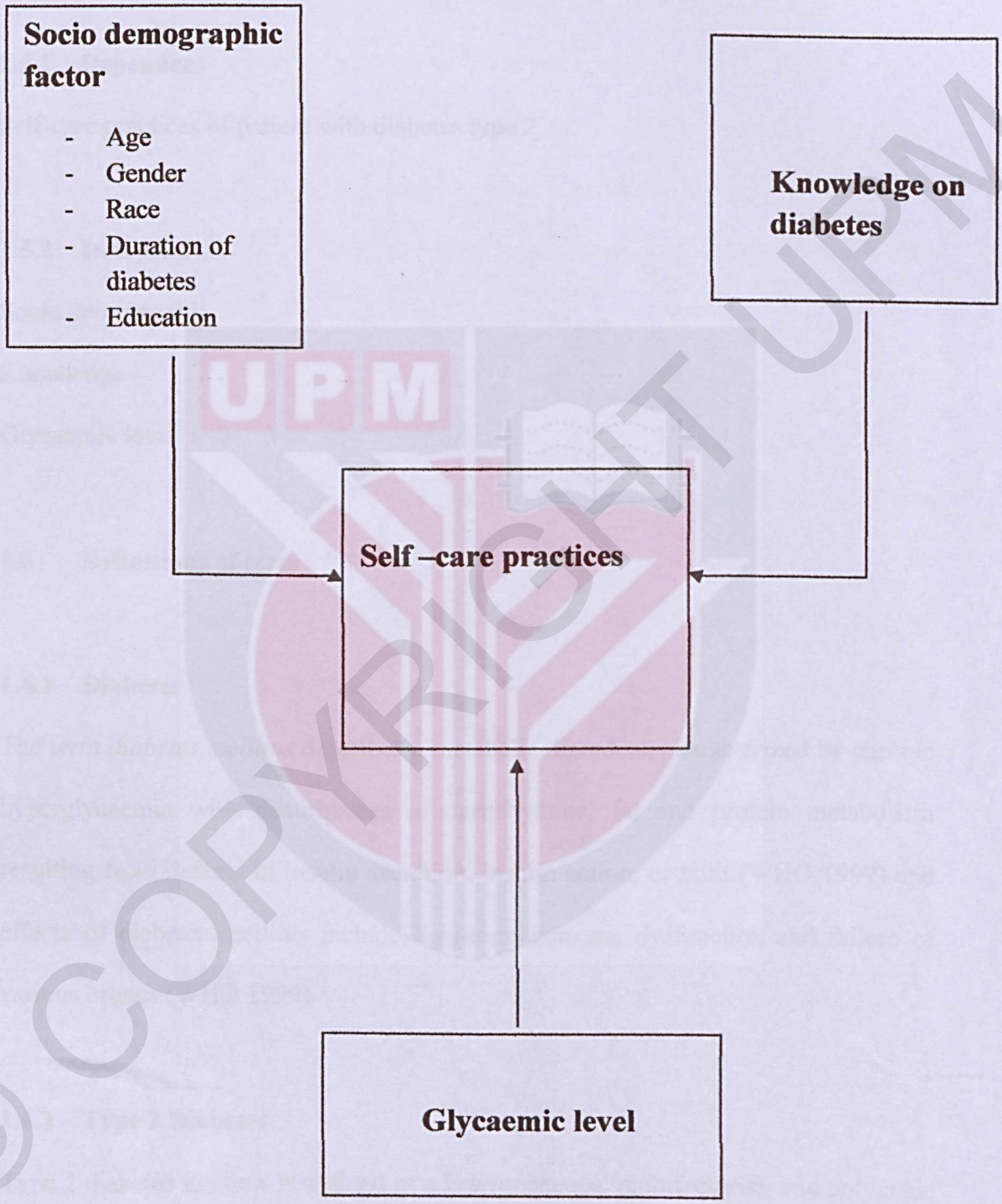

Figure 1: Conceptual framework of self-care practices

1.5 Key Dependent and Independent Variable

1.5.1 Dependent

Self-care practices of patient with diabetes type 2

1.5.2 Independent

Socio demographic

Knowledge

Glycaemic level

1.6 Definitions of term

1.6.1 Diabetes

The term *diabetes mellitus* describes a metabolic disorders, characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both (WHO 1999) and effects of diabetes mellitus include long-term damage, dysfunction and failure of various organs (WHO 1999).

1.6.2 Type 2 Diabetes

Type 2 diabetes mellitus is defined as a heterogeneous, multifactorial, and polygenic disease characterized by a defect in insulin's secretion (the beta cell secretory defect) and action (insulin resistance) (Hayden, 2002). Type 2 diabetes mellitus is a condition where the body cannot control the glucose level in blood circulation. Type

2 diabetes occurs as a result of insulin resistance with relative insulin efficiency. Patients with type 2 diabetes are not ketosis-prone under normal condition. Environmental factors such as obesity and sedentary lifestyle play an influential role. Genetic play a major role as well. Type 2 diabetes constitutes 85% to 95% of the diabetic population globally. The majority of type 2 diabetes patients are adults above 40 years of age. However, it may also occur in younger age groups. The global prevalence of young Type 2 diabetes has increased in the last two decades. (WHO, 1999).

1.6.3 Self-care practices

Diabetes self –care or self- management behavior is an active, cognitive process in which individuals with diabetes perform tasks as part of their daily regimen to manage their diabetes condition level including appropriate diet and medication intake, physical activity and self-monitoring (Weinger et al., 2005).

1.6.4 Knowledge

Downes, (2005) state knowledge is information and skills acquired through experience or education whereby knowledge is the presence of cognitive information related to specific topic that can be defined as information, skills and understanding that have been gained through learning or experience.

1.6.5 Glycaemic Control

According to the Academy of Medicine Malaysia guidlines, the component including in glycaemic control are fasting blood sugar where the target level is 4.4 to 6.1 mmol/L, For non-fasting blood sugar the target level is 4.4 to 8.0 mmol/L and

HbA1c the target level is below than 6.5 % but glycaemic target should be individualized to minimize the risk of hypoglycaemia. This test has been used to watch the diabetic patients' sugar control over several months (Wan Bebakar, 2009)

1.6.6 Glycoslated Haemoglobin (HbA1c)

Glycoslated haemoglobin results from linkage of glucose to erythrocyte haemoglobin. Because of the average erythrocyte lifespan is 120 days, the HbA1c level is proportional to ambient blood glucose level during the previous 2 to 3 months. Hence, HbA1c level has been used as an index of long-term glycaemic control and has been associated with decreased incidence of microvascular diabetes complications. The recommended goal is ≤6.5%. HbA1c correlates with the mean daily blood glucose. (John & O'Brien, 2007).

1.6.7 Poor Diabetes Control

Glycoslated haemoglobin (HbA1c) is the gold standards of glycaemic assessment according to the Academy of medicine Malaysia poor glycaemic level define as HbA1c levels ≥7%. (Wan Bebakar, 2009).

1.6.8 Good Diabetes Control

Good diabetes control is defined as HbA1c blood glucose levels ≤6.5% (Wan Bebakar, 2009).

CHAPTER 2

LITERATURE REVIEW

The number of the population who has diabetes is increasing and become global problem that need serious action. It is caused by increasing in obesity, population growth, aging, urbanization and physical inactivity (Wild. 2004). WHO estimated 194 million adult in worldwide have diabetes. Third National Health and Morbidity Survey found that in Malaysia, the prevalence of type 2 diabetes for adult aged 30 years and above was 14.9% in 2006 (Abougalambou et al, 2010).

This matter concerns not only because of the increasing number of diabetes but risk of complication from the disease. The several complication such as retinopathy, nephropathy and is associated with macro vascular diseases (Mafauzy, 2005). Another complication that becomes serious is depression. An estimated 30% of patients with diabetes have depression (Egede, 2009). According to Egede et al, 2009, diabetes is significant associated with mobility, mortality and health care utilization and cost. Therefore, effective health education from health providers is needed and diabetes self management includes diet, exercises, medication and self blood sugar monitoring are essential for all diabetes patients to know to prevent further health complications.

2.1 Prevalence of Diabetes

Type 2 diabetes with concurrent risk factors such as hypertension and dislypidemia and complications has now accounted for the majority of national and global morbidity and mortality (How, 2011). The international Diabetes Federation

predicted a 72% increase in the number of diabetes from 189 million in 2000 to 224 million in 2025 (How, 2011). The prevalence of the diabetes in Malaysia is 11% in 2006 (Tan, 2008). Prevalence of diabetes increased to 6.0 % in 2007 and this number is predicted to increase to 7.3% by 2025 (Albougalambau, 2010). This may be due to population growth, aging, urbanization and increasing prevalence of obesity and physical inactivity (Wild et al, 2004). WHO estimated more than180 million people worldwide have diabetes and this number is likely to be more than double by 2030 (Al-Qazaz et al., 2011). For example, in Taiwan, it is estimated that 1.0-1.4 million people in Taiwan are affected by diabetes (Wu et al., 2011).

