**UNIVERSITI PUTRA MALAYSIA**

*HEALTH-RELATED QUALITY OF LIFE AND ITS ASSOCIATED FACTORS*
*AMONG TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING HEALTH*
*CLINICS IN TAMPIN DISTRICT, NEGERI SEMBILAN, MALAYSIA*

**NUR FADHILAH BINTI BASIR**

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**HEALTH-RELATED QUALITY OF LIFE AND ITS ASSOCIATED FACTORS AMONG TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING HEALTH CLINICS IN TAMPIN DISTRICT, NEGERI SEMBILAN, MALAYSIA**

By

**NUR FADHILAH BINTI BASIR**

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

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

**HEALTH-RELATED QUALITY OF LIFE AND ITS ASSOCIATED FACTORS AMONG TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING HEALTH CLINICS IN TAMPIN DISTRICT, NEGERI SEMBILAN, MALAYSIA**

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**NUR FADHILAH BINTI BASIR**

**February 2016**

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**Introduction**: Diabetes Mellitus is one of the common non-communicable diseases in nearly all countries. It has an impact on quality of life, given by their lifelong nature and the need for self-management. In a chronic disease as Type 2 Diabetes Mellitus, health-related quality of life (HRQOL) is an important outcome measure, as a patients' perception about the disease and does not depend on the clinical parameters only. The Short Form 36 (SF-36) is an established HRQOL survey questionnaire for health outcome measurement. The aim of this study was to determine the HRQOL and its associated factors among Type 2 Diabetes Mellitus patients attending health clinics at the district of Tampin, Negeri Sembilan. **Methodology**: A cross-sectional study applying the Malay version of SF-36 and a structured pretested questionnaire among Type 2 Diabetes Mellitus patients attending all five health clinics at district of Tampin, Negeri Sembilan. All Type 2 Diabetes Mellitus patients who registered and received treatments at all five health clinics and met the inclusion criteria were taken as sample. Respondents were selected using stratified sampling method from each clinic. Demographic data, clinical characteristics, self-care behavioural factors and the Malay version of SF-36 questionnaire was administered by face-to-face interview. A total 430 respondents with 99.5% response rate were analysed. Descriptive analysis, t-test, Pearson product-moment correlation coefficient, ANOVA and hierarchical linear regressions analysis were applied to the data using SPSS version 21.0 software. **Results**: Majority of the respondents were females (54.2%), Malay (72.3%), married (83%), and attended primary education (58.1%).The mean age of the respondents was $57.5(\pm8.88)$ years and the mean duration of having diabetes was $6.9\ (\pm5.01)$ years. About 40.9% were overweight, and more than half had uncontrolled diabetes (HbA1c $\geq6.5\%$). Mean score of SF-36 health domains with exception of role emotional of respondents were significantly lower than that of the Malaysian norm scoring by Azman (2003) ($P<0.001$). Further analysis in hierarchical regression analysis revealed that, older age ($P<0.001$), Indian ethnic ($P<0.05$), household income ($P<0.05$), combination of oral hypoglycemic agents (OHA) and insulin treatments ($P<0.01$), years of having diabetes ($P<0.05$), having more than two co-morbidities ($P<0.05$), self-monitoring blood glucose ($P<0.05$), and uncontrolled glycemic status (HbA1c$\geq6.5\%$) ($P<0.05$) are the factors associated with deterioration of HRQOL among respondents.

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**Conclusion:** Type 2 Diabetes Mellitus was associated with lower HRQOL in comparison to normal population. HRQOL was significantly associated with socio-demographics, clinical and self-care behavioural factors of patients in district of Tampin. In the clinical settings, this knowledge can be used to encourage medical professionals to actively identify patients' difficulties in managing diabetes during routine diabetic follow-up consultations. This practice could promote in early detection of any reduced HRQOL. Both physical and mental aspects should be considered into and interventions are planned accordingly, efforts to improve the patients' health via individualized programme may alleviate the overall HRQOL.

