SELF-CARE ACTIVITIES AMONG TYPE 2 DIABETES MELLITUS AND GLYCAEMIC CONTROL IN KLINIK PAKAR PERUBATAN, HOSPITAL UNIVERSITI SAINS MALAYSIA

ROZILA BINTI MAMAT

SCHOOL OF HEALTH SCIENCES

UNIVERSITI SAINS MALAYSIA

2013

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by

ROZILA BINTI MAMAT

Dissertation submitted in partial fulfilment of the requirements for the degree of

Bachelor of Health Sciences (Nursing)

June 2013

ACKNOWLEDGEMENT

Alhamdulillah. First and foremost thank you Allah for the bless that allow me to complete this work. I wouldn't have strength to finish this final year project without His permission and His help. He gave me physical and mental strength as well as sent me people that can make my work easy.

This thesis also might not been completed without the help and support from my supervisor, Madam Rosmawati Mohamed. I am extremely grateful having her as my supervisor in completing this study. I owe my deepest gratitude for her constant and invaluable guidance, advice, support, and supervision in this Bachelor degree final year project.

Besides, I am very much grateful to my friends, all the respondents and everyone who involve directly or indirectly in completing my thesis. Thank you to my course mates and my close friends for giving me support, advice and help. It is also a pleasure to thank all respondents for spending their time in answering my questionnaire.

Last but not least, these acknowledgments would not be completed without thanking my parents, Mamat bin Yusoff and Hasmah bt Umat for their constant support and care. Today I feel that my parents' hard work and dreams have been blossomed. Surely, I also would like to show my gratitude to all of my siblings that helps me a lot. Without your love and helping, I would never finish it successfully

Thank you so much everyone.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PAGE

TITLE

LIST OF ABBREVIATIONS

T2DM	Type 2 Diabetes Mellitus
SCA	Self-care activity
HbA1c	Glycosylated haemoglobin
FBS	Fasting blood sugar
KPP	Klinik Pakar Perubatan
HUSM	Hospital Universiti Sains Malaysia
ADA	American Diabetes Association
HBM	Health Belief Model

OPERATIONAL DEFINITION

Terms		Definition
Type 2 Diabetes Mellitus	:	Diabetes is a metabolic disorder of multiple etiologies characterized by chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long term damage, dysfunction and failure of various organs (WHO, 1999). In this study Type 2 Diabetes Mellitus (Formerly Non-Insulin-Dependent Diabetes Mellitus) is results from a decreased sensitivity to insulin (insulin resistance) or from a decreased amount of insulin production. It occurs most frequently in patients older than 30 years and in patients with obesity (Brunner & Suddarth's, 2010). Type 2 Diabetes Mellitus is a patient who comes to the clinic to get the diabetic treatment and regular follow up in Klinik Pakar Perubatan in HUSM.
Glycaemic control	:	Glycaemic control remains an elusive goal for most patients with diabetes. Poor diabetes control is defined as the mean of minimum three fasting blood glucose levels of more than 7 mmol/L in the last year while good diabetes control mean of minimum three fasting blood glucose levels of 7 mmol/L and less in the previous year (WHO, 2012).

HbA1c : Glycoslated/ glycated haemoglobin results from linkage of glucose to erythrocyte haemoglobin. Because the average erythrocytes 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 decrease incidence of microvascular diabetes complications. The recommended goal of HbA1c is ≤ 6.5 %. HbA1c correlates with the mean daily blood glucose (Tan M.Y, 2009).

Self-Care Activities : Self-care in diabetes has been defined as the individual's self-identified management abilities (Atlas Diabetes Association, 2002). These self-care management abilities include the capability to use diabetes knowledge to balance physical, emotional, and activity levels and manage medications and nutritional intake to achieve optimal glycaemic control (ADA, 2003). In this study, the self-care activities will be divided into four components which are healthy diet, physical activity, medication intake and also self monitoring blood glucose.

Outpatients patients : A patient who is not hospitalized, but instead comes to a hospital or clinic for treatment (Medical Dictionary, 2013). In this study, the outpatients' clients are the diabetes patients who actively follow up and get treatment in Klinik Pakar Perubatan (KPP), hospital USM.