2.2 Prevalence of Type 2 Diabetes

Type 2 diabetes is the most common and it is due to the combination of insulin resistance. Individuals with diabetes need to learn several types of self-care activities and adopt these steps into their daily routine because of its importance to maintain quality of life. Thus, blood sugar control, health-related quality of life, and self-care are important indicators to reflect health outcomes among individuals with diabetes. (Tan & Mageray, 2008).

2.3 The Roles of Diabetes Education

The knowledge and skills needed for result as good self-care practices that acquired through diabetes education. Patient education has transformed and reinvented itself many times since its original introduction. In United States, one clinician in Joslin Clinic was one of the first physicians that started diabetes education and emphasized to his patient the importance of monitoring urine glucose at home (Allen, 2003). Diabetes education programs can have long-term benefits on increasing the

knowledge, improving the psychosocial function, and controlling the blood sugar in diabetic patients (Zahra et al., 2011).

2.4 Significant of Self-care in Diabetes Management

The United Kingdom one study had shown that individuals who adhere to daily self-care of diabetes followed meal plan, take medication as prescribed, exercise regularly and monitor their blood glucose levels usually achieved better short and long term health outcomes and better in glyceamic level (Tan & Mageray, 2008).

2.5 Dietary Self-care

Dietary glucose from carbohydrate contributes to the prevailing blood glucose level. Nutritional intervention is one strategy to improves glycaemic control of individuals with diabetes. (Pastor et al., 2002). Lifestyle modifications such as nutritional interventions reduce diabetes complications by reduce cardiovascular risk factors like hypertension, dyslipidemia and weight reduction. (Klein et al., 2004).

2.6 Factors Affecting Dietary Adherence

According to the American Diabetic Association, (2004), some women with diabetes were more obsessed with food and ate excessively when they were experiencing times of depression (Sacova, 2004). Furthermore, the multiple care roles that women bear requires them to balance their personal needs with those of the family resulted in less adherence to dietary habits and adherence to medication. (Albarran et al., 2006). In another report, some researchers have reported that there is no gender difference in dietary adherence which is that female with better family and social support are able to follow the recommended diet. (Klein et al, 2004).

2.7 Physical Activity

Physical activity increases glucose utilization in muscles and fats and thereby influencing the prevailing blood glucose level. For people with diabetes type 1 and type 2, regular aerobic exercise has been shown to improve their glycaemic control, reduced cardiovascular risk factors and weight reduction (Hu, 2005).

2.8 Factors Influencing Physical Activity Self-care

According to Wanko et al. (2004), physical discomfort or illness, lack of family and social support, lack confidence and time, depression and environmental barriers are the major reasons for inactivity including negative attitude towards exercise. Therefore self-efficacy and family supports are important predictors for performing physical exercise (Wen et al., 2004).

2.9 Medication Intake

For people with diabetes, it is important for them to adhere to medication as prescribed because it can influence the prevailing blood glucose whereby it depends on the anti-hyperglycaemic medication prescribed, to reduce the blood glucose level via different mechanisms of drug. For example, the functions of metformin help to decrease the hepatic production of glucose and thiazolidinediones help to decrease insulin resistance and increase of glucose in muscles and fats. Alpha glucosidase inhibitors slow the digestion of complex carbohydrate and delay their absorption. So, adherence towards medication intake can influence the prevailing blood glucose in many ways. (Tan & Magarey, 2008)

2.10 Factors Related to Medication Adherence

Lower-socioeconomic status leading to depression, financial problems, lack of knowledge and poor social support are significantly factors in non adherence to medication (Rubin et. al, 2005). Some studies have shown that younger patients are giving more complaint than the older ones (Kuo et al., 2003). Another factor that decreased medication adherence is complexity of treatment like combination of therapy, higher dosing and medication side effects (Cramer, 2004). The last factor that decreased medication adherence is health care system. One study in New Zealand found that communication between patient and physician improved medication adherence by one third as compared to control groups (Claxton et al., 2001).Therefore it is importance communication among health care provider to increase patient awareness.

2.11 Self Monitoring Blood Glucose (SMBG)

One studies found increased frequently of SMBG and treatment modification were associated with better glycaemic and metabolic control but it's associated to other factor like dietary change or exercise effects (Tan & Magerey, 2008). According to the American Diabetes Association state tight glycaemic control and self-care practices have been emphasizes to prevent the development of complication. (Haejung et al., 2009). According to the Academy of Medicine Malaysia guidelines, (2009) blood glucose targets for Type 2 Diabetes Mellitus during fasting is 4.4 - 6.1 mmol/L and none fasting is 4.4 – 8.0 mmol/L.

2.12 Factor Affecting Adherence to SMBG

Family support and self-efficacy were association factor increase testing frequency but had study found factor that decreased testing frequency is depression. (Tan & Magerey, 2008).

2.13 Knowledge on diabetes

American Diabetes Association, (2002) have recommended diabetes patient education because patients' understanding of diabetes mellitus and its treatment have been viewed as essential to the management of this complex chronic illness. Educational interventions have been shown to increase patients' knowledge of diabetes and self-care activities. Therefore knowledge on diabetes able in increasing patient understanding of diabetes, providing support for behaviour change, and empowering patients to assume the primary management role for their illness.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This study has been using a cross-sectional method using a structured questionnaires and previous-record for glycaemic level (HbA1c).

3.2 Study Location

This study was carried out at "Klinik Kesihatan Kuang, Gombak, Selangor". The diabetes patients with regular follow up and treatment selected universally for this study. Data and medical records of the patient were reviewed for glycaemic level.

3.3 Sampling Unit

Both genders of type 2 diabetic patients are selected for the study.

3.4 Inclusion Data

All type 2 diabetic male and female patients receive treatment at study location. Both genders, regardless of ethnicity are included in the study.

3.5 Exclusion Criteria

Diabetes categories other than diabetes type 2 such as diabetes type 1 and gestational diabetes are excluded from the sampling. The possible respondents also excluded if they have physical or mental impairments that affect their ability to answer independently.

3.6 Sampling Method

Universal sampling was used for this study

3.7 Sampling size

Sample size calculation using the Daniel's (1999) formula for estimation of sample size (Naing et al ., 2006)

n= sample size

Z= statistic for a level confident

d= the proportion of sampling error in a given situation

p= prevalence of diabetes among population in Malaysia is 11%

In this study, using level of z = 1.96 and 5% sampling error (d=0.05)

$$n = \frac{Z^2 (P) (1-p)}{d^2}$$

$$n = \frac{1.96^2 (11) (1-11)}{0.5^2}$$

$$n = \frac{3.8416 (0.11) (0.89)}{0.0025}$$

$$n = \frac{0.3760926}{0.0025}$$

n= 150 respondent

n= 150 + 20% considering drawn out rate

n = the estimation sample size is 180 respondent.

3.8 Study Instruments

This study used structured questionnaire adopted from previous study from Tan and Magarey, (2008) that has been modified to suit Malaysian context. A questionnaire consisting of 32 questions in 4 sections has been distributed to the target group. The questionnaire has been provided in Malay and English language. Section A contains glycaemic data from patient's record. Section B contains socio demographic factors such as age, gender, ethnic and marital status. Section C contains diabetes knowledge assessment questions while Section D contains self-care practices questions. A Likert scale has been use to assess knowledge and self-care activity diabetic patient. The scoring has been calculated according to score for each item. For example 1=Yes and 2=No.

3.9 Validity

Validity is defined as the capability of any instrument chosen to measure the data that is supposed to measure. For this study, the questionnaire is taken from original research. This questionnaire has been used by Tan and Magarey, (2008) and was validated by their study done in Malaysia.

3.10 Reliability

Reliability is the state where the instrument is able to produce similar result in the repeated identical situation (Naing et al ., 2006). Pilot study was conducted from Tan and Magerey, 2008 in a meta-analysis of Cronbach's coefficient alpha (n=4,286) and the total Cronbach's coefficient is 0.73.

3.11 Data Collection Technique

Data was collected from patients' previous 5 months data. 4 section questionnaires has been used to assess patients' knowledge and self care practices encompassing diet, medication, physical activity, self monitoring blood glucose and self foot care. Assess the current fasting blood glucose and three previous months of patient record and HbA1c if available. Demographic data has been collected from existing records. A structured questionnaire would assess patients' diabetes knowledge, diet plan, self foot care and physical activity.