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

# KUALITI KESIHATAN HIDUP DAN FAKTOR YANG BERKAITAN DALAM KALANGAN PESAKIT DIABETES MELLITUS JENIS 2 DI KLINIK-KLINIK KESIHATAN DI DAERAH TAMPIN, NEGERI SEMBILAN, MALAYSIA

Oleh

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**Februari 2016**

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**Pengenalan:** Diabetes Mellitus adalah salah satu penyakit tidak berjangkit yang biasa di hampir semua negara. Diabetes memberi kesan ke atas kualiti hidup, memandangkan ia dihidapi dan memerlukan penjagaan diri seumur hidup. Dalam penyakit kronik seperti Diabetes Mellitus jenis 2, mengetahui tahap kualiti yang berkaitan dengan kesihatan hidup (HRQOL) juga penting untuk mengetahui persepsi pesakit tentang penyakit ini dan bukan hanya bergantung kepada parameter klinikal. SF-36 adalah instrumen HRQOL yang digunakan untuk mengukur tahap kesihatan seseorang. Tujuan kajian ini adalah untuk menentukan HRQOL dan faktor-faktor yang berkaitan dengannya dalam kalangan pesakit Diabetes Mellitus jenis 2 yang datang ke klinik-klinik kesihatan di daerah Tampin, Negeri Sembilan. **Metodologi**: Kajian keratan rentas dijalankan dengan menggunakan versi bahasa Melayu SF-36 dan soal selidik berstruktur yang telah diprauji dalam kalangan pesakit Diabetes Mellitus Jenis 2 yang mendapatkan rawatan di kesemua lima klinik kesihatan di daerah Tampin, Negeri Sembilan. Responden dipilih dengan menggunakan kaedah persampelan berstrata daripada setiap klinik. Semua pesakit Diabetes Mellitus jenis 2 yang mendaftar dan menerima rawatan di lima klinik kesihatan dan memenuhi kriteria kajian telah diambil sebagai sampel. Faktor- faktor sosiodemografi, ciri-ciri klinikal, faktor penjagaan diri sendiri dan borang soal-selidik versi bahasa Melayu SF-36  telah dijalankan melalui kaedah temuramah. Sejumlah 430 responden dengan kadar respon 99.5% telah di analisis. Analisis deskriptif, ujian-t, korelasi Produk- Momen Pearson, ANOVA dan ujian analisis regresi linear berhirarki telah dijalankan dengan menggunakan perisian SPSS versi 21.0. **Keputusan**: Majoriti responden adalah perempuan (54.2%), Melayu (72.3%), berkahwin (83%), dan mendapat pendidikan sekolah rendah (58.1%). Min umur responden adalah 57.5 ($\pm$ 8.88) tahun dan min. Purata tempoh menghidap diabetes adalah 6.9 ($\pm$ 5.01) tahun. 40.9% mempunyai berat badan berlebihan, dan lebih daripada separuh mempunyai diabetes yang tidak terkawal (HbA1c $\geq$6.5%). Kesemua skor min domain kesihatan SF-36 kecuali peranan emosi  responden adalah jauh lebih rendah daripada hasil kajian norma di Malaysia oleh Azman (2003) ($P$ <0.001). Analisis lanjut dalam analisis regresi berhirarki menunjukkan bahawa, umur yang lebih tua ($P$ <0.001), etnik ($P$ <0.05), pendapatan keluarga ($P$<0.05), etnik India ($P$ <0.05), gabungan oral hipoglisemik (OHA) dan rawatan insulin ($P$ <0.01), bilangan tahun

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menghidap Diabetes Mellitus (*P* <0.05), mempunyai lebih daripada dua komorbiditi (*P* <0.05), menjalankan pemantauan sendiri glukosa darah (*P* <0.05), dan status glisemik yang tidak terkawal (HbA1c≥6.5%) (*P* <0.05) adalah antara faktor-faktor kemerosotan HRQOL di kalangan responden. **Kesimpulan**: Diabetes Mellitus jenis 2 dikaitkan dengan kemerosoton HRQOL berbanding norma populasi Malaysia. HRQOL dikaitkan secara signifikan dengan faktor-faktor sosio-demografi, faktor-faktor tingkah laku klinikal dan penjagaan diri pesakit di daerah Tampin. Dalam tetapan klinikal, pandangan ini boleh digunakan untuk menggalakkan pegawai profesional perubatan untuk mengenalpasti kekangan pesakit secara aktif dalam menguruskan diabetes semasa rutin rundingan susulan diabetes. Amalan ini dapat menggalakkan pengesanan awal sebarang kekurangan HRQOL. Kedua-dua aspek fizikal dan mental perlu dipertimbangkan dalam usaha untuk meningkatkan kesihatan pesakit melalui program individu, secara keseluruhannya bagi membaiki HRQOL.

