



**UNIVERSITI PUTRA MALAYSIA**

***FACTORS ASSOCIATED WITH GLYCAEMIC CONTROL  
AMONG DIABETES MELLITUS TYPE 2 PATIENTS  
ATTENDING HEALTH CLINICS IN TAMPIN DISTRICT  
NEGERI SEMBILAN, MALAYSIA***

**WAN FARZANA FASYA BINTI WAN HAMDZAN**

**FPSK(M) 2017 27**



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**By**

**WAN FARZANA FASYA BINTI WAN HAMDZAN**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
Fulfilment of the Requirements for the Degree of Master of Science**

**August 2016**



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## DEDICATION

To my dearest parents,

Wan Hamdzan Bin Wan Mohamed & Salbiah Binti Tahir

My late mother, Khamidah Binti Jaliman

For their guide and care since my childhood, love and effort;

To my best friends, Nur Fadhilah Binti Basir and Rianti Samosir

And;

My lovely husband, Mohamad Alique Bin Kamisan

For all their patience, understanding and support during all the difficulties of my study

Abstract of thesis presented to the senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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By  
**WAN FARZANA FASYA BT WAN HAMDZAN**

**August 2016**

**Chairman : Associate Professor Muhamad Hanafiah Juni, MPH**  
**Faculty : Medicine and Health Sciences**

**Introduction:** Diabetes Mellitus Type 2 has become one of the most serious global health problems nowadays. The prevalence of Diabetes Mellitus Type 2 in Malaysia has increased to 31.0% in 5 years, from 11.6% in 2006 to 15.2% in 2011. In 2012, the Malaysian National Diabetes Registry reported that 76.2% of the proportion are having poor glycaemic control (HbA1c  $\geq$ 6.5%) and only 23.8% are having good glycaemic control (HbA1c <6.5%).

**Objective:** The aims of this study are to determine the factors associated with poor glycaemic control among Diabetes Mellitus Type 2 patients attending health clinics in Tampin District, Negeri Sembilan, Malaysia

**Method:** A cross sectional study was conducted among 324 patients with Diabetes Mellitus Type 2 in July 2013 – January 2014 in all 5 health clinics in Tampin district, Negeri Sembilan by using proportionate stratified random sampling and stratified random sampling. Data collection was done through face to face interviews using structured validated questionnaires. Data were analysed using Statistical Packages for Social Sciences version 22.

**Results:** Response rate was 92%. The percentage of poor glycaemic control was 66.4%. Glycaemic control were found significantly associated with age ( $\chi^2=10.405$ ,  $p=0.006$ ), marital status ( $\chi^2=5.718$ ,  $p=0.017$ ) education status ( $\chi^2=7.312$ ,  $p=0.026$ ), types of medication ( $\chi^2=18.058$ ,  $p<0.001$ ), family history of Diabetes Mellitus Type 2 ( $\chi^2=7.234$ ,  $p=0.007$ ), Co-morbidities ( $\chi^2=5.718$ ,  $p=0.017$ ), systolic blood pressure ( $\chi^2=18.515$ ,  $p<0.001$ ), diastolic blood pressure ( $\chi^2=9.574$ ,  $p=0.002$ ), level of knowledge ( $\chi^2=23.209$ ,  $p<0.001$ ), types of foods containing fat that controlled by respondents ( $\chi^2=7.796$ ,  $p=0.005$ ), daily dietary intake of protein sources ( $\chi^2=19.173$ ,  $p<0.001$ ), self-monitoring blood glucose practice ( $\chi^2=16.935$ ,  $p<0.001$ ), taking medication other place than health

clinics ( $\chi^2=5.907, p= 0.020$ ), compliance of medication intake and appointment keeping with doctors ( $\chi^2=11.225, p=0.001$ ), and level of physical activity ( $\chi^2=25.530, p=<0.001$ ). In the multivariate model, those who were on insulin alone/combination of insulin and oral medication (AOR 3.217, 95% CI: 1.636, 6.327), co-morbidities (AOR 3.810, 95% CI: 1.507, 9.633), systolic blood pressure more than or equal than 130mmHg (AOR 4.595, 95%CI: 2.328, 9.069), poor knowledge (AOR 3.927, 95% CI: 1.724, 8.944), dietary intake of protein sources (AOR 3.423, 95%CI: 1.707, 6.864), take foods that contain fat (AOR 3.116, 95% CI: 1.056, 9.193), not comply with medication intake and appointment with doctors (AOR 3.850, 95% CI: 1.497, 9.905), and inadequate level of physical activity (AOR 4.001, 95% CI: 1.649, 9.711) were significantly associated with poor glycaemic control.