3.12 Data Analysis

All data was analyzed using the package for social sciences (SPSS). Descriptive statistic includes variable, means and standard deviation has been used. Categorical chi-square has been used to analyze internal scaled data. Statistically p value (≤ 0.05) was adopted as the significant level.

3.13 Ethical Consideration

Permission to carry out the study and ethical approval was obtained from the Ethic Committee, Faculty of Medicine and Health Science, University Putra Malaysia. Besides that, ethical approval will also be obtained from Medical Research Ethics Committee, Ministry of Health Malaysia. Permission was obtained from the patients to allow their treatment record being used in this research.

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CHAPTER 4

RESULT

4.1 Socio demographic characteristics

Table 4.1 shows results for socio demographic characteristics of respondents (n=120) which is respond rate is 66.7% from sample size. In socio demographic characteristic, in term of age, 65% of them were above 60 years old, while 35% of respondents were below than 59 years old. In term of gender, 55.8% of respondents were female and other 44.2% were male. Percentage of respondents according to race were 34.2% Malay, 34.2% Indian, 21.7% Chinese and 10% other race. More than half of the respondents or 62.5% of them have diabetes for duration between 6-10 years, followed by respondents with duration more than 10 years, 21.7%, while percentage of respondents with duration less than 5 years is 15.8%. As far as respondents' education is concerned, 45.8% of them having secondary education, 30.0% having primary education, another 21.7% were not having formal education and other 2.5% having tertiary education. In term of marital status, most of respondents were married with 67.5%, followed by widow with 13.3%, single with 10.8% and divorce with 8.3%. In term of living, majority of the respondent living with family, 78.3%, followed by those who living with friends, 10%, while 6.7% living alone and another 5% living with others such as in welfare.

Table 4.1: Socio demographic characteristics (n=120)

Socio-demographic (n=120)	Frequency	Percent (%)
Age		
<59	42	35.0
>60	78	65.0
Gender		
Male	53	44.2
Female	67	55.8
Race		
Malay	41	34.2
India	41	34.2
Chinese	26	21.7
Other	12	10.0
Duration of diabetes		
<5 years	19	15.8
6-10 years	75	62.5
>10 years	26	21.7
Education		
Never	26	21.7
Primary	36	30.0
Secondary	55	45.8
College/Tertiary	3	2.5
Marital status		
Single	13	10.8

Married	81	67.5
Divorce	10	8.3
Widowed	16	13.3
Living with		
Family	94	78.3
Friends	12	10.0
Alone	8	6.7
Others	6	5.0

4.2 Glycaemic Level Characteristics

Table 4.2 shows result for glycaemic level characteristics of respondents. Result found that most of the respondents or 68.3% of them had glycaemic level >7%, while another 31.7% had glycaemic level <6.5%.

Table 4.2: Glycaemic level characteristics (HbA1c) (n=120)

HbA1c	Frequency	Percent
<6.5% = (Good control)	38	31.7
>6.5% = (Poor control)	82	68.3

4.3 Diabetes knowledge characteristic

Table 4.3 shows result for diabetes knowledge characteristic of respondents. It show that 86.7% of respondents know that eating lower in fat help in reduce risk of developing kidney problem, while 13.3 % of them do not know. From 120 respondents, 51.7% of them know that high blood glucose can be cause by taking too much fruit. The rest of the respondents or 48.3% of them do not know. Majority of the respondents with percentage of 99.2% know that if they not take their medicine as prescribed by doctor, their blood glucose level will increase. Another 0.8 % of the respondents do not know. 90.8 % of the respondents know that their blood glucose will be increased if they skip breakfast after taking diabetes tablets/insulin injection. The rest of the respondents or 9.2% of them do not know. Percentage of respondents that know exercise help in decrease blood glucose is 73.3%, while 26.7% of the respondents do not know. Most of the respondents alert that kidney problem, nerve problem, lung problem, stroke and eye problem is complication of diabetes where the percentage is 87.5%, 76.7%, 76.7%, 72.5% and 90.8% respectively. Percentage of respondents that not alert is 12.5%, 23.3%, 23.3%, 27.5% and 9.2% respectively.

Table 4.3: Diabetes knowledge characteristic (n=120)

Diabetes knowledge	Frequency	Percent
1.Eating lower in fat help in reduce risk of developing kidney problem		
Yes	104	86.7
No	16	13.3
2.High blood glucose can be cause by taking too much fruit		
Yes	62	51.7
No	58	48.3
3.If you do not take your diabetes medicine prescribed by your doctor, your blood glucose level usually increase		
Yes	119	99.2
No	1	.8
4.If you take your morning diabetes tablets/insulin injection but skip breakfast, your blood glucose level will usually increase		
Yes	109	90.8
No	11	9.2
5.Exercise help in decrease blood glucose		
Yes	88	73.3
No	32	26.7
6. Kidney problem is complication of diabetes	105	87.5
Yes	15	12.5
No		

7.Nerve problem is complication of diabetes		
Yes	92	76.7
No	28	23.3
8.Lung problem is complication of diabetes		
Yes	92	76.7
No	28	23.3
9.Stroke is complication of diabetes		
Yes	87	72.5
No	33	27.5
10.Eye problem is complication of diabetes		
Yes	109	90.8
No	11	9.2

4.4 Diabetes knowledge score

Diabetes knowledge was assessed by using question that consists of 10 items where respondents have been asked to select either the answer is yes or no. One point was given for each correct answer with maximum score of 10 points. 2 points was allocated for wrong answer with maximum 20 points. Score from 1-14 means good knowledge while score from 14-20 means poor knowledge. Table 4.4 shows that majority of the respondents have poor knowledge where the percentage is 72.5%. Only 27.5% of respondents have good knowledge.

Table 4.4: Diabetes knowledge Score (n=120)

Knowledge score	Frequency	Percent
1-14= Good Knowledge	33	27.5%
14-20=Poor Knowledge	87	72.5%

4.5 Self-care practices characteristic

Table 4.5 shows self-care practices characteristic of respondents. In term of carbohydrate intake, 49.2% of respondents took it 3 times per day, 37.5% of respondents took it 2 times per day, 6.7% of respondents took it 4 times per day, 5% of respondents took it more than 5 times per day and 1.7% of respondents took it 1 times per day. In term of fruit intake, 42.5% of respondents took it 1 times per day, 22.5% of respondents didn't take it, 15.0% of respondents took it 3 times per day, 13.3% of respondents took it 2 times per day and 6.7% of respondents took it more than 4 times per day.

In term of high fat food intake, 66.7% of respondents didn't take it, 23.3% of ook it 1 times per week, 5.0% of respondents took it 2 times per week, 3.3% of respondents took it inconsistently and 1.7% of respondents took it 3 times per week. In term of junk food or snack intake, 46.7% of respondents didn't take it, 38.3% of respondents took it 1 times per day and 15.0% of respondents took it 2 times per day. In term of sweet drink or carbohydrate drink intake, 42.7% of respondents took it 2 times per

day, 25.0% of respondents didn't take it, 21.7% of respondents took it 1 times per day, 9.2% of respondents took it 3 times per day and 1.7% of respondents took it inconsistently. In term of dissert intake, 46.7% of respondents took it 1 times per day, 34.2% of respondents didn't take it and 19.2% of respondents took it 2 times per day.

In term of medication intake, 100% of respondents never missed taking their diabetes medication where 95.8% of respondents didn't need help in taking medication while 4.2% of respondents need help. In term of exercise, 27.5% of respondents did it 2 times per week, 23.3% did it more than 3 times per week, 19.2% of respondent did it 1 times per week and another 19.2% of respondents didn't exercise. Percentages of respondents that did simple, moderate and heavy exercise were 60.8%, 15.8% and 3.3% respectively. 32.5% of respondents spend time between 16-30 minutes to exercise, 25.8% of respondents spend time between 6-5 minutes to exercise, 22.5% of respondents spend time more than 31 minutes and 0.8% of respondents spend 5 minutes or less to exercise.

In term of physical activity during leisure time, 62.5% of respondents choose to walk, 31.7% of respondents choose to watch and 5.8% choose to do cycling. Based on tendency of respondents to spend their leisure time for reading activity, 27.5% of respondents spend most of the times, 27.5% of respondents spend sometimes, 22.5% of respondents spend seldom, 14.2% of respondents spend all the times and 8.3% of respondents never spend their leisure times for reading activity. Percentages of respondents that choose to do gardening during leisure time at most of the times are 35.8%, sometimes, 31.7%, all the times, 16.7%, seldom, 9.2% and never, 6.7%.

In term of self test of blood glucose at home, 83.3% of respondents didn't test, 8.3% of respondents did 1 test per day, 5.8% of respondents did 2 tests per day, 1.7% of respondents did 3 tests per day and 0.8% of respondents did more than 4 tests per day.94.2% of respondents didn't modify their diet intake or physical activity or medicine base on glucose reading. Only 3.3% of respondents did 1 modification per day and 2.5% of respondents did 2 modifications per day.