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I certify that a Thesis Examination Committee has met on 22 February 2016 to conduct the final examination of Nur Fadhilah binti Basir on her thesis entitled "Health-Related Quality of Life and its Associated Factors among Type 2 Diabetes Mellitus 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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| | |
|---|---|
| HRQOL | Health-related quality of life |
| IDF | International Diabetes Federation |
| NCD | Non-communicable disease |
| NHMS | National Health Morbidity Survey |
| QOL | Quality of life |
| SF-36 | 36-item short form health survey |
| WHO | World Health Organization |
| T2DM | Type 2 Diabetes Mellitus |
| DM | Diabetes Mellitus |
| BMI | Body Mass Index |
| PF | Physical functioning |
| RP | Role physical |
| BP | Bodily pain |
| GH | General health |
| SF | Social Functioning |
| RE | Role emotional |
| VT | Vitality |
| MH | Mental health |
| PCS | Physical component summary |
| MCS | Mental component summary |

# CHAPTER 1

# INTRODUCTION

## 1.1     Background

### 1.1.1     Diabetes Mellitus

Diabetes Mellitus is a chronic, life-long condition that requires careful monitoring and control. It is one of the most common non-communicable diseases (NCDs) identified by World Health Organization (2010) along with cardiovascular disease, which includes heart attack and stroke, cancer and chronic respiratory disease in nearly all countries. Its include Malaysia, one of the country that contributed to the number of Diabetes Mellitus patients in Asia (International Diabetes Federation (IDF), 2006). Diabetes Mellitus as a chronic disease worldwide has a huge impact on morbidity and mortality rates in all societies at all stages of development, thus Diabetes Mellitus is a well-known disease in societies.

Diabetes Mellitus is primarily categorised as Type 1 Diabetes Mellitus and Type 2 Diabetes Mellitus. Type 1 Diabetes Mellitus, which is resulted from cell destruction, usually leads to absolute insulin deficiency. Furthermore, Type 1 Diabetes Mellitus is often seen in children and adolescents. On the other hand, Type 2 Diabetes Mellitus is recognised by World Health Organization (WHO) as non-insulin-dependent or adult-onset that is resulted from the body's ineffective use of insulin. Insufficient production of insulin by the organ, called pancreas, is also known to occur in Type 2 Diabetes Mellitus patients aged more than 40 years old. However, the diagnosis can occur at any age. Type 2 Diabetes Mellitus is much more common comprising of 90% of people with diabetes around the world, and is largely due to the result of excess body weight and physical inactivity. Some patients are unable to be clearly classified as having either Type 1 or Type 2 Diabetes Mellitus. In addition, both Type 1 Diabetes Mellitus and Type 2 Diabetes Mellitus may have a late onset and slow progression of disease (World Health Organization, 2011).

It is well-known that people who develop Type 2 Diabetes Mellitus almost always have a 'pre-diabetes stage', a term which refers to 'having blood glucose level that is higher than normal but is not enough to be diagnosed as diabetes' (American Diabetes Association, 2010). Type 2 Diabetes Mellitus is often, but not always associated with overweight or obesity, which can cause insulin resistance and lead to high blood glucose levels. Initially, people who are diagnosed with Type 2 Diabetes Mellitus can often manage their condition through exercise and diet alone. However, over time most people will require pharmacological interventions such as oral drugs and or insulin injections (Clinical Practice Guidelines, 2009).

