UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH LEVEL OF GLYCAEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN SELECTED HEALTH CLINICS IN KUALA SELANGOR, MALAYSIA

NURUL AIN BINTI ABDULLAH

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By

NURUL AIN BINTI ABDULLAH

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FACTORS ASSOCIATED WITH LEVEL OF GLYCAEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN SELECTED HEALTH CLINICS IN KUALA SELANGOR, MALAYSIA

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NURUL AIN BINTI ABDULLAH

November 2018

Chairman : Suriani binti Ismail, PHD
Faculty : Medicine and Health Sciences

Introduction: Type 2 diabetes mellitus (T2DM) is the most common form of diabetes affecting more people worldwide.

Aims and objectives: The objective of this study is to determine the factors associated with glycaemic control (HbA1c) among T2DM patient at Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang, Kuala Selangor. The factors assessed were socio-demographic characteristics, T2DM medical history, diabetes knowledge, health literacy, adherence to treatment, diabetes self-care activity, diabetes quality of life, physical activity body mass index (BMI) and level of glycaemic control.

Method: This is a cross - sectional study. 200 T2DM patients selected by random sampling received a guided self - administered questionnaire. The questionnaire consisted of socio-demographic variables, T2DM medical history, Michigan Diabetes Knowledge Test (MDKT), Short Test of Functional Health Literature in Adult (S-TOFHLA), adherence to treatment, Summary of Diabetes Self-care Activity (SDSCA), Diabetic Quality of Life (DQoL), International Physical Activity Questionnaire (IPAQ), BMI and HBA1c readings. To test the association between variables, the Chi - square test was used. Multiple logistic regressions have been used to find the predictors of good glycaemic control.

Results: The response rate was 87.7%. The factors associated with the level of glycaemic control was the duration of diagnosed with T2DM, type of treatment obtained, blood glucose monitoring, diabetes quality of life (Worry) and BMI ($p<0.05$). The predictors of good glycaemic control were the duration of diagnosed with T2DM lower than 10 years and blood glucose monitoring. The probability of respondents diagnosed with T2DM below than 10 years was two times more likely to have good glycaemic control (AOR=2.458, 95% of CI=1.504-14.282, p=0.050). The odds of having good glycaemic control is higher with increasing frequency of blood glucose monitoring (AOR=1.341, 95% of CI=1.041-1.727, p-value=0.023).

Conclusion: Duration diagnosed with T2DM, type of treatment obtained, blood glucose monitoring, worry and BMI were significantly associated with glycaemic control levels. The predictors of good glycaemic control were diagnosed with T2DM for less than 10 years and self blood glucose monitoring.

Keywords: Glycaemic control, type 2 diabetes mellitus, predictors, rural area.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

FAKTOR BERKAITAN TAHAP KAWALAN GLYSEMIK DALAM KALANGAN PESAKIT DIABETES MELLITUS JENIS 2 DI KLINIK KESIHATAN TERPILIH DI KUALA SELANGOR, MALAYSIA

Oleh

NURUL AIN BINTI ABDULLAH

November 2018

Pengerusi : Suriani binti Ismail, PHD
Fakulti : Perubatan dan Sains Kesihatan

Pengenalan: Diabetes melitus jenis 2 (T2DM) adalah masalah kesihatan yang paling biasa dihidap oleh kebanyakan populasi dunia.

Objektif : Kajian ini adalah untuk mengenalpasti faktor-faktor yang berkaitan dengan tahap kawalan glisemik (HbA1c) dalam kalangan pesakit T2DM di Klinik Kesihatan Sungai Tengi Kanan dan Klinik Kesihatan Tanjung Karang di Kuala Selangor. Faktor-faktor yang dikaji adalah ciri-ciri sociodemografi, sejarah perubatan T2DM, pengetahuan diabetes, literasi kesihatan, kepatuhan kepada rawatan, aktiviti penjagaan diri pesakit diabetes, ukuran kualiti hidup pesakit diabetes, aktiviti fizikal, indeks jisim badan (BMI) dan tahap kwalan glisemik pesakit T2DM.

Metodologi : Kajian ini merupakan kajian keratan rentas. 200 pesakit T2DM telah dipilih melalui persampelan rawak telah diberikan satu set borang kaji selidik yang mengandungi soalan mengenai ciri-ciri sociodemografi, sejarah perubatan T2DM, pengetahuan diabetes (Michigan Diabetes Knowledge Test, MDKT), literasi kesihatan (S-TOFHLA), pematuhan terhadap rawatan, aktiviti penjagaan diri pesakit diabetes (Summary of Diabetes Self-care Activity, SDSCA), ukuran kualiti hidup pesakit diabetes (Diabetic Quality of Life ,DQoL), aktiviti fizikal (International Physical Activity Questionnaire, (IPAQ), BMI dan bacaan HbA1c. Chi ujian persegi telah digunakan untuk menguji perkaitan antara pemboleh ubah. Regresi logistik berganda telah digunakan untuk mencari prediktor kawalan glisemik yang baik.