Table 4.5: Self-care practices characteristic (n=120)

Self-care practices	Frequency	Percent
1.I Eat carbohydrate		
1 times per day	2	1.7
2 times per day	45	37.5
3 times per day	59	49.2
4 times per day	8	6.7
>5 times per day	6	5.0
2.I eat fruit		
Non	27	22.5
1 times per day	51	42.5
2 times per day	16	13.3
3 times per day	18	15.0
>4 times per day	8	6.7
3.I take high fat food		
Non	80	66.7
1 times per week	28	23.3
2 times per week	6	5.0
3 times per week	2	1.7
Inconsistent	4	3.3
4.I take junk food or snack		

Non	56	46.7
1 times per day	46	38.3
2 times per day	18	15.0
3 times per day	-	-
Inconsistent	-	-
5.I take sweet drink or carbohydrate drink		
0 Non	30	25.0
1 times per day	26	21.7
2 times per day	51	42.5
3 times per day	11	9.2
Inconsistent	2	1.7
6.I eat dissert		
Non	41	34.2
1 times per day	56	46.7
2 times per day	23	19.2
7.Last week, I miss taking diabetes medication		
Non	120	100.0
8.Last week, I need help in taking medication		
0	115	95.8
1	5	4.2
9.In one week I do exercise		
>4		
3 times per week	28	23.3

2 times per week	33	27.5
1 times per week	23	19.2
Non	23	19.2
10.The exercise that I do		
Heavy	4	3.3
Moderate	19	15.8
Simple	73	60.8
Non	24	20.0
11.I spend time to exercise		
>31	27	22.5
16-30	39	32.5
6-15	31	25.8
None	22	18.3
5	1	.8
12.My leisure physical activity is		
Cycling	7	5.8
Walking	75	62.5
Watching	38	31.7
13.I reading book, magazine, news paper, computer during leisure time		
Never	10	8.3

Seldom	27	22.5
Sometimes	33	27.5
Most of times	33	27.5
All the times	17	14.2
14.I do gardening during leisure time		
All the times	20	16.7
Most of the times	43	35.8
Sometimes	38	31.7
Seldom	11	9.2
Never	8	6.7
15.last week I test my blood glucose at home		
>4 per day	1	.8
3 per day	2	1.7
2 per day	7	5.8
1 per day	10	8.3
Non	100	83.3
16. Last I modify my diet intake or physical activity or medicine base on glucose reading.		
2 per day	3	2.5
1 per day	4	3.3
Non	113	94.2

4.6 Self-care practices score

Table 4.6 shows scoring of the self-care practices question. Respondents have been asked to answer question that consist of 16 items and points from one to five was given for each answer. Score below than 35 means good practice and for score more than 35, it means poor practices. The result show that majority of the respondents were in poor self-care practices where the percentage is 90.8%. Only 9.2% of respondents were in good self-care practices.

Table 4.6: Self-care practices score (n=120)

Practice score	Frequency	Percent
1= <35 Good practices	11	9.2
2= >35 Poor practices	109	90.8

4.7 Association between Socio demographic and Self-care practices

Table 4.7 shows association between socio demographic and self-care practices. The result show there is significant association between age and self-practices ($p \leq 0.023$). The result of the association between gender and self-practices show there is significant association between gender and self-practices ($p \leq 0.008$). This study also shows there are no significant on duration of diabetes, living with, marital status between self-care practices.

Table 4.7: Association between Socio demographic and Self-care practices

	Good practice		Poor practice		x^2	df	p
	n	%	n	% of			
Age							
<59	8	6.7%	34	28.3%	7.587[a]	2	**.023**
>60	3	2.5%	75	62.5%			
Gender							
Male	9	7.5%	44	36.7%	6.962[a]	1	**.008**
Female	2	1.7%	65	54.2%			
Race							
Malay	2	1.7%	39	32.5%	2.236[a]	3	.525
India	5	4.2%	36	30.0%			
Chinese	2	1.7%	24	2.0%			
Other	2	1.7%	10	8.3%			
Education							
Never	4	3.3%	22	18.3%	2.074[a]	3	.557
Primary	2	1.7%	34	28.3%			

Secondary	5	4.2%	50	41.7%			
College/Tertiary	0	.0%	3	2.5%			
Marital status							
Single	2	1.7%	11	6.7%	.802	3	.849
Married	7	5.8%	74	65.0%			
Divorce	1	.8%	9	7.5%			
Widowed	1	.8%	15	7.5%			
Living with							
Family	8	6.7%	86	75.0%	1.572[a]	3	.666
Friends	2	1.7%	10	6.7%			
Alone	1	.8%	7	4.2%			
Others	0	.0%	6	5.0%			
Duration of diabetes							
< 5 years	4	3.3%	15	12.5%	4.230[a]	2	.121
6-10 years	6	5.0%	69	57.5%			
>10 years	1	.8%	25	20.8%			

4.8 Association between Glycaemic level (HbA1c) and Self-care practices

Table 4.8 shows there are significant association between association between HbA1c and self-care practices (p=0.04).

Table 4.8: Association between Glycaemic level (HbA1c) and self care practices

Glycaemic level (HbA1c)	Good practices		Poor practices		x^2	df	p
	n	%	n	%			
<6.5%	8	6.7%	30	25.0%	9.435[a]	1	**0.04**
>7.0%	3	2.5%	79	65.8%			

4.9: Association between Diabetes knowledge and Self-care practices

Table 4.9 shows association between of diabetes knowledge and self care-practices. There are no significant between diabetes knowledge and self-care practices p= 0.354.

Table 4.9: Association between Diabetes knowledge and Self care-practices

	Good Practices		Poor practices		x^2	df	p
	n	%	n	%			
Good knowledge	4	3.3%	29	24.2%	0.477	1	0.354
Poor knowledge	7	5.8%	80	66.7%			

Table 4.10 shows association between diabetes knowledge and self care-practice. The result shows there is significant between knowledge on medication intake and practices which p≤0.02 and there is significant between physical activity and practices which is p≤0.036. There are no significant between knowledge on medication, diabetes complication and practices.

Table 4.10: Association between knowledge and self care-practices (n=120)

		Good practices		Poor practices		x^2	df	p
		n	%	n	%			
1.Eating lower in fat	Yes	9	7.5%	95	79.2%	.246[a]	1	.620
	No	2	1.7%	14	11.7%			
2.High blood glucose	Yes	7	5.8%	55	45.8%	.695[a]	1	.405
	No	4	3.3%	54	45.0%			
3.Do not take diabetes medicine	Yes	10	8.3%	109	90.8%	9.992[a]	1	**.002**
	No	1	.8%	0	.0%			
4.Take morning medication but skip	Yes	10	8.3%	99	82.5%	.000[a]	1	.993
	No	1	.8%	10	8.3%			

breakfast								
5.Exercise help in decrease blood glucose	Yes	11	9.2%	77	64.2%	4.404[a]	1	**.036**
	No	0	.0%	32	90.8%			
6.Kidney problem is complication of diabetes	Yes	10	8.3%	95	79.2%	.129[a]	1	.720
	No	1	.8%	14	11.7%			
7.Nerve problem is complication of diabetes	Yes	9	7.5%	83	69.2%	.180[a]	1	.672
	No	2	1.7%	26	21.7%			
8.Lung problem is complication of diabetes	Yes	9	7.5%	83	69.2%	.180[a]	1	.672
	No	2	1.7%	26	21.7%			
9.Stroke is complication of diabetes	Yes	8	6.7%	79	65.8%	.000[a]	1	.986
	No	3	2.5%	30	25.0%			
10.Eye								

problem is complication of diabetes	Yes	9	7.5%	100	83.3%	1.182[a]	1	.277
	No	2	1.7%	9	7.5%			

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Discussion

This chapter will discuss the finding of the study. The discussion will be focusing on descriptive findings in socio demography, glycaemic level, level of diabetes knowledge, and level of self-care practices of respondents. Discussion will also elaborate the association between socio demographic, glycaemic level and diabetes knowledge with self-care practices among the respondents. Then, the conclusions will be drawn in this chapter based on the discussion of the finding with recommendation for further study.

5.2 Socio demographic

This study found that more than half of 120 respondents were 60 years old and above while the rest of the respondents were 59 years old and below. Intentionally, all the respondents are patients who were 40 years and above to ensure that only patient with diabetes type 2 involve in this study. Result of the study show that numbers of female respondents have outcomes the male respondents which give an interpretation that more female is having diabetes than male. That may caused by their physical routine or diet intake.