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Moreover, Diabetes Mellitus is seen to be increasing year by year, 346 million people worldwide suffer from Diabetes Mellitus (World Health Organisation (WHO), 2011). Prevalence of diabetes will increase from about 366 million of people with diabetes in 2011 to 552 million worldwide by the year 2030 (Whiting et al., 2011). It was estimated about 80% of the disease burden appeared in low and middle income countries. Figure 1.1 shows age-standardised prevalence of Diabetes Mellitus among adults aged 25 years old and above. Global status report on non-communicable disease 2010 has reported low-income countries showed the lowest prevalence of Diabetes Mellitus of about 8% for both genders, while upper middle-income countries showed the highest prevalence of 10% for both genders (World Health Organisation (WHO), 2010). In addition, Diabetes Mellitus has been everywhere in the world and indicated that all countries from different socioeconomic background are not excepted from its burden. It is well known that the prevalence of Diabetes Mellitus has shown escalating trend due to many factors such as population growth, urbanisation, aging, and increasing prevalence of obesity and physical inactivity.
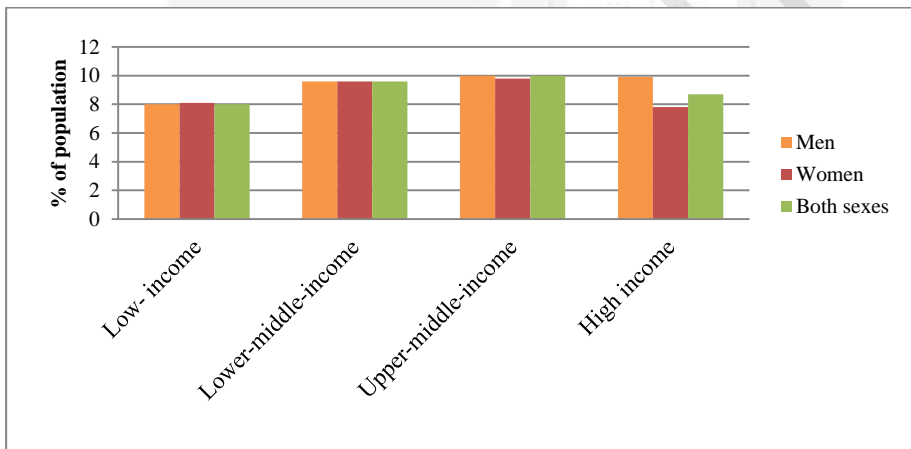


**Figure 1.1: Age-standardised prevalence of Diabetes Mellitus in adults aged 25+ years, by World Bank income group, comparable estimate 2008.**
(Source: Global status report on Non-Communicable Diseases's 2010, WHO, 2010)

In Malaysia, the same trend also can be seen in previous studies, the First National Health and Morbidity Survey (NHMS I) conducted in 1986, National Health and Morbidity Survey (NHMS II) in 1996 and until 2006 (NHMS III) reported a prevalence of diabetes had risen among adults aged 30 years and above by almost 80% in the last decade (NHMS III., 2006). Figure 1.2 indicates the overall prevalence of diabetes in NHMS III of 14.9% which has doubled over a period of 10 years from the previous NHMS II, 8.3%. Moreover, the total prevalence had been found to be increased about 6%, followed by the prevalence of people with known diabetes in NHMS II which increased from 6.5% to 9.5% in NHMS III. Meanwhile, the newly diagnosed diabetes was 1.8% in NHMS II and increased to 5.4% in NHMS III. Likewise, a local study on prevalence of diabetes in the nationwide population which was conducted in all 13 states of Malaysia in 2004 involving 7683 respondents (Rampal et al., 2010) also found that, the overall national prevalence of diabetes among

Malaysians aged $\geq$ 30 years was 15.2%. Therefore, Malaysia should take more aggressive actions to overcome the projecting number of Diabetes Mellitus patients.
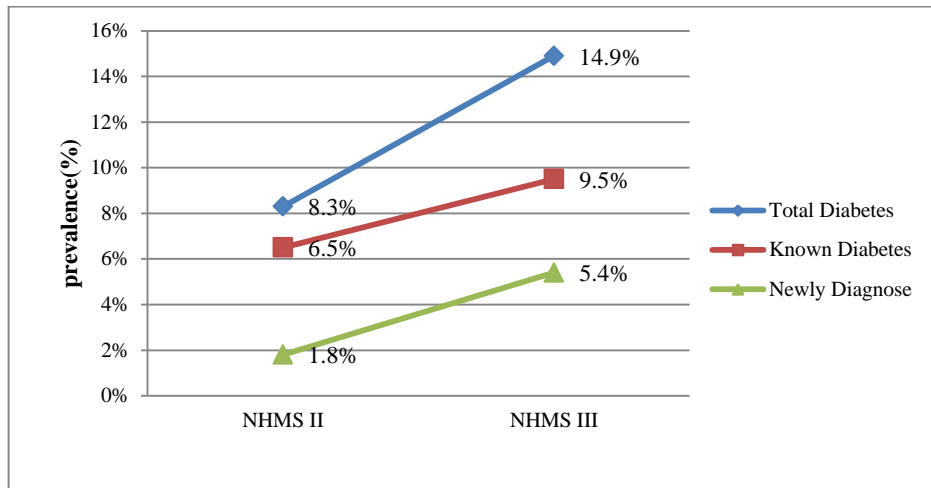