ABSTRACT

The purpose of this cross-sectional study is to determine the self-care activities among type 2 diabetes mellitus and glycaemic control at Klinik Pakar Perubatan (KPP), Hospital USM. The health belief model was used as the theoretical framework of the study. 140 patients who were diagnosed with type 2 diabetes mellitus were allocated into this study. Before they enroll in this study, respondents were consented and being informed regarding the protocol of the study. A pilot study had been done among 30 respondents to check the reliability and validity of the study. Fasting blood sugar especially on HbA1c was also measured as the baseline's data. Score of self-care activities was evaluated during the data analysis. The Spearman's and Pearson correlation were used to test whether there was any significant association between score of self care activities practices and glycaemic control which involved the FBS and HbA1c. Before performing the analysis, data was tested in term of normality and fulfill several assumptions of correlation test. Then, the analysis shows that there was a significant association ($p<0.05$) with the negative correlation since r value were -0.468 for FBS and -0.475 for HbA1c. The findings showed that majority of the respondents (61.4%) practice moderate self-care activities. Significant association was found between age, gender, educational and marital status to the self-care practices among type 2 diabetic patients. There is a need for health care professional to empower the knowledge and awareness of diabetic patients towards self-care activities. It is hope that this study will help to expand the knowledge and serve as a reference to help improve the management of diabetes in Malaysia as well as improve nursing service and related research.

ABSTRAK

Tujuan kajian keratan rentas ini adalah untuk menentukan aktiviti-aktiviti penjagaan diri di kalangan pesakit diabetes jenis 2 dan kawalan glukosa di dalam darah di Klinik Pakar Perubatan (KPP), Hospital USM. Model kepercayaan kesihatan telah digunakan sebagai rangka kerja teori kajian. 140 pesakit yang disahkan menghidap diabetes jenis 2 dan menerima rawatan susulan di KPP telah diperuntukkan dalam kajian ini. Sebelum mereka mendaftar dalam kajian ini, responden telah bersetuju dan dimaklumkan mengenai protokol kajian. Kajian rintis telah dilakukan di kalangan responden untuk memeriksa kebolehpercayaan dan kesahihan soalan. Bacaan FBS dan HbA1c juga diukur sebagai data asas. Skor aktiviti penjagaan diri telah dinilai semasa analisis data. Ujian Spearman dan korelasi Pearson telah digunakan untuk menguji perkaitan yang signifikan antara skor aktiviti amalan penjagaan diri dan kawalan glukosa darah. Sebelum analisis, data telah diuji dari segi normaliti dan memenuhi beberapa andaian ujian korelasi. Kemudian, analisis menunjukkan terdapat hubungan yang bererti ($p < 0.05$) dengan korelasi negatif kerana nilai r adalah -0,468 untuk FBS dan -0,475 untuk HbA1c. Hasil kajian menunjukkan bahawa majoriti responden (61.4%) mengamalkan aktiviti penjagaan diri pada tahap yang sederhana. Perkaitan bermakna didapati antara umur, jantina, pendidikan dan status perkahwinan dengan amalan penjagaan diri di kalangan pesakit diabetes jenis 2. Adalah diharapkan kajian ini akan membantu untuk mengembangkan pengetahuan dan sebagai rujukan untuk membantu meningkatkan pengurusan diabetes di Malaysia serta meningkatkan perkhidmatan kejururawatan dan penyelidikan yang berkaitan diabetes.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Diabetes Mellitus (DM) is the most common non-communicable diseases which is a serious debilitating and deadly disease causing significant mortality and morbidity globally (Mastura, 2008). It is a major cause of heart disease and stroke making it become the seventh leading cause of death in the United States (National Diabetes Fact Sheet, (Department of Health and Human Services, 2011). Diabetes becomes an important public health concern because there is a rising trend in the prevalence of diabetes due to many factors such as population growth, aging urbanization and increasing prevalence of obesity and physical inactivity globally (Zanariah & Isa, 2010)

According to World Health Organization (WHO, 2012) reported the prevalence of diabetes is more than 346 million people worldwide have diabetes and this number is likely to more than double by 2030 without intervention. In large numbers of adult population, it also estimated 3.4 million people died from consequences of high blood sugar in 2004 (WHO, 2012) while record obtains from International Diabetes Federation (IDF) estimates that 3.9 million deaths will be caused by diabetes in 2010 which represents 6.8% of the total global mortality (Ellis, 2010).