Most of the respondents in this study are Malay and Indian with both race have score more than 30%. It is due to the population of the area where several villages and

estates are located near to the study area. This study also found that majority of the respondents has been diagnosed with diabetes for duration more than 6 years. Besides that, the result shows that nearly 78% of the respondents have at least primary education which give indication that majority of the respondents have attend formal education. Most of the respondents were married and stay with their families.

5.3 Glycaemic Level

This study found that more than 60% of the respondents failed to perform good control of glycaemic level where their HbA1c have reach 7 % and above.

5.4 Level of Diabetes knowledge

Knowledge is an essential factor in behaviour change and this study identifies that knowledge of the respondents about diabetes was high where the score is higher than 70%. More than 80% of the respondents in this study know that lower fat intake can help in reduce blood glucose but nearly 50% of them not realise that too much fruit intake can increase blood glucose. Result of the study shows that almost 100% of respondents know that they need medicine to control blood glucose but only 70% of them realise that exercise is the another way to control blood glucose. This study also found that more than 70% of the respondents know that kidney problem, nerve problem, lung problem, stroke and eye problem are complications of diabetes.

5.5 Level of Self-care practices

This study found that majority of respondents had poor practice where the score is higher than 90%. More than 50% respondents in this study took high intake of carbohydrate, sweet drink or carbohydrate drink where it is considered as poor

practice in blood glucose control. Result of this study shows that more than 40% of the respondents not having enough and proper exercise to help them control their blood glucose. This study also found that more than 30% of the respondents spend their leisure time for non-physical activity which considered as poor practice in blood glucose control. While only less than 3% of the respondents having proper control by doing regular blood glucose test and modify diet intake or physical activity or medicine to reduce their blood glucose level. This result similar to study done by Padma et al. (2012) where their study found majority of respondent were poor in self-care practice. This may caused by less of family monthly income and educational status.

5.6 Association between Socio-demographic and Self-care practices among Diabetic Type 2

The association between socio-demographic profile and self-practices is found in this study. There is a significant association between age and self-care practices. Contrast with study done by Zehra et al. (2011) whereby their study found no significant association between age and self-care practice. This study shows that respondents who are below than 59 years old have better practice (19.0%) compared with respondent who are 60 years above (3.8%). This may happen because majority of older ages have lack of education according to Tan et al. (2008) that found that educational level is an important variable in improving self-care practice.

There is significant between genders and self-care practices. Between of two genders, male perform more good practices than female. This result similarly study done by Desalu et al, (2011) that found male perform more good practice than female. This may be because of male responsibility on their family.

5.7 Association between Diabetes knowledge and Self-care practices among Diabetic Type 2

This study found association between diabetes knowledge and self-care practices where knowledge of the respondents about diabetes was high. However, majority of the respondents did not follow the recommended self-care practices which means poor in self-care practices. However, 12.1% of respondents with good knowledge of diabetes had better practices compared with 8% of respondents with poor knowledge of diabetes. This result has similarity with study done by Ayele et al. (2012) whereby the study found that knowledge of respondent is very high (94.7%) but majority of them did not follow the recommended self –care practice. This may be associated to factors such as educational status, low income, less of awareness on self-care and not receive formal diabetes education which is supported by study done by Adibe & Aguwa. (2009).This result also has similarity with a study in Ethpiopia by Endalew et al. (2012) that knowledge about diabetes had no significant statistical association with glycaemic control and state that incomes was one of the factors that affect self care behaviour and patient who are had formal education were more adherence on self care.

In contrast, the study done by Karam et al. (2012) found that patients who more self aware about the disease, having knowledge and regularly involved in self care practices achieve better glycaemic control and better management of the disease. Hence, health educations is importance making the patient aware regarding the disease and encouraging self care and help achieve optimal control of the disease with minimal long term complications. One study in USM Malaysia done by Tan &

Magarey, (2009) showed that patients who followed self efficacy education on self care have brought significant improvement on self care.

5.7.1 Medication

Almost of respondents were aware of importance of adherence to medication (91.6%) similarly study done by Adibe & Aguwa. (2009). Most of them (91%) answered that non adherence to medication will increases blood glucose level. This result similarly study done by Ayele et al, (2012).

5.7.2 Exercise

Majority of respondents were aware of importance of regular exercise decrease blood glucose that regular exercise help to control diabetes similarly study done by Adibe & Aguwa. (2009) but most of the respondent were less active and this could be because of not having formal knowledge in term of the benefits of regular physical exercise. (Endalwe et al., 2012).

5.8 Association between HbA1c and Self-care practices among Diabetes Type 2

The findings of this study indicated that inadequate self-care practices significant with poor-controlled blood sugar this finding result similar with had done by Zahra et al. (2011). This also is similar with study done by Al-Sultan & Al-Zanki. (2005). In this study most of respondent had low level of their self–care practices and poor glycaemic control there may be because of longer duration of diabetes which is most of them 6 years and above 10 years, not adherence to dietary plans and less of physical activity. This finding is consistent with that report by Maysaa et al. (2010), longer duration of diabetes association with poor glycaemic control. In their study

found poor glycaemic control was more common among patients who did not follow dietary regimens, did not practice any physical activity, not adherent to medication and not self glucose monitoring. The UK Prospective Diabetes Study (UKPDS) state, longer duration of diabetes is to be associated with poor control because of progressive impairment of insulin secretion with time because of Bcell failure, which makes the response to diet or oral agents Maysaa et al. (2010).

5.9 Conclusion

From this study we can conclude that the proportion of patients with poor self-care practice is high. Longer duration of diabetes, age factor and negative attitude of not adherent to diabetes self-care practice were associated with poor glycaemic control. In this study, it is found that poor glycemic control was common among patients that were not being adherent to self-care practice. Knowledge among patient was high but their self-care practice was poor, resulting only a small percentage of patients being adherent to medication and physical activity. In conclusion, knowledge and self-awareness are important to increase self-care practice among patient and supported by proper self-care practice education by health care provider.

6.0 Limitation

The limitation of the study is Glycaemic level was only reviewed from client record. From n=180 sample only 66.7% sample size achieved due to patients' refusal to answer and limited time. Another limitation of this study is the limited language offered in the questionnaire where only English and Bahasa Malaysia are used.

6.1 Recommendations

An educational program that emphasizes lifestyle modification with the importance of being adherence to treatment regimen would be of great benefit in poor glycemic control. Therefore, patients should be motivated to aware of self-care practice. An educational program is recommended to encourage physical activity and diet regimen adherence with lifestyle modification for better glycemic control. Creating health care team that focus on diabetes is very important and they must be trained to be knowledgeable on diabetes. Involving social support groups such as family members, friends during education program for best result in education programme is strongly suggested. In the other hand, create health education in supportive involve patient in exercise activity especially simple exercise like brisk walking and choose role from previous patient who knowledgeable to help other patient in same illness. Future research could assess the efficacy of cultural to enhance dietary self-care. Future studies also should explore the barriers associated with SMBG practices among population.

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Subject: RE:

From: Ming Yeong Tan (mytan53@hotmail.com)

To: tajrinazwati@yahoo.com;

Date: Friday, October 14, 2011 11:59 PM

Dear Nazawati,

Thank you for your interest in my paper. You may use my self-care questionnaire for your study. Kindly acknowledge it. I appreciate if you could share your results after you have completed your study.

The English version of the questionnaire is already attached as an appendix in the published paper. I do not have the Tamil version. I do not have the soft copy of the Mandarin version. The Malay version of the questionnaire is attached with this mail.

Thank you

Regards,
Ming Yeong

Date: Thu, 13 Oct 2011 23:31:48 -0700
From: tajrinazwati@yahoo.com
To: mytan53@hotmail.com
Subject:

Dear Ming Young Tan,

I am Nazwati Tajri. I am currently doing my Bachelor of Nursing at University Putra Malaysia, Malaysia. I am in my final year of study and I am required to do a research to graduate this program. I have decided to do research on "self practices among type2 diabetic patient". I have been read your studies using ADDQOL questionnaire. I wish to use the same questionnaire as it has also been used in Malaysia, and it is very easy to understand. I would like to know how may I obtain this questionnaire and i need the versions in English, Malay, Mandarin and Tamil.

I am looking forward to your speed reply as I have time consuming difficulty. It will be my honour to use your questionnaires.
Thank you very much.