**Figure 1.2: Prevalences of Diabetes Mellitus among adults ≥ 30 years old in NHMS II (1996) and NHMS III (2006), Malaysia.**
(Source: NHMS III, 2006)

Diabetes Mellitus has a substantial influence on key aspects of patients' life in terms of physical, psychological and social. Diabetes Mellitus generally linked with short-term complications such as fatigue and recurrent infection and with long-term complications such as kidney failure, limb amputation and loss of vision. The development of the diabetes complications is generally presumed to increase morbidity and mortality consequently in line with poor quality of life (Manuel et al., 2004; Coffey et al., 2002). People with Type 2 Diabetes Mellitus have a two-fold increase in the risk of stroke (Boden-Albala et al., 2008). Besides that, renal failure is one of the diabetic complications that occurs in many populations in both developed and developing countries. Lower limb amputations are at least 10 times more common in people with diabetes than in non-diabetic individuals in developed countries, in which more than half of all non-traumatic lower limb amputations are due to diabetes (Icks et al., 2009). Furthermore, Diabetes Mellitus is one of the leading causes of visual impairment and blindness in developed countries (Resnikoff et al., 2004). In addition, the risk of tuberculosis is also three times higher among people with Diabetes Mellitus (Jeon et al., 2008). These complications are devastating and prominently impair patients' health-related quality of life (HRQOL).

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### 1.1.2　Health-related quality of life of Type 2 Diabetes Mellitus

Monitoring diabetic patients only with metabolic variables has been seen to be insufficient, and thus, assessments of quality of life have been initiated. Quality of life is commonly recognised as multidimensiol concept including physical and social functioning, and perceived physical and mental well-being (Garratt et al., 2002). Quality of life is an important health outcome in its own right, representing the ultimategoal of all health interventions. In recent years, parallel to the increasing number of diabetic patients, there is also burgeoning of quality of life studies among diabetes patients, and especially the health-related quality of life and factors associated (Carlos et al., 2013; Venkataraman et al.,2013; Shim et al.,2012; Sundaram et al., 2009). In a chronic condition such as Type 2 Diabetes Mellitus, health-related quality of life (HRQOL) is an especially important outcome, given their lifelong nature and the need for daily self-management.

Health-related quality of life (HRQOL) is increasingly used as an assessment of ones' satisfaction of their own life. The study of health-related quality of life implies that an illness interferes a person's daily life (Rubin et al.,1999). The World Health Organization Quality of Life (WHOQOL) defined quality of life as individual perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (WHOQOL GROUP, 1998). Moreover, HRQOL assessment was widely used in chronic diseases including Type 2 Diabetes Mellitus (Ware et al., 1993; Speight et al., 2009). It is generally known that HRQOL of Type 2 Diabetes Mellitus patients can be assessed by adapting generic and disease-specific HRQOL instrumentations (Rubin et al., 1999).

Numerous studies have been conducted on HRQOL among patients with Type 2 Diabetes Mellitus. Most of previous studies worldwide, demonstrated that Type 2 Diabetes Mellitus has a negative impact on HRQOL (Redekop et al., 2002; Kalda et al., 2008; Bennett et al., 2008; Kamarul Imran et al., 2010; Porojan et al., 2012; Cheah et al., 2012). Moreover, having Type 2 Diabetes Mellitus also seen to have lower HRQOL as compared to whom without Type 2 Diabetes Mellitus (Bennett et al., 2008; Porojan et al., 2012), but better HRQOL than people with other serious chronic diseases (Rubin et al.,1999). In addition, HRQoL in subjects with Type 2 Diabetes Mellitus may be associated with the number of other co-existing medical conditions (Maddigan et al., 2005).