Keputusan: Kadar sambutan pesakit yang menjawab borang kaji selidik penyelidikan adalah 87.7%. Faktor-faktor yang berkaitan dengan tahap kawalan glisemik adalah tempoh masa seorang pesakit didiagnosis T2DM (p=0.006), jenis rawatan yang diterima (p=0.009), pemantauan glukosa darah (p=0.010), dua domain dari ukuran kualaiti hidup pesakit diabetes iaitu domain Impak (p=0.041) dan domain Kebimbangan (p=0.007) dan juga BMI (p=0.001). Faktor yang diramalkan mempengaruhi tahap kawalan glisemik yang baik adalah pesakit yang didiagnosis dengan T2DM kurang dari 10 tahun years (AOR=2.458, 95% of CI=1.504-14.282, p=0.050) dan juga pemantauan glukosa darah (AOR=1.341, 95% of CI=1.041-1.727, p-value=0.023).

Konklusi: Tempoh pesakit didiagnos dengan T2DM, jenis rawatan yang diterima, pemantauan glukos darah, Impak dan kebimbangan dan juga BMI telah ditemui sebagai faktor yang berkaitan dengan paras kawalan glisemik. Tempoh pesakit didiagnosis kurang dari 10 tahun dengan T2DM dan juga pemantauan glukosa darah didapati adalah faktor yang diramalkan berkaitan dengan tahap kawalan glisemik yang baik..

Kata Kunci: kawalan glisemik, diabetes mellitus jenis 2, ramalan faktor, luar bandar

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the Master of Science. The members of the Supervisory Committee were as follows:

Suriani Binti Ismail, PhD
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Sazlina Shariff Ghazali, PhD
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

ROBIAH BINTI YUNUS, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

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Signature: _____
Name of Chairman of Supervisory Committee: Associates Professor Dr Suriani Binti Ismail

Signature: _____
Name of Member of Supervisory Committee: Associates Professor Dr Sazlina Shariff Ghazali

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LIST OF ABBREVIATIONS

BMI	Body mass index
CI	Confidence Interval
DQoL	Diabetes Quality of Life
HbA1c	glycated haemoglobin
IPAQ	International Physical Activity Questionnaire
JKEUPM	Jawatankuasa Etika Universiti untuk Penyelidikan Melibatkan Manusia
MDKT	Michigan Diabetes Knowledge Test
MREC	Medical Research Ethics Committee
NHMS	National Health and Morbidity Survey
SDCA	Self-Diabetic Care Activity
S-TOFHLA	Short Test of Functional Health Literacy in Adult
T2DM	type 2 diabetes mellitus
UPM	University Putra Malaysia

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Diabetes mellitus is a group of metabolic diseases characterized by hyperglyca emia caused by malformation of insulin secretion, insulin action or both (Ameri can Diabetes Association, 2009). By 2035, around 592 million people are expected to suffer from diabetes (International Diabetes Federation, 2011). In 2013, 382 million people were diagnosed with diabetes, causing 5.1 million deaths. Eighty percent of them also lived in low- and medium - income countries. In addition, an estimated 175 million people with diabetes are not diagnosed (International Diabetes Federation., 2013). This non - communicable disease is a "silent killer" and has been considered the leading cause of death in recent years. Currently around 3.3 million adults 18 years of age and older live with diabetes in Malaysia (National Health and Morbidity., 2015) up from 2.6 million numbers in 2011 (National Health and Morbidity., 2011).

Improving glycaemic control is a high priority in reducing and delaying the burden of type 2 diabetes mellitus (Nichols G et al., 2000). Glycaemic control can be indicated by glycosylated haemoglobin (HbA1c). The desirable value of good glycaemic control was defined as HbA1c ≤ 6.5 percent, whereas poor control of glycosylated haemoglobin was > 6.5 percent, as recommended by the Clinical Practices Guidelines (CPG) (2015) for type 2 diabetes mellitus. In addition, glycosylated haemoglobin (HbA1c) is essential for the optimal care of diabetic patients (Roszyk et al., 2007).

Failure to optimize glycaemic control will result in additional healthcare require ments, healthcare costs and a high risk of complications, especially in the low s ocio - economic and minority population (Ratner., 2011). Higher levels of HbA1c, for example, have been associated with increased risk of diabetic retinopathy, increased risk of chronic kidney disease and increased risk of heart disease. Reducing levels of HbA1c by combining clinical and effective self - management has shown a reduced risk of microvascular complications (Huang., 2011). Although the most appropriate target for HbA1c levels to achieve optimal health impacts may vary among people, the majority of adults with diabetes will benefit from reducing HbA1c levels to 6.6 - 7.0 percent (Clinical Practice Guideline, 2015) such as reducing cardiovascular events to 42 percent (Nathan et al., 2005).