Research Submission

Date Printed : 09-12-2011 20:58:45

ResearchID :	10598
Research Title :	Self-care Practices of Patients with Type 2 Diabetic
Research Abbreviation :	Self-Care Practices of DM Patients
Approval Type :	Research Registration & Notification

Built PDF By : nazwati binti tajri

Built PDF Date : 09-12-2011 20:58:45

Research Details

Date Printed : 09-12-2011 20:58:45

ResearchID : 10598 **Correspondence Person :** nazwati binti tajri

1.1. Title : Self-care Practices of Patients with Type 2 Diabetic

1.2. Title abbreviate : Self-Care Practices of DM Patients

1.3. Collaborative research :

- ☑ This is NOT a collaborative work with any of the NIH institutes
- ☐ Clinical Research Centre (CRC)
- ☐ Institute for Medical Research (IMR)
- ☐ Institute of Public Health (IPH)
- ☐ Institute for Health Management (IHM)
- ☐ Institute for Health Systems Research (IHSR)
- ☐ Institute for Health Behavioural Research (IHBR)

1.4. Submission purpose :

Institute of Public Health (IPH)

IRB/IEC Medical Research Ethics Committee (MREC)

Research Registration

2.1. Protocol ID :

2.2.1. Student Academic Project : Bachelor

2.2.2. Student Academic Project Specify :

2.3. Research Type : Public Health / Epidemiology

2.4. Clinical Research Sub Type :

Clinical Research

3.0.1. Research Purpose : To determine the self care practices with type 2 diabetes

3.0.2. Research Description : INTRODUCTION

Diabetes is a global problem according to the World Health Organisation (WHO). It is reported that 346 million people worldwide have diabetes where estimated 3.4 million people died because of high blood sugar in 2004. The number of diabetes death estimated will increase between 2005 and 2030 (WHO, 2011). In Malaysia and numbers of diabetes patient with complication is increasing every year. It increment is up to 11% in 2006 (Tan & Magarey, 2008). Diabetes complications can be devastating and it includes heart disease, stroke, and kidney failure, loss of sight, neurological complications and early death (Wichowski & Kubsch, 1999). Studies in Malaysia indicate a high prevalence of sub-optimal control and that diabetes complication are common (Tan & Magarey, 2008). Studies in Malaysia indicate a high prevalence of sub-optimal control and that diabetes complications are common (Tan & Magarey, 2008). So, it is important for diabetes patient to control their glycaemic to prevent complication where patients need to take medication as recommended and know type of medication they taken. Patient adherence to medication, lifestyle changes and the maintaining of adherence to oral antidiabetic medications also important step in reaching long-term glycaemic control (Al-Qazaz et al., 2011). The main problem with diabetes is lower adherence with self care such as low compliance with medication as recommended, less physical activity, not compling with diet plan and not requirement self glucose monitoring. Patients must understand about their medication, diet and must have knowledge of their conditions.

METHODOLOGY

A cross sectional study design will be used. This study will be carried out at Klinik Kesihatan Kuang Gombak to diabetic patients with regular follow up and treatment will be selected randomly for this study. Sample size will be conducted, n=180. Data

3.0.2. Research Description : and medical records of the patient will be reviewed for glycaemic level. All type 2 diabetic males and females receive treatment at the study location. A structured questionnaire adopted from previous study of Tan & Magarey (2008) has been modified to suit Malaysian context. A questionnaire consisting of 75 questions in 4 sections will be distributed to the target group. The questionnaire is provided in two languages Malay and English. Section A contains glycaemic data from patients record. Section B contains socio demographic factors such as age, gender, ethnic and marital status. Section C contains diabetes knowledge assessment questions. Section D contains self-care practices questions. A Likert scale will be use to assess knowledge and self-care activity of diabetic patient. The scoring will be calculated from the scoring for each item. Data will be analysed using the statistical package for Social Sciences (SPSS). Descriptive statistic includes variable means and standard deviation will be used. Categorical ANOVA will be used to analyse internal scaled data. Permission to carry out the study and ethical approval will be obtained from the Ethic Committee, Faculty of Medicine and Health Science, Universiti Putra Malaysia. Besides that, ethical approval will also be obtained from the Medical Research Ethics Committee, Ministry of Health Malaysia.

3.0.3. Keywords : Type 2 Diabetes

3.0.4. Research Date Start : 15/01/2012 **3.0.5. Research Date Completed :** 02/05/2012

3.0.6. Research Duration (months) : 4.0

3.0.7. LinkURL :

3.0.8. Recruitment Status : Not yet recruiting

3.0.9. Condition : Diabetes

3.0.10. Age Limit : **3.0.10.1. Not Available - Not Applicable** **3.0.10.2. Age Limit Min :** 18.0

3.0.10.3. Age Limit Max 99.0

3.0.11. Gender : Both

3.0.12. Eligibility : Inclusion data

All type 2 diabetics male and female receive treatment at study location. Both gender, regardless of ethnicity.

Exclusion criteria

Diabetes categories other than diabetes type 2 such as diabetes type 1 and gestational diabetes. Also excluded if physical or mental impairment that impact on ability to answer independently

3.0.13. Acceptable Participant : Yes

3.0.14. Target No Subject - All / Msian : 180 / 180

3.0.15. Target Number Subject in Malaysia : 1.Total in number : 180

2.Number by site in text: 1

Clinical Trial

3.1.1. Study Phase :

3.1.2. Purpose :

3.1.3. Allocation :

3.1.4. Masking :

3.1.5. Control :

3.1.6. Assignment :

3.1.7. Endpoint :

3.1.8.1. OutcomeMeasure Primary :

3.1.8.2. OutcomeMeasure Secondary :

3.1.9.1. Name of intervention under investigation :

3.1.9.2 Intervention Type :

3.1.10. Therapy Area :

Observational Study

3.2.1.1. Disease Area :

3.2.1.2. Disease Area Specific Disease :

3.2.1.3.Disease Area Other Specify :

3.2.2. Purpose :

3.2.3. Selection :

3.2.4. Duration :

3.2.5. Timing :

Research Sponsor List

Date Printed : 09-12-2011 20:58:45

ResearchID : 10598

Correspondence Person : nazwati binti tajri

Research Title : Self-care Practices of Patients with Type 2 Diabetic

Research Abbreviate : Self-Care Practices of DM Patients

User ID	Contact Name	Email	SponsorType	FundingSource	Institution	Note	CRO/CRA Name
14956	nazwati binti tajri	tajrinazwati@yahoo.com	Investigator Initiated study	Self-funding	Universiti Putra Malaysia (UPM), Faculty of Medicine and Health Sciences		

Research Investigator List

Date Printed : 09-12-2011 20:58:45

ResearchID : 10598

Correspondence Person : nazwati binti tajri

Research Title : Self-care Practices of Patients with Type 2 Diabetic

Research Abbreviate : Self-Care Practices of DM Patients

User ID	Name	Institution	Department	Role	State	Ethics Committee	Email	Note	GFStatus
14956	nazwati binti tajri	Universiti Putra Malaysia (UPM), Faculty of Medicine and Health Sciences		Principal / Coordinating Investigator	Selangor Darul Ehsan	Ethics Approval - Medical Research Ethics Committee (MREC)	tajrinazwati@yahoo.com		

NATIONAL INSTITUTES OF HEALTH APPROVAL FOR CONDUCTING RESEARCH IN THE MINISTRY OF HEALTH MALAYSIA

PENGESAHAN INSTITUSI PENYELIDIKAN NEGARA UNTUK MENJALANKAN PENYELIDIKAN DI KEMENTERIAN KESIHATAN

This is an auto computer - generated document.It is issued by one of the research institute under the National Institutes of Health (NIH). These are the Institute for Medical Research (IMR), Clinical Research Centre (CRC), Institute for Public Health (IPH), Institute for Health Management (IHM), Institute for Health Systems Research (IHSR), and Institute for Health Behavioural Research (IHBR)

Dokumen ini adalah cetakan berkomputer. Borang ini dikeluarkan oleh salah satu institusi dibawah National Institutes of Health (NIH) iaitu Institut Penyelidikan Perubatan (IMR), Pusat Penyelidikan Klinikal (CRC), Institut Kesihatan Umum (IKU), Institut Pengurusan Kesihatan (IPK), Institut Pergurusan Sistem Kesihatan (IPSK), Institut Penyelidikan Tingkahlaku Kesihatan (IPTK)

Unique NMRR Registration ID : [Nombor Pendaftaran]	NMRR-11-983-10598
Research Title : [Tajuk]	Self-care Practices of Patients with Type 2 Diabetic
Protocol Number if available : [Nombor Protokol jika ada]	

#	**Investigator Name** [Name Penyelidik]	**Institution Name** [Nama Institusi]
1	nazwati binti tajri	Pejabat Kesihatan Daerah Gombak

I have reviewed the above titled research, and approve of its design and conduct.

Saya telah menyemak kajian yang bertajuk seperti di atas dan meluluskan rekabentuk dan perlaksanaannya.