**Conclusion:** More than half (66.4%) of the respondents was having poor glycaemic control. Respondent who on insulin alone or combine medication, poor knowledge level, respondent who not controlling food containing fat, inadequate of physical activity and not comply with medication intake should be targeted with additional intervention to achieve optimal glycaemic control and boost healthy living.

Key words: Glycaemic control, Diabetes Mellitus Type 2, Health Clinics, Tampin District, Negeri Sembilan, Malaysia

Abstrak tesis ini dikemukakan kepada senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**FAKTOR-FAKTOR YANG BERSEKUTU DENGAN KAWALAN GLISEMIK  
ANTARA PESAKIT DIABETES MELITUS JENIS 2 YANG  
MENGHADIRI KLINIK KESIHATAN DI DAERAH TAMPIN  
NEGERI SEMBILAN, MALAYSIA**

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**Pengerusi : Profesor Madya Muhamad Hanafiah Juni, MPH**  
**Fakulti : Perubatan dan Sains Kesihatan**

**Pengenalan:** Penyakit Diabetes Melitus Jenis 2 merupakan salah satu masalah kesihatan global yang paling serius kini. Prevalens bagi penyakit Diabetes Melitus Jenis 2 meningkat kepada 31.0% dalam 5 tahun, iaitu daripada 11.6% pada tahun 2006 kepada 15.2% pada tahun 2011. Pada tahun 2012, Pendaftaran Diabetes Kebangsaan Malaysia melaporkan 76.2% daripada rakyat Malaysia mempunyai kawalan glisemik tidak sihat ( $HbA1c \geq 6.5\%$ ) dan hanya 23.8% yang mempunyai kawalan glisemik yang sihat ( $HbA1c < 6.5\%$ ).

**Objektif:** Kajian ini bertujuan untuk menentukan faktor yang berkaitan dengan kawalan tidak sihat dalam kalangan pesakit Diabetes Melitus Jenis 2 yang hadir ke klinik kesihatan di daerah Tampin, Negeri Sembilan., Malaysia.

**Kaedah:** Kajian silang rentas dijalankan terhadap 324 orang pesakit Diabetes Melitus Jenis 2 dari Julai 2013 hingga Januari 2014 di semua klinik kesihatan daerah Tampin, Negeri Sembilan dengan menggunakan kaedah persampelan berkadar rawak berstrata dan persampelan rawak berstrata. Pengumpulan data dilakukan melalui temu bual bersemuka dan dengan merujuk kepada rekod perubatan pesakit. Analisis deskriptif, ujian *chi square* dan regresi logistik dijalankan dengan menggunakan Pakej Statistik untuk Sains Sosial versi 22.

**Keputusan:** Kadar sambutan sebanyak 92%. Peratusan kawalan yang tidak sihat sebanyak 66.4%. Untuk sosiodemografi, keputusan menunjukkan perkaitan yang signifikan antara kawalan glisemik ialah umur ( $\chi^2=10.405$ ,  $p=0.006$ , status perkahwinan ( $\chi^2=5.718$ ,  $p=0.017$ ) dan status pendidikan ( $\chi^2=7.312$ ,  $p=0.026$ ). Selain itu, jenis pengambilan ubatan ( $\chi^2=18.058$ ,  $p<0.001$ ), sejarah keluarga ( $\chi^2=7.234$ ,  $p=0.007$ ), komorbiditi ( $\chi^2=5.718$ ,  $p=0.017$ ), tekanan darah sistolik ( $\chi^2=18.515$ ,  $p<0.001$ ) dan tekanan darah diastolic ( $\chi^2=9.574$ ,  $p=0.002$ ), Tahap pengetahuan ( $\chi^2=23.209$ ,  $p<0.001$ ),