In United State, the total prevalence of diabetes is about 25.8 million children and adults or about 8.3% of the population in 2011 (American Diabetes Association, 2012). Furthermore, American Heart Association, 2011 in American shows that approximately 1.6 million new cases of diabetes are diagnosed every year. Asian countries contribute to

more than 60% of the world's diabetic population and the prevalence among adults aged 20-70 years is expected to rise from 285 million in 2010 to 438 million by the year 2030 (Ambady Ramachandran, 2012). India, which currently has the largest numbers of diabetic patients, are predicted to rise from 31.7 million to 79.4 million in 2000 to 2030. Other than that, China shows increasing from 20.8 million in 2000 to 42.3 million by 2030 (Pradeepa & Mohan). Ramachandran et al, 2012 also state that the prevalence Chinese adults had diabetes had increased to nearly 10% from less than 1% in 1980 to 2008.

In Philippines, the prevalence of diabetes showed increasing in number by 4.6 % in 2003 to 7.1 % in 2008 (Guzman-Quizon, 2011). Estimation by World Health Organization (WHO), Malaysia would have a total number of 2.48 million diabetics in 2030 compared to 0.94 million in 2000 (Mafauzy, 2006b). According to Disease Control Division of MOH, 2012, estimates that the number of people with diabetes will raise to 500 million within generation, killing over 4 million people each year prematurely and costing the global economy an estimated US$378 billion in health care spending.

Moreover, based on National Health and Morbidity Survey, (NHMS 111) 2011, 2.6 million (15.2 %) of Malaysian are suffering from diabetes. Mafauzy M. stated in the Malaysian Diabetes Conference that "the rate of increase in diabetes cases is staggering. In Malaysia alone, 1.8 million people were diagnosed with diabetes in 2010, a significant increase from 1.4 million in 2006" (Malaysian Endocrine & Metabolic Society, 2011). Kelantan which is the famous state in Malaysia contribute about 22 459 active patients in diabetes in 90.7% coverage (Registry, 2012).

According to annual report Ministry of Health Malaysia indicated that there are rapid increase in the prevalence of diabetes patients on active follow up which is 554 000 to 629 152 in 2008 and 2009. Report also highlight that Kelantan is one of two states that has least optimal control of blood sugar level control (HbA1c <6.5%) in Malaysia.

Diabetes is a major global issue because it may cause a serious debilitating and deadly disease causing significant mortality and morbidity globally (I Mastura, 2008a). World health organization (WHO) mentioned that the average life expectancy of individual with diabetes is shortened by 10-15 years (WHO, 1999). Diabetes also is the 7th leading cause of death in United States in 2007 (Jiaquan Xu, 2010). 30% of people with diabetes develop diabetic neuropathy leading to a range of problems including from foot ulceration, sexual difficulties, cardiac arrhythmias and sudden death (David & Bush, 2009).

Individuals with poor management of diabetes are at a greater risk of developing long-term micro and macro-vascular complications that lead to the damage of end organs such as kidney, heart, brain and eyes, affects the direct and indirect health care costs and overall quality of life (Mohamed E.E. Shams, 2010). These complications implies burden to total health care spending on the disease worldwide which estimated to be US$ 213 billion and US$ 396 billion by year 2025 (Salmiah, 2009).