Name of Director : *[Nama Pengarah]*	Dr. Tahir Aris
NIH Institute (IMR, CRC, IPH, IHM, IHSR and IHBR) *[Nama Institusi di bawah NIH]*	Institute for Public Health (IPH)
Signature & Official stamp : *[Tandatangan dan Cop Rasmi]*	This is computer generated document, therefore no signature is required.
Date : *[Tarikh]*	14-02-2012

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FAKULTI PERUBATAN DAN SAINS KESIHATAN
FACULTY OF MEDICINE AND HEALTH SCIENCES
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

HELAIAN MAKLUMAT RESPONDEN

Tajuk projek: Amalan penjagaan diri di kalangan pesakit diabetic jenis ke 2

Anda dijemput untuk menyertai kajian ini. Sebelum anda membuat keputusan, adalah penting untuk anda memahami tujuan kajian ini dijalankan dan siapa yang akan terlibat. Sila baca maklumat berikut dengan teliti. Sila bertanya jika ada perkara yang anda ragui atau tidak jelas. Kami amat berterima kasih atas kesudian anda membaca maklumat yang disediakan.

Tujuan kajian ini dijalankan adalah untuk mentukan amalan penjagaan diri di kalangan pesakit diabetic jenis ke 2 di Klinik Kesihatan Kuang Gombak. Dengan kajian ini dapat menambah maklumat dan meningkatkan pengetahuan mengenai amalan penjagaan diri bagi pesakit diabetic di Malaysia.

Apa yang akan saya lakukan dalam pengajian ini?

Anda hanya perlu memberi maklumat dengan menggunakan 4 set borang soal selidik yang akan mengambil masa dalam 15 minit.

Siapakah yang tidak patut melibatkan diri dalam pengajian ini?

Jika anda tidak bersetuju untuk mengambil bahagian dalam kajian ini.

Apakah kebaikan melalui penyelidikan ini?

Kepada anda sebagai subjek

Sumbangan anda dalam memberikan maklumat dalam penyelidikan ini amatlah dihargai dan lebih memahami penjagaan diri dikalangan pesakit diabetic

Kepada Penyelidik

Data yang diperolehi daripada kajian ini akan dapat meningkatkan kualiti perkhidmatan dan jagaan pesakit sama ada di peringkat hospital atau komuniti.

Adakah saya akan mengalami kemungkinan risiko apabila melibatkan diri dalam pengajian ini?

Kajian ini tidak akan membawa sebarang risiko dan kerugian pada anda.

Apakah kemungkinan jika menarik diri

Terpulang pada diri anda sendiri untuk melibatkan diri dalam kajian ini atau tidak. Walaupun anda telah mengambil keputusan untuk melibatkan diri, tetapi anda boleh untuk menarik diri.

Adakah penglibatan saya dalam penyelidikan ini sulit?
Segala maklumat yang diperolehi adalah dianggap sebagai sulit. Nombor kod akan digunakan dan hanya diketahui oleh penyelidik.

Jika anda perlu informasi

Sila hubungi personel berikut untuk mendapatkan maklumat yang selanjutnya.

i) Pengkaji selidik, Bacelor kejururawatan

Nazwati Binti Tajri
Department of Nursing unit,
Faculty of Medicine and Health Sciences,
43400 UPM Serdang.
Tel. No: 012-9008307
Email address: tajrinazwati@yahoo.com

ii)Pemantau projek
Puan Rosna Binti Abdul Raman
Department of Nursing unit,
Faculty of Medicine and Health Sciences,
University Putra Malaysia,
43400 UPM Serdang.
Tel. No: 0193883844
Email address: rosnaar@putra.upm.edu.my

iii) Pembantu pemantau projek
Dr. Huzlinda Bt Hussin
Department of Phatology
Faculty of Medicine and Health Sciences,
University Putra Malaysia,
43400 UPM ,Serdang. Tel. No: 017-6724549
Email: Huzlinda@medic.upm.edu.my

FAKULTI PERUBATAN DAN SAINS KESIHATAN
FACULTY OF MEDICINE AND HEALTH SCIENCES
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

RESPONDENT'S INFORMATION SHEET

Please read the following information carefully, do not hesitate to discuss any questions you may have with your researcher.

STUDY TITLE
Self-Care Practices of Patients with Diabetes Type 2

INTRODUCTION

You have been invited to take part in a research study. Before you make a decision, it is important for you to understand why the research is being done and what it will involve. Please take some time to read the following information carefully. Please do not hesitate to ask any question if you are not clear and would like more information. We like to thank you for reading this information sheet.

The purpose of this study to determine Self care- practices among type 2 diabetes patients with glycaemic control Klinik Kesihatan Kuang at Gombak. This information and study also increases the information and knowledge regarding self-care practices among diabetic patient in Malaysia.

WHAT WILL YOU HAVE TO DO?

You will only be required to provide information as stated in the questionnaire form that provided, which should take about fifteen minutes.

WHO SHOULD NOT ENTER THE STUDY?

If you not agreeable to take part in this study

WHAT WILL BE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

Your contribution is valuable in providing information for further understanding of the Self care practice among type 2 diabetes patient with uncontrolled glycaemic level

b) TO THE INVESTIGATOR?

The information and data from this study will be used to improve the quality of

Services either hospital or primary care setting

ARE THERE ANY RISKS?

The study will not cause any harm or risk to you.

WHAT ARE THE POSSIBLE DRAWBACKS?

It is up to you to participate or not. Even you are decides to take part, you are still free to withdraw at any time without giving any reason.

WILL THE INFORMATION AND MY IDENTITY REMAIN CONFIDENTIAL?

All information you are giving to us in this study will be kept strictly confidential and only will be used in this study.

WHO SHOULD I CONTACT IF I HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any question about this questionaire, please do not hesitate to contact the following personnel :

Researcher :

Nazwati Binti Tajri
Department of Nursing unit,
Faculty of Medicine and Health Sciences,
43400 UPM Serdang.
Tel. No: 012- 9008307
Email address: tajrinazwati@yahoo.com

ii)Project Supervisor

Puan Rosna Binti Abdul Raman
Department of Nursing unit,
Faculty of Medicine and Health Sciences,
University Putra Malaysia,
43400 UPM Serdang.
Tel. No: 0193883844
Email address: rosnaar@putra.upm.edu.my

iii) Co-supervisor

Dr. Huzlinda bt Hussin
Department of Pathology
Faculty of Medicine and Health Sciences,
University Putra Malaysia,
43400 UPM ,Serdang. Tel. No: 017-6724549
Email: Huzlinda@medic.upm.edu.my

FAKULTI PERUBATAN DAN SAINS KESIHATAN
FACULTY OF MEDICINE AND HEALTH SCIENCES
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

BORANG PERSETUJUAN (RESPONDEN)

TAJUK PENYELIDIKAN : **Amalan Penjagaan Diri di Kalangan Pesakit Diabetic Jenis Ke 2**

PENYELIDIK : **NAZWATI BINTI TAJRI**

Saya ..... No Kad Pengenalan. .....
alamat.....
.....dengan ini bersetuju untuk mengambil bahagian di dalam kajian ini*(kajian klinikal, kajian soal selidik/ percubaan dadah ubatan) seperti yang dinyatakan di atas.

Saya telah dimaklumkan mengenai sifat penyelidikan klinikal dari segi metodologi, mungkin kesan buruk dan komplikasi (rujuk Helaian Maklumat). Saya faham bahawa saya mempunyai hak untuk menarik diri daripada kajian ini klinikal pada bila-bila masa tanpa memberikan apa jua sebab. Saya juga faham bahawa kajian ini adalah sulit dan semua maklumat yang diberikan mengenai identiti saya akan kekal sulit dan persendirian. Saya juga dengan ini membenarkan rekod rawatan saya digunakan digunakan untuk tujuan kajian di atas.

Saya ingin * tahu / tidak ingin mengetahui keputusan ujian yang dilakukan ke atas sampel saya.

* potong mana yang berkenaan

Tandatangan ..... Tandatangan.....
(*Responden*) (*saksi*)

Tarikh :..... Nama :.....

No I/C. :.....

I confirm that I have explained to the respondent the nature and purpose of the above –mentioned clinical research.

Tarikh ..... Tandatangan .....
(Penyelidik)

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SELANGOR, MALAYSIA

CONSENT FORM (RESPONDENT)

RESEARCH TITLE : **Self-Care Practices of Patients with Diabetes Type 2**

RESEARCHER : **NAZWATI BINTI TAJRI**

I ..... Identity Card No. .....
address.....
....hereby voluntarily agree to take part in the clinical research *(clinical study, questionnaire study/ drug trial) specified above.

I have been informed about the nature of the clinical research in terms of methodology, possible adverse effects and complications (refer to Information Sheet). I understand that I have the right to withdraw from this clinical research at any time without assigning any reason whatsoever. I also understand that this study is confidential and all information provided with regards to my identity will remain private and confidential. I also agree my treatment record being use for the above research.

I wish to *know/don't wish to know the results of the tests performed on my sample.

* delete where necessary

Signature ..... Signature .....