pengambilan diet karbohidrat harian ( $p = 0.019$ , pengambilan diet sumber protein harian ( $\chi^2=19.173, p<0.001$ ), jenis makanan terkawal bagi responden (makanan mengandungi lemak) ( $\chi^2=7.796, p = 0.005$ ), amalan pengawasan sendiri bagi tahap glukosa di dalam darah ( $\chi^2=16.935, p<0.001$ ), pengambilan ubatan selain ubat yang diterima daripada klinik kesihatan ( $\chi^2=5.907, p= 0.020$ ), pematuan pengambilan ubatan dan janji temu dengan doktor ( $\chi^2=11.225, p= 0.001$ ) dan tahap aktiviti fizikal ( $\chi^2=25.530, p<0.001$ ). Walau bagaimanapun, faktor-faktor yang berkaitan dengan kawalan glisemik tidak sihat ialah pengubatan insulin sahaja/gabungan insulin dan ubatan oral (NGT 3.217, 95% SK: 1.636, 6.327), komorbiditi (NGT 3.810, 95% SK: 1.507, 9.633), tekanan darah sistolik melebihi atau bersamaan dengan 130mmHg (NGT 4.595, 95% SK: 2.328, 9.069), pengetahuan yang lemah (NGT 3.927, 95% SK: 1.724, 8.944), pengambilan diet sumber protein harian (NGT 3.423, 95% SK: 1.707, 6.864), pengambilan makanan yang mengandungi lemak (NGT 3.116, 95% SK: 1.056, 9.193), ketidakpatuhan terhadap pengambilan ubatan dan janji temu dengan doktor (NGT 3.850, 95% SK: 1.497, 9.905) dan tahap aktiviti fizikal (NGT 4.001, 95% SK: 1.649, 9.711).

**Kesimpulan:** Lebih daripada separuh pesakit (66.4%) mempunyai kawalan glisemik tidak sihat. Responden yang mendapat pengubatan insulin sahaja/gabungan insulin dan ubatan oral, pengetahuan yang lemah, tiada pengawalan dalam pengambilan makanan yang mengandungi lemak, kurang menjalani aktiviti fizikal dan tidak patuh terhadap pengambilan ubatan dan janji temu dengan doktor adalah antara golongan yang perlu diberi intervensi dalam mencapai kadar glisemik yang optimum untuk kehidupan yang lebih sihat.

Kata Kunci : Kawalan glisemik, Diabetes Mellitus Tahap 2, Klinik Kesihatan, Daerah Tampin, Negeri Sembilan, Malaysia

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I certify that a Thesis Examination Committee has met on 25 August 2016 to conduct the final examination of Wan Farzana Fasya binti Wan Hamdzan on her thesis entitled "Factors Associated with Glycaemic Control among Diabetes Mellitus Type 2 Patients Attending Health Clinics in Tampin District, Negeri Sembilan, Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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## LIST OF ABBREVIATIONS

ADA	American Diabetic Association
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CDC	Centre for Disease Control and Prevention
CI	Confidence interval
COR	Crude Odds Ratio
CPG	Clinical Practice Guidelines
HbA1c	Glycated Haemoglobin
HPT	Hypertension
IDF	International Diabetes Federation
IQR	Interquartile range
MMAS	Morisky Medication Adherence Scale
NDR	National Diabetes Registry
NHMS	National Health Morbidity Survey
ROC	Receiver Operating Characteristics
SD	Standard Deviation
SMBG	Self-monitoring blood glucose
T2DM	Diabetes Mellitus Type 2
WHO	Who Health Organization
$\beta$	Beta

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

The global prevalence of Diabetes has been rising more rapidly year by year, in 2011, the International Diabetes Federation (2011) predicted that there will be 592 million individuals suffering with diabetes in 2035. In 2013, 382 million people were detected with diabetes and this had caused 5.1 million deaths and 80% of them lived in low and middle income countries. About 175 million people with diabetes were estimated to be undiagnosed (International Diabetes Federation [IDF], 2013). This non-communicable diseases are “silent killer” and rated as the leading causes of death in the recent years

The World Health Organization (2014), projects that diabetes mellitus will be the seventh leading cause of death in 2030. Among Americans aged 20 years or younger, 215,000 individuals have Diabetes Mellitus Type 2 and among Americans aged 20 years or more, 11.3% (25.6 million individuals) have Diabetes Mellitus Type 2. This shows that among Americans aged 65 years or older, 26.9% (10.9 million individuals) have diabetes mellitus (Centre for Diabetes Control and Prevention [CDC], 2011). Other than that, the prevalence of Diabetes Mellitus Type 2 for all age groups worldwide has been estimated to be 2.8% in year 2000 and 4.4% in 2030. Moreover, the total number of people with Diabetes Mellitus Type 2 is projected to rise from 171 million in 2000 to 366 million in 2030. Although the prevalence of Diabetes Mellitus Type 2 is higher in men than women, there are more women than men (Wild et al., 2004).