The most effective strategies in managing a disease are by improve the prevention strategies because prevention is better than cure. The best prevention strategy in managing diabetes patients is by empowering patients for more than good self-care (Ministry of Health, 2012). The management of diabetes self-care is largely on patient's

responsibility because it is easier to manage diabetes on the earlier stage. This change requires them to make many dietary and lifestyle changes like as their motivation to eat, exercise, take medication, test glucose levels, and maintain a normal body weight all vie with life's other motivations (Collins, M. et al, 2009). Non-adherence or non-compliance to medication, poverty, lack of knowledge and poor follow up are the main factors observed in poor glycemic control. Lifestyle modification including weight loss, changes in diet and increased physical activity also plays a major role in controlling the disease (Clinical Practices Guidelines of MOH, 2009).

1.2 Problem statement

Diabetes mellitus is a chronic metabolic disorder, which is usually manifested as hyperglycaemia and glycosuria due to lack of insulin or to its biological ineffectiveness that resulting in a wide range of abnormalities of carbohydrate, fat and protein metabolism (Bajaj, 2004). There is a global epidemic of diabetes when the prevalence among adults aged 20-70 years is expected to rise from 285 million in 2010 to 438 million by the year 2030 (Ambady Ramachandran, 2012). The developing countries are particularly at high risk even though this increasing occurring in all nations' results from population ageing, unhealthy diet, obesity and a sedentary lifestyle Diabetes affects everyone include men, women, the elderly and also the children.

The diabetes study among youth in United State postulated that diabetes is one of the leading chronic diseases in childhood and adolescence, affecting 1.82 of 1000 young people in the United State (Pediatrics., 2006). In large numbers of adult population, it

also estimated 3.4 million people died from consequences of high blood sugar in 2004 (WHO, 2012) while record obtains from International Diabetes Federation (IDF) estimates that 3.9 million deaths will be caused by diabetes in 2010 which represents 6.8% of the total global mortality (Egede & Ellis, 2010). (Figure 1)

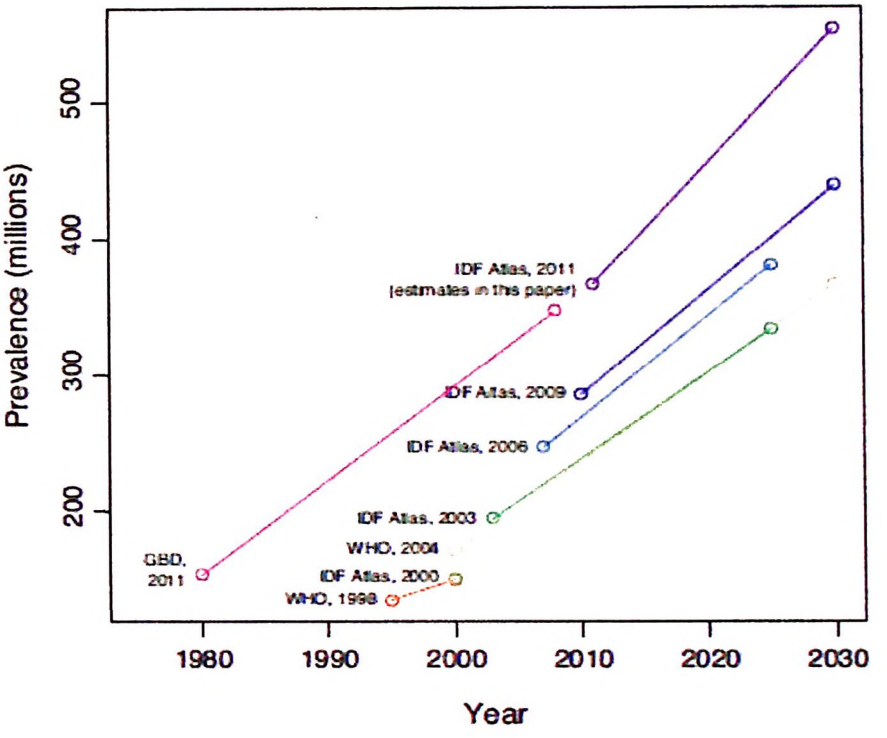

Figure 1: Increasing in the prevalence of diabetes by World Health Organization and International Diabetes Federation

Source:WHO (2012), IDF (2004)