There are multifactorial reasons for lower HRQOL among diabetics, for instance the deterioration of HRQOL status associated with Type 2 Diabetes Mellitus may be affected by treatment regimen factors (Caruso et al., 2000; Redekop et al., 2002; Saito et al., 2006; Porojan et al, 2012), and as well as psychological factors (Chyun et al., 2006; Misra & Lager, 2008). Psychosocial factors, such as anxiety and depression, may also contribute to inadequate self-management and diminished HRQOL of Type 2 Diabetes Mellitus patients (Chyun et al., 2006).

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In addition, several studies have also addressed the importance of including co-morbidities or complications of Type 2 Diabetes Mellitus with HRQOL (Ohsawa et al., 2003; Papadopoulos et al., 2007; Ribu et al., 2007). Previously, diabetes-specific health behaviours like diet and exercise also give impact to quality of life in diabetes patients (Watkins et al., 2000). Besides that, socio-demographic characteristics of Type 2 Diabetes Mellitus patients such as increasing age was associated with deteriorating of HRQOL (Kalda et al., 2008) also included in this study. This study is done to determine HRQOL and its associated factors among Type 2 Diabetes Mellitus patients in the context of rural communities.

## 1.2    Problem Statement

Type 2 Diabetes Mellitus is not only a health crises, but it is also one of the developmental challenges. WHO has estimated that 3.4 million people worldwide had died from consequences of high blood sugar (World Health Organization, 2011). As per the increasing number of diabetic patients, globally, healthcare expenditure for diabetes has totalled to USD 465 million in 2011, and by 2030, this number is projected to USD 595 million (Whiting et al., 2011). Other than that, not only does diabetes affect the patients but also imposes a heavy economy burden and major challenges to health policy makers in the developing countries such as Malaysia in managing this chronic disease (Wan Norlida Ibrahim et al., 2010). Hence, it is important to confront the problem rising up caused by Type 2 Diabetes Mellitus, especially HRQOL.

The projecting prevalence of Diabetes Mellitus in Malaysia is worrying. Thus, it becomes important to assess the quality of life for better care and control. HRQOL of Type 2 Diabetes Mellitus patients seen to be detrimental by many factors including having comorbidities. Furthermore, NHMS III 2006 reported that, there were 4.3% loss of limbs, 3.4% of them had strokes, and 1.6% were on dialysis or had kidney transplants due to Diabetes Mellitus among the patients. Therefore, continuous studies of HRQOL are required to understand the reality of living with Type 2 Diabetes Mellitus.

Moreover, among the study of HRQOL and its associated factors, body mass index (BMI) has been identified to be important factor that deteriorate HRQOL of Type 2 Diabetes Mellitus patients. BMI and obesity are the risk factors of Type 2 Diabetes Mellitus. It is understanding that prevalence of overweight and obesity among population aged 18 years has also shown escalating trends. In Malaysia, prevalences of overweight and obesity were 16.6% and 4.4% in NHMS II, and the prevalences of overweight and obesity increased to 29.1% and 14.0% in NHMS III. This shows worrying trend which indicates high risk of developing Type 2 Diabetes Mellitus and consequently affecting HRQOL.

In addition, self-reported HRQOL is an important outcome to assess Diabetes Mellitus as clinical parameters, such as glycated hemoglobin (HbA1c), a measure of average

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blood glucose control over the previous three months, often fail to capture the overall impact of the disease among diabetic patients. By highlighting the assessment of HRQOL in health research, health care providers will be encouraged to provide suitable focus and care to patients' welfare. Therefore, health care is gradually becoming more patient-focused, and there is a rising appreciation of the patient's perspective on health treatment and management.

It is generally known that the overall quality of life in Diabetes Mellitus patients is poorer than in normal population (Porojan et al.,2012). In addition, local studies on health-related quality of life revealed that the SF-36 scale scores were lower than those of the SF-36 norms among Type 2 Diabetes Mellitus patients in Malaysia (Kamarul Imran et al., 2010 ). However, the studies of HRQOL conducted among Diabetes Mellitus patients in Malaysia are still scarce. Intuitively, as different cultures would have different value systems, it would be expected that cultural related factors such as ethnicity would has an association on the patient's HRQoL. Therefore, more studies should be carried out in Malaysia to increase understanding on how having Type 2 Diabetes Mellitus affects patients' HRQOL, their needs of interventional programmes to improves their HRQOL.