In Malaysia, the National Health Morbidity Survey IV [NHMS IV] (2011), shows the prevalence of Diabetes Mellitus Type 2 among Malaysians has increased by 31.0% in 5 years, from 11.6% in 2006 to 15.2% in 2011. Currently, about 2.6 million adults aged 18 years and above live with Diabetes Mellitus Type 2 (National Diabetes Registry [NDR], 2009-2012). Besides that, the study from Wan Nazaimoon et al., (2013) the predominance of Diabetes Mellitus Type 2 in Malaysia has increased radically throughout the most recent two years, from 11.6% in 2006 to the present general prevalence of 22.9%, where 12.1% of the citizens were recently diagnosed.

Diabetes is a chronic disease that happens either when the pancreas produces enough insulin or when the body is not able to viably utilize the insulin it transforms. On the other hand, insulin is a hormone that directs glucose. Meanwhile, hyperglycaemia, or raised glucose, is a normal impact of uncontrolled diabetes and about whether to prompt genuine harm to large portions of the body's frameworks, particularly the nerves and veins (World Health Organization [WHO], 2014).

Table 1.1 presents the prevalence of Diabetes Mellitus Type 2 by state and residence and it shows that Negeri Sembilan has the highest percentage with 15.33% and followed by Melaka with 15.23% (Letchuman et al., 2010). According to Letchuman et al., (2010) the comparison between NHMS II, 1996 and NHMS III, 2006 shows that the prevalence rates are increasing in adults at age >30 years from 8.3% to 14.9%. However, the newly diagnosed with Diabetes Mellitus Type 2 are rising 3 times higher from 1.8% to 5.5%.

**Table 1.1: Prevalence of Diabetes Mellitus Type 2 in Malaysia and by State  
National Health Morbidity Survey III, 2006**

State	Prevalence (%)
Negeri Sembilan	15.3
Melaka	15.2
Penang	14.9
Kedah	13.6
Perlis	13.5
Perak	12.6
Kuala Lumpur	12.6
Pahang	12.1
Selangor	12.0
Kelantan	11.7
Terengganu	11.1
Johor	11.1
Sarawak	10.0
Sabah	4.9

(Sources: Adapted from Letchumanan et al.,2010)

Diabetes is classified as type 1, type 2, gestational diabetes mellitus and other specific types (American Diabetes Association [ADA], 2004). Diabetes Mellitus Type 2 is a disease to be called non-insulin dependent diabetes or adult onset diabetes, and records for no less than 90% of all instances of Diabetes Mellitus Type 2. It is described by insulin deficiency and relative insulin insufficiency, either or both of which may be available at the time Diabetes Mellitus Type 2 is diagnosed. Thus, the diagnosis of Diabetes Mellitus Type 2 can occur at any age. For instance, Diabetes Mellitus Type 2 may persist undetected for a long time and the diagnosis is regularly made when a complexity emerges or a routine blood or urine glucose test is depleted. It is regularly, but not constantly, connected with overweight or obesity, which can result in insulin resistance and lead to high blood glucose levels. In addition, individuals with Diabetes Mellitus Type 2 can be regularly overseeing their condition through physical activity and healthy eating practice (International Diabetes Federation [IDF], 2013). Frequently, individuals with Diabetes Mellitus Type 2 can reduce their blood glucose by getting more fit and broaden physical activity.



Likewise, getting more fit helps bring down the danger for other wellbeing issues that particularly influence individuals with Diabetes Mellitus Type 2, for example, cardiovascular disease (Centre For Disease Control And Prevention [CDC], 2014). According to the World Health Organization (2012) the process to prevent or delay Diabetes Mellitus Type 2 were practicing healthy diet, regularly doing physical activity, maintaining a normal body weight and avoiding tobacco use. Diabetes Mellitus Type 2 can be due to additional socioeconomic burden and can account for substantial health care costs because diabetes is associated with serious long term complications. Prevalence of Diabetes Mellitus Type 2 is noted to vary with ethnicity. However, the developing and newly industrialized nations, and the disadvantaged community groups in the developed countries are said to be at the highest risk of having diabetes. It has also been demonstrated that as age increases, the risk of having Diabetes Mellitus Type 2 and hence the prevalence of Diabetes Mellitus Type 2 increases (Rugayah Bakri, 2007).