Perlis	9,039	9,696	40,815	38,011	1,190	1,740
Kedah	49,115	71,777	171,372	176,863	5,875	5,797
Pulau Pinang	27,147	31,895	101,904	102,633	5,233	5,427
Perak	68,372	68,372	255,647	314,066	4,907	6,521
Selangor*	101,689	104,137	317,916	358,203	11,067	12,074
FT Kuala Lumpur	20,523	23,728	106,662	109,107	3,600	3,370
Negeri Sembilan	35,841	39,393	119,206	125,447	3,294	3,621
Melaka	31,316	31,427	73,467	84,949	2,996	2,040
Johor	74,715	87,645	265,918	488,411	7,712	9,987
Pahang	40,920	43,871	159,516	184,814	6,885	6,919
Terengganu	16,944	18,433	78,842	92,258	2,993	2,875
Kelantan	24,774	224,774	135,602	33,662	5,709	3,342
Sabah	9,205	9,155	26,926	32,667	979	1,497
FT Labuan	535	n.a.	1,307	n.a	58	n.a
Sarawak	64,848	64,848	189,749	181,872	4,773	4,869
Total	**574,983**	**629,151**	**2,044,849**	**2,322,963**	**67,271**	**70,079**

Figure 2: Distribution number active diabetes patients in Malaysia by state, 2008 and 2009

Source: Annual report Ministry Of Health Malaysia, 2009

Diabetes is one of the most important global health issues. Recently, the prevalence of diabetes has been dramatically increasing in the world (Huang et al, 2010). By the year 2030, over 85 percent of the world's diabetic patients will be in developing countries (Mehta *et al.*, 2009). As a developing country, Malaysia has an increasing prevalence of diabetes as well. According to National Health and Morbidity Survey II &III, the prevalence of diabetes in Malaysia has increased from 8.3% in 1996 to 14.9% in 2006 (Mastura, 2009). Moreover, annual report from ministry of health state that there are also increasing in the number of active follow up diabetes patient between 2008 and 2009 which are 554000 and 629151 in 2009 (Annual Report of Ministry of Health, 2009). (Figure 2)

In a study in Kelantan, the prevalence of diabetes was reported to be higher at 10.5 % (Mafauzy, 2006a) .This statistic shows that Kelantan also has increasing in the diabetes statistic every year which is 25,500 diabetes sufferers with 4,038 new cases on 2011. (State women and family development and health committee chairman, Wan Ubaidah Omar, 2012 in the News Straits Time Press, 2012). The complications of diabetes will increase with the increasing in the prevalence of diabetes in this state. Furthermore, Kelantan is one of state that has high prevalence of diabetes which is tenth place in 2008 but in ninth place in 2009 in Malaysia (Annual Report of Ministry of Health, 2009). It also state that Kelantan has least optimal control of blood sugar level which is just 8.1% in 2009. (Figure 3)