A study among the Malaysian sample by Kamarul Imran et al. (2010) also reported that glycemic status is associated with quality of life. However, the extent of this decline related to the level of glycemic control remains debatable as the results of previous studies have been inconsistent. Hence, there is a need to assess the association of glycemic control level and HRQOL in future studies. Moreover, according to Malaysia's NHMS III in 2006, Negeri Sembilan had the highest prevalence of Diabetes Mellitus patients with 15.3%. The study of HRQOL among Type 2 Diabetes Mellitus patients in Negeri Sembilan having the highest population of diabetes patients, will give the perspective of patients' feelings and perceptions about the disease.

### 1.2.1    Significances of study

HRQOL among Type 2 Diabetes Mellitus patients can be associated with various sociodemographic, clinical and self-care behavioural factors. There is a need for intervention strategies to help Type 2 Diabetes Mellitus patients achieve the optimum quality of life. This study is significant in understanding and exploring the relationship of factors that is associated with HRQOL as an important step towards developing and implementing effective preventive intervention programmes. This study might have the potential to help improve the hollistic quality of care and HRQOL for diabetic patients.

Moreover, determination of the factors, including personal, clinical and  behavioural factors that predict health-related quality of life among diabetic patients is one of the important strategies to improve the awareness and knowledge of the patients. Fostering patients to take on a meaningful role in their own care is therefore central for improving quality of care and health outcomes.

This study may also provide useful information on diabetic patients difficulties, their views and needs, hence assist healthcare providers to help diabetic patients obtain the same or optimise quality of life as other healthy people. Moreover, understanding quality of life may also be useful in communicating with future patients about their expectations of the impact Diabetes Mellitus management and treatment have on diabetes.

In addition, to the best of our knowledge, there are a number of local studies conducted on diabetic patient quality of life. These local studies on quality of life of Type 2 Diabetes Mellitus will help enhance the growing of literature. Additionally, this study also supplies suitable suggestions and inspiration for future research to look at the factors that influence quality of life in relation to Diabetes Mellitus or other chronic diseases such as heart disease, hypertension, and open spaces for more large-scale studies related to quality of life.

## 1.3 Research Questions

This study will address the following research questions:

1.3.1 What are the factors associated with Type 2 Diabetes Mellitus patients?

1.3.2 What is the health-related quality of life (HRQOL) among Type 2 Diabetes Mellitus patients, as measured by the SF-36 scores?

1.3.3 What are the factors influencing the health-related quality of life (HRQOL) among Type 2 Diabetes Mellitus patients?

1.3.4 What are the significant predictors of HRQOL among Type 2 Diabetes Mellitus patients?

### 1.4 Research Objectives

### 1.4.1 General objective

The general objective of this study is to determine the health-related quality of life (HRQOL) and its associated factors among Type 2 Diabetes Mellitus patients attending health clinics in district of Tampin, Negeri Sembilan.

### 1.4.2 Specific objectives

The specific objectives of this study are:

i. To determine the socio-demographic, self-care behavioural, and clinical characteristics of Type 2 Diabetes Mellitus patients.
ii. To determine the health-related quality of life (HRQOL) scores among Type 2 Diabetes Mellitus patients as compared to Malaysian general population.
iii. To determine the association between the health-related quality of life (HRQOL) with socio-demographic (age, gender, ethnicity, marital status, educational level, occupation, household income), clinical characteristics (treatment regime, duration of having Type 2 Diabetes Mellitus, glycemic control, diabetes co-morbidities, body mass index (BMI)) and self-care behavioural (compliance to medication, self-monitoring blood glucose (SMBG)) among Type 2 Diabetes Mellitus patients.
iv. To determine significant predictors of the health-related quality of life (HRQOL) among Type 2 Diabetes Mellitus patients.

### 1.5 Research Hypotheses

H1: There is a significant association between the health-related quality of life (HRQOL) with socio-demographic characteristics of Type 2 Diabetes Mellitus patients.

H2: There is a significant association between the health-related quality of life (HRQOL) with clinical characteristics of Type 2 Diabetes Mellitus patients.

H3: There is a significant association between the health-related quality of life (HRQOL) with self-care behavioural characteristics of Type 2 Diabetes Mellitus patients.

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