## **1.2 Importance of Glycaemic Control**

Glycaemic control is fundamental to the management of diabetes. Many people with Diabetes Mellitus Type 2 do not achieve good glycaemic control. Glycaemia refers to the presence of glucose in the blood. This level of blood glucose can fluctuate constantly. Many people with diabetes do not achieve adequate glycaemic control. Good glycaemic control has become an important goal of diabetes care, although a recent research suggested that the complications of type 2 diabetes may be caused by genetic factors (Tarnow et al., 2008). Glycaemic control is a measure / indication of whether blood glucose is maintained within a normal range in diabetic patients.

In Malaysia, the desirable value of good glycaemic control was defined as having a level of HbA1c <6.5%, whereas the poor control of glycosylated haemoglobin was  $\geq 6.5\%$  as recommended by the Clinical Practices Guidelines (CPG) for Diabetes Mellitus Type 2 (CPG, Ministry of Health Malaysia 4th Edition, 2009). Major public health problems and risk factors for the development of Diabetes Mellitus Type 2 complication are usually related to poor and inadequate glycaemic control among patients with Diabetes Mellitus Type 2 (Koro et al., 2004).

According to Beattie et al., (1998) highlighted some of the obstacles to achieving good glycaemic control, in his evaluation of diabetes care at primary level facilities in South Africa from the 1990's, which included costs to patients, transport difficulties, lack of health education and shortcomings in clinical expertise. According to Bevan et al., (2006) good maintenance of glycaemic control can reduce the blood glucose level and lead to decrease in morbidity and mortality. Thus, glycaemic control is considered as the main therapeutic goal for preventing organ damage and other complications of Diabetes Mellitus Type 2 (Maysaa et al., 2008). According to Nichols G et al. (2000), improving glycaemic control is a high priority in decreasing the burden of Diabetes Mellitus Type 2 and delaying its complications. Apparently, an improvement in glycaemic control is likely to reduce the risk of diabetic complications. Therefore, diabetic patients are recommended to achieve HbA1c levels as close to normal (<6%) as possible to ensure the risk of disease progression is reduced (Stratton et al., 2000).

### 1.3 Statement of Problem

Patients with Diabetes Mellitus Type 2 have comprehensive treatment regimens designed to manage good glycaemic control values as close to the non-diabetic range as possible. This is because good glycaemic control naturally reduces the risk of long term complications of the disease. For instance, the crucial components of such treatment are monitoring, education and pharmacological treatment with oral anti-diabetic agents or insulin to attain glycaemic goals. According to Eid et al., (2003) the reasons that have been prompted for glycaemic control are a local diet that is elevated in carbohydrate, a deficit of physical activity and a lack of knowledge about diabetes and its treatment. In Malaysia, a study by Rahmah et al., (2011) in Kulim reported the prevalence of good glycaemic control at 40% and poor glycaemic control at 60% respectively among elderly diabetic patients. Similarly, findings from a study conducted by Matsuura et al., (2009) in Japan showed that only 46.5% of prevalence good glycaemic control and 53.4% of prevalence poor glycaemic control. In their study, Guisasola et al. (2008) reported that although tools are currently available to facilitate more optimal glycaemic control and reduce the risk of long-term complications, many adolescents with Diabetes Mellitus Type 2 do not achieve optimal glycaemic control. Poor glycaemic control is also significantly associated with the development of long term complications such as macro vascular complications, which result from many years of hyperglycaemia (Titty et al., 2010). In a previous study, Tainow et al., (2008) found that good glycaemic control can eventually be an important target of diabetes care, although a recent research suggested that the complications of Diabetes Mellitus Type 2 may be caused by genetic factors.