(*Respondent*) (*Witness*)

Date :..... Name :.....

I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above – mentioned clinical research.

Date ..... Signature .....

(Researcher)

Kaji Selidik Aktiviti Penjagaan Diabetes

Self-care practice activities

Tarikh/ *Date:*_____

A.Data Demografik

No ID:_____ Pusat: _____
ID NO *Canter*

Umur: _____ tahun
Age *Year*

Jantina: □1 Lelaki □2 Perempuan
Gender *Male* *Female*

Bangsa: □1 Melayu □2 Cina □3 India □4 Lain-lain
Race *Malay* *Chinese* *Indian* *Others*

Tempoh masa mengalami Diabetes: _____tahun _____ Tidak pasti
Duration of diabetes *Year* *Not sure*

Status perkahwinan: □1 Bujang □2 Berkahwin □3 Bercerai □4 Bertisah □5 Janda
Marital status: *single:* *married:* *divorced:* *separated:* *widowed:*

Pendidikan: □1 Tidak pernah □2 Rendah □3 Menengah □4 Kolej □5 Univeristi
Education: *never* *primary* *secondary* *college* *tertiary*

Tinggal bersama: □1 Keluarga □2 Kawan □3 Sendiri □4 Lain-lain
Living with: *family* *friends* *alone* *others*

B.Garis dasar HbA1c: _____% (tarikh diambil :_____)

C. Asas Pengetahuan Diabetes/*Diabetes knowledge*

1. Makan makanan rendah lemek merendahkan risiko buah pinggang
   Eating lower in fat reduce your risk of developing kidney problem
   Ya /*Yes* ☐ Tidak/ *No* ☐
2. High blood glucose can be cause by taking too much fruit
   Ya/*Yes* ☐ Tidak/*No* ☐
3. Jika anda mengambil ubat diabetes tablet atau cucuk waktu pagi tetapi tidak sarapan, darah akan meningkat
   If you take your morning diabetes tablets/insulin injection but skip breakfast, your blood glucose level will usually Increase
   Ya/*Yes* ☐ Tidak/ *No* ☐

4. Jika anda tidak mengambil ubatan diabetes seperti yang diarahkan oleh doctor,gula dalam darah biasanya akan meningkat

If you do not take your diabetes medicine prescribed by your doctor, your blood glucose level usually increase

Ya/Yes ☐ Tidak/ No ☐

5. Senaman membantu merendahkan gula dalam darah
   Exercise help in decrease blood glucose
   Ya/Yes ☐ Tidal/ No ☐

6. Masaalah mata adalah komplikasi diabetes
   Eye problem is complication of diabetes Ya/Yes ☐ Tiak/ No ☐

7. Saraf adalah komplikasi diabetes
   Nerve Problem is complication of diabetes Ya/Yes ☐ Tidak /No ☐

8. Masaalah paru-paru adalah komplikasi diabetes
   Lung Problem is complication of diabetes Ya/Yes ☐ Tidak /No ☐

9. Angih ahmar adalah komplikasi diabetes
   Stroke is complication of diabetes Ya/Yes ☐ Tidak /No ☐

10. Masaalah buah pinggang adalah komplikasi diabetes
    Kidney problem is complication of diabetes Ya/Yes ☐ Tidak/ No ☐

D. Aktiviti Penjagaan Diri

i)Pemakanan/*Diet*

1. Saya makan makanan berkarbohidrat seperti nasi,mee, behoon, roti
   I eat carbohydrate such as rice, noodles, beehoon,bread
   ☐$_1$ 1 kali sehari ☐$_2$ 2 kali sehari ☐$_3$ 3kali sehari ☐ 4 kali sehari ☐ >5

2. Saya makan makanan tinggi lemak seperti daging merah atau makanan tenusu tinggi lemak sebanyak
   I est high fat food such as red meat, dairy food
   ☐$_1$ 0 kali sehari ☐$_2$ 1 kali sehari ☐$_3$ 2kali sehari ☐ 3 kali sehari ☐ Tidak tentu

3. Saya makan makanan segera atau makanan ringan
   I eat junk food
   ☐$_1$ 0 kali sehari ☐$_2$ 1 kali sehari ☐$_3$ 2kali sehari ☐ 3 kali sehari ☐ Tidak tentu

4. Saya makan buah-buahan
   I eat fruit
   ☐$_1$ 0 kali sehari ☐$_2$ 1 kali sehari ☐$_3$ 2kali sehari ☐ 3 kali sehari ☐ >4

5. Saya minum minuman manis (atau minum minuman berkarbohidrat seperti milo, vitagen, rebena, horlick, susu, kacang soya)

I drank sweet drink (carbohydrate dink,milo,vitagen,rebena,hirlicks,milk,soy)
□1 0 kali sehari □2 1 kali sehari □3 2kali sehari □ 3 kali sehari □ Tidak tentu

6. Saya makan pemanis mulut
I eat dissert
□1 0 kali sehari □2 1 kali sehari □3 2kali sehari □ 3 kali sehari □ Tidak tentu

ii)Ubatan/*Medication*

1. Dalam seminggu, terdapat beberapa hari saya tidak mengambil ubatan kencing manis/suntikan kencing manis?
In one week I missing take medication
□1 0 kali sehari □2 1 kali sehari □3 2kali sehari □ 3 kali sehari □ Tidak tentu

2. Dalam seminggu saya memerlukan pertolongan orang lain untuk mengambil ubatan/suntikan kencing manis
In one week I need help to take medication
□1 0 kali sehari □2 1 kali sehari □3 2kali sehari □ 3 kali sehari □ Tidak tentu

iii)Aktiviti fizikal/ *Physical activity*

1. Saya melakukan senaman
□1 >4 □2 3 kali seminggu □32 kali seminggu □4 1kali seminggu □4 0
I do excereise
□>4 □2 *3per week* □3 *2per week* □ *1per week*

2. Senaman yang saya lakukan adalah

□1 Senama berat (Degupan jantung laju dan meringkatkan pernafasan)
(Contoh: berlari, jogging, bola sepak, skuash, bola keranjang, giat bernang, berbasikal jarak
juah, tenis)
□2 Senaman Sederhana (Sedikit kesan kenaikan pada degupan jantung atau pernafasan)
(Contoh: berjalan cepat, berbasikal, bola tampar, badminton, Ping pong, berenang santai, tarian
poco-poco, bowling)

□3 Senaman ringkas (kesan yang minima)
(Contoh seperti yoga, golf, berjalan sontai, Tai Chi, seni senaman Cina, memancing ditepi, sungai, memanah)

3. Setiap kali senaman saya memperuntukan masa

I spen time to exercise
□1 >31 minit □2 16-30 minit □3 6-15 minit □4 5 minit □5 Tiada

The exercise I do

□*Mild exercise (yoga, easy, walking, tai chi, fishing, archery)*
□*Moderate exercise (badminton, swimming, tennis, volleyball)*
□*Strenuous exercise (running, jogging, foot ball, squash, long distance bicycling)*

4. Aktiviti masa lapang saya
   □1 Berbasikal/ Cycling
   □2 Berjalan sekeliling rumah/ Walkinh around home
   □3 Menonton televisyen/membaca buku/majalah/surat khabar/mengguna computer

During leisure activity I
□1 *Watching television/reading/magazine/paper/computer*
□2 *Walk around house/apartment*
□3 *Cycling*

5. Semasa waktu lapang saya membaca, bermain computer
   □*Tiada*
   □*jarang-jarang*
   □*kadang-kadang*
   □*hampir setiap masa*
   □*sepanjang masa*

I reading book, magazine, mews paper, computer during leisure time
□*Never*
□*seldom*
□*Sometimes*
□*Most of times*
□*All of tomes*

6. Saya berkebun semasa waktu lapang dalam seminggu

   □kerap
   □hampir kerap
   □kadang-kdang
   □jarang-jarang
   □tiada

I do gardening during leisure time per week
□*All of times*
□*most of times*
□*Sometimes*
□*Seldom*
□*Never*

iv)Pemeriksaan sendiri gula dalam darah (SMBG)/ *Self monitoring blood glucose(SMBG)*

1. Saya melakukan pemeriksaan sendiri gula dalam darah
   □1 ≥4 □2 3 kali seminggu □32 kali seminggu □4 1kali seminggu □4 0
   I do self monitoring blood gluose
   □1 ≥4 □2 *3per week* □3 *2per week* □41

2. Saya mengubah corak pemakanan, aktiviti fizikal, pengambulan ubatan berdasarkan bacaan gula

   □1 ≥4 □2 3 kali seminggu □32 kali seminggu □4 1kali seminggu □4 0
   I change my diet according to glucose reading
   □1 ≥4 □2 *3per week* □3 *2per week* □41

Terima kasih diatas peryertaan anda
Thank you for your participation