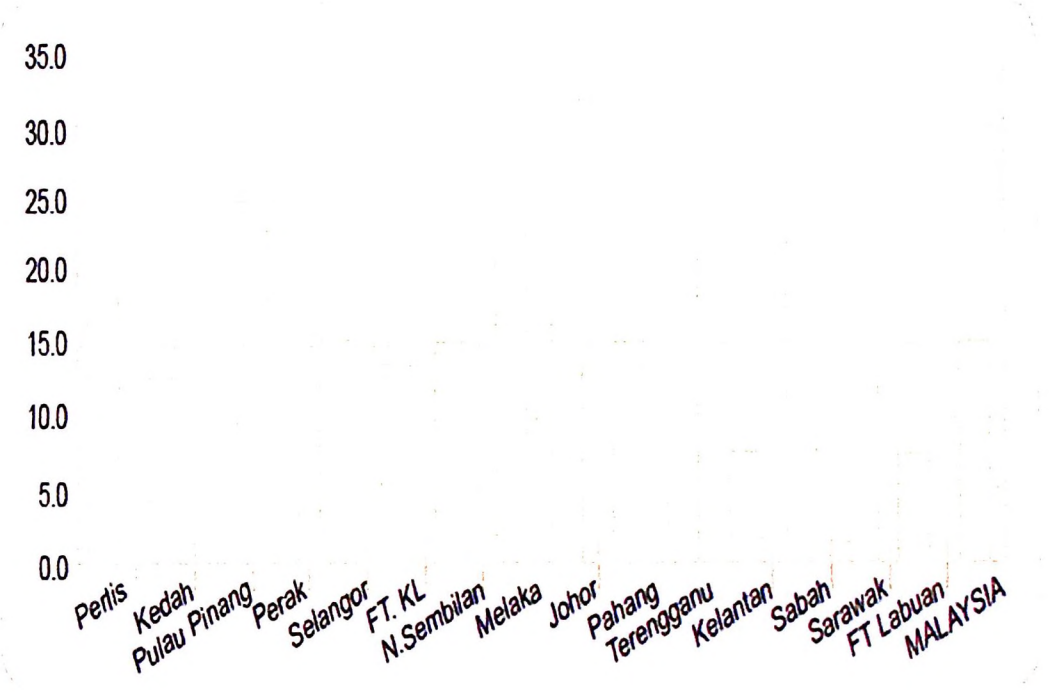

Figure 3: Percentage distribution of patients with HbA1C <6.5% by state.

Source: Annual report Ministry Of Health Malaysia, 2009

In Klinik Pakar Perubatan, there is an increasing trend of diabetes patient from 2009 (5732 patients), 2010 (8995 patients), 2011 (8431 patients) and 2012 (8446 patients). Although in year 2011, the figure had decreased to 8431 patients, but it is still a high numbers patients with diabetes in HUSM. There is also increasing in the number of patients came for diabetic treatment from January to December every year (Unit Rekod, Hospital USM).

Other than that, the self care activities are very important in managing can be prevent by empowering the self care activities in their daily life. Unfortunately, many studied done by the previous researcher found that the self care activities is lacking among Type 2 Diabetes Mellitus patient. Then, there are a few studies regarding self-care activities among diabetes have been done in Malaysia but no similar study done to assess the self-care activities among diabetes patients in Kelantan especially in Hospital Universiti Sains Malaysia (HUSM). So, I think it is very meaningful and significant for me to do my study regarding that.

The theoretical theory used in this study is Health Belief Model (HBM). In this study, the self care activities that have been practice by Type 2 Diabetes Mellitus patient can be described by using HBM. Health Belief Model explained to us that the effective's modification of healthy behavior may cause changes in individual's belief that will leads to the increasing in health related action. This theory shows us that the demographic data like as age, gender, duration of having diabetes, marital status and educational level play a very important role to indicate the possibility of the individual to practice self-care activities in order to empowering the management chronic illness.

Usually the individual will seek for the information regarding the disease, Type 2 Diabetes Mellitus before they are ready to adapt or practices with the health related action. The information's usually found by their own experienced or health educations from the health care provider like as doctors, nurses and dietitian or sometimes through the media such television, radio and so on. This phase is known as cues to action that leads to the readiness to practices self-care activities.

Besides that, the patients also will face the perceived to the seriousness to the diabetes and perceived to the barriers. Perceived seriousness of Type 2 Diabetes mellitus is when patient belief that they are in high risk of having diabetes complications results from uncontrolled diabetes and poor glycaemic control. Then, they also believe that their disease will become worst if they are not going to practice a healthy lifestyle by practicing the healthy self- care activities. Patients will received the perceived of barriers when they do not get enough and appropriate information regarding self-care activities. This occurs when the health care provider is unable to give health education regarding self-care activities.

Then, when the patients perceived the seriousness of the diabetes and barriers of practicing self-care activities plus the modifying factors, it make them a positive reinforcement in making a change in their health related action which is the readiness to practice self-care activities. This readiness will leads to the increasing in the self efficacies that is the major factors in ability to carry out self care activities in their daily life. So, good self-care activities will give the result in good diabetes and glycaemic control among the Type 2 Diabetes Mellitus patients.