According to Zeinab et al., (2010), it is very difficult to achieve optimal glycaemic control in clinical practices as there are complex reasons for poor glycaemic control. Although the importance of glycaemic control is well established, it is often not achieved. Based on previous literature, there are various factors associated with glycaemic control. For instance, the contribution of poor glycaemic control is due to the paucity of information available to patients about the importance of compliance to glycaemic control and adherence to self-care behaviours, and to healthcare providers about patient's barrier to compliance to glycaemic control and practicing diabetes self-care behaviours. Poor glycaemic control may lead to several diabetes complications. The study done in Malaysia with poorly controlled diabetes patients in Kelantan showed that 20.6% of them had nephropathy, 9.8% had neuropathy, 8.2% had retinopathy, 2.8% had foot ulcer and 2.4% had coronary heart disease (CHD) (Fauziah and Suhaiza, 2004). There are many factors such as age, knowledge of Diabetes Mellitus Type 2, lifestyle and dietary behaviour may affect glycaemic control. However, much is not known about the factors that influence glycaemic control among Malaysian Diabetes Mellitus Type 2 patients. Thus, the purpose of this study is to determine the most important factors associated with glycaemic control among Diabetes Mellitus Type 2 patients attending health clinics in Tampin district, Negeri Sembilan.

## **1.4 Significance of Study**

Taking control of diabetes to enhance personal satisfaction has put the focus on the requirement for extra support and education for patients with Diabetes Mellitus Type 2. In spite of the fact that new medications and innovation have helped in regulating the disease in numerous people, the challenges of self-management in diabetes toward oneself are overwhelming for most. These studies were attempted to describe the associated factors with glycaemic control among Diabetes Mellitus Type 2 patients attending health clinics in a district of Tampin, Negeri Sembilan. The findings of this study may help improve quality of care and provide better understanding of the factors that are possibly associated with poor glycaemic control. Moreover, this study also can help to develop and implement targeted interventions that could contribute to decrease the burden of Diabetes Mellitus Type 2.

## **1.5 Research Questions**

The research questions of this study are:-

- 1.5.1 What is the proportion of poor glycaemic control of Diabetes Mellitus Type 2 patients attending health clinics in a Tampin district of Negeri Sembilan?
- 1.5.2 What are the associated factors of the glycaemic control of Diabetes Mellitus Type 2 patients attending health clinics in a Tampin district of Negeri Sembilan?
- 1.5.3 What is the relationship between self-care behaviour and glycaemic control of Diabetes Mellitus Type 2 patients?
- 1.5.4 What is the relationship between knowledge and glycaemic control of Diabetes Mellitus Type 2 patients?
- 1.5.5 What is the relationship between medical profiles and glycaemic control of Diabetes Mellitus Type 2 patients?

## **1.6 Objective**

### **1.6.1 General Objective**

The main objective is to determine the factors associated with poor glycaemic control among Diabetes Mellitus Type 2 patients attending health clinics in Tampin District, Negeri Sembilan, Malaysia

### **1.6.2 Specific Objective**

**1.6.2.1** To determine:-

- i) The socio-demographic characteristics (gender, age, ethnic and marital status) and socioeconomics characteristics (education background, income status and occupation) of respondents.

- ii) Medical profiles of the respondents (types of medication, duration of having Diabetes Mellitus Type 2, family history, and co-morbidities)
- iii) Systolic, Diastolic blood pressure and Body mass index.
- iv) Knowledge on Diabetes Mellitus Type 2
- v) Self-care behavioural factors (dietary behaviour, self-monitoring blood glucose level, compliance of medication and appointment keeping, physical activity, used of alternative/complementary medication and smoking status)

**1.6.2.2** To determine the association between:-

- i) Socio-demographic and socio-economic with glycaemic control among Diabetes Mellitus Type 2 respondents.
- ii) Medical profiles with glycaemic control among Diabetes Mellitus Type 2 respondents.
- iii) Systolic, Diastolic blood pressure and body mass index with glycaemic control among Diabetes Mellitus Type 2 respondents.
- iv) Level of knowledge with glycaemic control among Diabetes Mellitus Type 2 respondents.
- v) Self-care behavioural factors with glycaemic control among Diabetes Mellitus Type 2 respondents.

1.6.2.3 To determine the predictors of poor glycaemic control

## **1.7 Research Hypothesis**

- H1:** There is significant association between socio-demographic and socio-economic factors with glycaemic control of Diabetes Mellitus Type 2.
- H2:** There is significant association between medical profiles with glycaemic control of Diabetes Mellitus Type 2.
- H3:** There is significant association between self-care behavioural factors with glycaemic control of Diabetes Mellitus Type 2.
- H4:** There is significant association between levels of knowledge with glycaemic control of Diabetes Mellitus Type 2.
- H5:** There is significant association between systolic diastolic blood pressure with glycaemic control of Diabetes Mellitus Type 2
- H6:** There is significant association between body mass indexes with glycaemic control of Diabetes Mellitus Type 2.

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