1.2 Problem Statements

According to the National Health and Morbidity Survey (NHMS) 2015, it is reported that the prevalence of diabetes in Malaysia has increased in 5 years duration from 11.6% (2011) to 15.2% (2015). A total of 19 935 patient all over in Malaysia have participated in the NHMS 2015 survey. A study that was done in clinic at Universiti Kebangsaan Malaysia Medical Centre found that only 28% and 20% of the patient had fasting glycaemia and HbA1c at optimum levels (Sumayyeh et al., 2015). Similarly another study was done in Tampin, Negeri Sembilan found that only 33.6% patient practiced good glycaemic control (Wan Farzana Fasya et al., 2016).

Poor glycaemic control had caused 2.2 million deaths (WHO., 2016). Higher levels of blood glucose have been associated with increased risk of diabetic retinopathy, increased risk of chronic kidney disease, and increased risk of cardiovascular disease (Colagiuri et al., 2010). When glycemic control is not optimized, diabetes imposes additional burdensome care requirements, health-care costs, and high risk of disabling complications, and this has been especially evident in socioeconomically disadvantaged and minority population (Ali et al., 2012). Therefore, the determination of factors associated with the levels of glycaemic control is important in order to minimize the complication that caused by poor glycaemic control.

The number of diabetic patients is growing rapidly, and this explosive growth is noticeable in both urban and rural areas. The overall prevalence of diabetes mellitus was slightly higher in the urban areas at 17.7% compared to rural at 16.7%, but it is also found that the prevalence of impaired blood glucose is slightly higher in rural (5.0%) than in urban area (4.7%) (National Health and Morbidity Survey., 2015). Several studies have been conducted in Malaysia to determine the factors associated with level of glycaemic control among T2DM patient, however there is still a lack of studies in rural areas especially on diabetes knowledge, health literacy, diabetes selfcare activities, quality of life and physical activity.

1.3 Significance of the Study

Diabetes is a major problem in this country and is expected to become a much larger problem. Diabetes care is far from satisfactory with most patients failing to achieve clinical objectives and the rate of complications is still high. A few studies have reported the effect of good glycaemic control to have a positive impact on diabetic patients. The strength of this study was that the data have been collected is in recent years and could therefore give an insight into the country's current T2DM situation especially in rural area. It will be an update to see how progress is being made in the fight against T2DM. The data gathered

in this study will also be used as baseline information to plan a diabetes management program for the target population for the next intervention program.

1.4 Research Questions

1. What is the level of glycaemic control among T2DM patient attending Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang in Kuala Selangor?
2. What are the factors associated with level of glycaemic control among T2DM patient attending Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang in Kuala Selangor?
3. What are the predictors of poor glycaemic control among T2DM patient attending Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang in Kuala Selangor?

1.5 Research Objectives

1.5.1 General Objectives

The aim for this study is to determine the factors associated with the level of glycaemic control among T2DM patient attending Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang in Kuala Selangor.

1.5.2 Specific Objectives

1. To determine the socio-demographic characteristics (gender, age, marital status, ethnicity, occupation, household income, and level of education), T2DM history (duration of T2DM diagnosed and treatment obtained), level of diabetes mellitus knowledge, health literacy, adherence to treatment, diabetic self care activity, quality of life, physical activity, BMI and level of glycaemic control of T2DM patient in Klinik Kesihatan Sungai Tengi Kanan and Klinik Kesihatan Tanjung Karang in Kuala Selangor.
2. To determine association between level of glycaemic control with socio-demographic data, T2DM history, diabetes knowledge, health literacy, adherence to treatment, self diabetic care activity of patient, diabetes quality of life, physical activity and body mass index
3. To determine the predictive factors of level of glycaemic control.

1.6 Research Hypothesis

1. Ho: There were no significant association between level of glycaemic control with socio-demographic data, T2DM history, diabetes knowledge, and health literacy, adherence of treatment, self-diabetic care activity, diabetes quality of life, physical activities and body mass index of T2DM patient attending two health clinics in Kuala Selangor.

H_A : There were significant association between level of glycaemic control with socio-demographic data, T2DM history, diabetes knowledge, and health literacy, adherence of treatment, self-diabetic care activity, diabetes quality of life, physical activities and body mass index of T2DM patient attending two health clinics in Kuala Selangor

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BIODATA OF STUDENT

Nurul Ain Binti Abdullah is a Master of Science (Public Health) student from Faculty of Medicine and Health Sciences at the Universiti Putra Malaysia (UPM). She was born on the 14th June 1990 at Pahang Darul Makmur. She has a Bachelor Degree in Health Science (Nursing) from Universiti Sains Malaysia (USM) in 2014. She is also a registered nurse that is registered to the Malaysian Nursing Board since 2014. She had experienced working at Kedah Medical Centre as staff nurse at the emergency department before furthering her study at UPM.

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