



# MONASH University

## **PSYCHOSOCIAL VARIABLES AFFECTING DIABETES SELF-MANAGEMENT AND THE IMPACT ON QUALITY OF LIFE**

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B.A., M.Ed. (Psychology)

Thesis submitted for the Degree of Doctor of Philosophy

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MONASH UNIVERSITY MALAYSIA

FEBRUARY 2016

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**LIST OF ABBREVIATIONS**

CAS	- Clinical Anxiety Scale
DDS	- Diabetes Distress Scale
DKT	- Diabetes Knowledge Test
DM	- Diabetes Association Malaysia
DSES	- Diabetes Self-Efficacy Scale
HbA1c	- Glycated Haemoglobin
HCCQ-6	- Modified Health Care Climate Questionnaire
IDF	- International Diabetes Federation
IHLC	- Internal Health Locus of Control
LOT-R	- Revised Life Orientation Test
MDI	- Major Depression Inventory
mmol/mol	- millimoles per mole
mmol/L	- millimole per litre
MOH	- Ministry of Health, Malaysia
MSPSS	- Multidimensional Scale of Perceived Social Support
NADI	- National Diabetes Institute, Malaysia
NIDDK	- National Institute of Diabetes and Digestive and Kidney Diseases, United States
PDSMS	- Perceived Diabetes Self-Management Scale
PSI	- Problem-Solving Inventory
QOLS	- Quality of Life Scale
SCT	- The Social Cognitive Theory
SDSCA-R	- The Revised Summary of Diabetes Self-Care Activities Measure
SDT	- The Self-Determination Theory
SMBG	- Self-monitor blood glucose
WHO	- World Health Organisation

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## **ABSTRACT**

The diabetes population in Malaysia has grown and exceeded the prediction by WHO and potentially exhausts the country's healthcare systems. Such rapid growth has directly challenged the effectiveness of existing diabetes self-management education, urging researchers to explore any overlooked elements to be included in the healthcare services, especially from psychological health aspects. Rooting itself in SCT and SDT, this research explored psychosocial aspects in personal disease management and quality of life. Thirteen scales relevant to personal attributions, emotion management, interpersonal relationship, health literacy, perceived care, self-care activities, and quality of life were compiled and conducted along with an engagement interview. The data of 181 Malaysian Type 2 diabetics were used for analyses including multiple regression, independent-samples T-test, ANOVA, Kruskal-Wallis, and Mann-Whitney U test. Results revealed significant associations between psychosocial variables and self-management. Factors including self-efficacy, problem-solving skill, optimism, depression, anxiety, and distress were powerful determinants for self-management, which in turns predicts the quality of life amongst diabetics. Among self-management factors, self-perception of care was identified as the most powerful predictor for quality of life. Further, between-groups comparisons revealed that West Coast group and Chinese ethnic group reported better glycaemic. Additional information related to diagnosis, motivation, adaptation, self-evaluation, and acknowledgement was obtained via engagement interviews. The overall findings have placed personality, emotion regulations, availability of quality health services, education levels, cultural differences in health belief and lifestyle, under the speculation for the explanations. Lastly, limitation of study, practical implications, recommendations, and future directions of study were identified and discussed.

## **DECLARATION**

I hereby declare that this is an original research and it contains no material, which has been accepted for the award of any other degree or diploma in any university or other institution.

I also affirm that to the best of my knowledge the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Chin Choo Yap

February, 2016

## ACKNOWLEDGEMENT

*“Some trust in chariots and some in horses, but we trust in the name of the Lord our God.”*

- Psalm 20 : 7 -

First and foremost, I would like to express my deepest gratitude to my supervisors, Dr. Tam Cai Lian, Dr. Saravanan Muniandy, Assoc. Prof. Dr. Amudha Kadirvelu who have guided me from the beginning until the end of the research journey. Their support and understanding helped me to endure and complete my PhD study.

Special thanks go to Prof. Dr. Nigel Marsh who tirelessly reviewed and commented on my writing; Dr. Lin Mei-Hua and Dr. Alia Azalea for their advices and encouragements.

I am grateful to my fellow PhD colleagues; Aris, Intan, Kamruzzaman, Ee Lin, and Azma for their support and advice; Siew Ling and Yin Wah for their continuous prayer support and faith in me.

I am indebted to Dr Sharifah Yusoff, Dr Lily Aidura, Florence Lee Yik Peng, Khaw Kai Li, Mahindran M, Diabetes Care Centre (Sunway Medical Centre), Secita Senior Citizen Club, Subang Jaya Senior Citizen Club, Puchong Herbal Life Nutrition Club, ProChem Pharmacy, Praise Christian Church, Permai Methodist Church, and Damansara Utama Methodist Church. The data collection process could not be completed without your assistance.

I would like to thank Monash University Malaysia for providing me with a full scholarship for completing my PhD research. Jeffrey Cheah School of Medicine and Health Sciences indebted me by providing financial assistance to conduct the research project.

To all the men and women who participated in the study – thank you for your selfless sharing and trust.

Last but not least, many thanks to others who have directly or indirectly assisted me in any respects, towards the completion of this research. I am blessed to meet with all of them throughout the journey.



## **DEDICATION**

To my late parents, who had dedicated their lives to provide the best nurturance to their  
children and who had demonstrated remarkable courage and strength  
to overcome life challenges.

To my husband for his unconditional support, love and countless intellectual discussions.

To my nephews and nieces, never cease to learn.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

*Diabetes*, termed diabetes mellitus, is a metabolic disorder- a chronic disease with no known cure presently. It is a condition in which the body's blood glucose level is higher than usual due to one's pancreas cannot use insulin efficiently or does not produce enough insulin, or both (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2014). Insulin is a hormone that converts sugar, starches, and other food into energy needed for daily life. Lack of insulin causes hyperglycaemia that is referred to an abnormally high level of glucose in the blood. Persistent hyperglycaemia, if unattended, damages nerves and blood vessels, leads to other complications in heart, nerves, kidneys and eyes over time (National Diabetes Institute [NADI], 2009). The aetiology of diabetes is uncertain, although scientists believe that both genetic and environmental factors appear to play roles (NIDDK, 2014). There are two frequently mentioned diabetes namely Type 1 and Type 2. Type 1 diabetes is known as the insulin dependent diabetes mellitus that caused by the destruction of insulin-producing cells, resulting in insulin deficiency. Type 1 diabetes is usually detected among children and young adults. On the other hand, Type 2 diabetes or also called non-insulin-dependent diabetes mellitus is the more common type of diabetes in which the body either produces too little insulin or cannot use insulin effectively. Type 2 diabetes is often, but not always, diagnosed in older or

overweight adults. Unlike Type 1 diabetes, risk factors of Type 2 diabetes are modifiable through maintaining a healthy weight, eating sensibly, and exercising regularly (NIDDK, 2014). As a matter of fact, Diabetes Association Malaysia (DM, 2006) and NADI (2009) recorded more than 98% and for about 90% of patients within the Malaysian diabetes populace were diagnosed with Type 2 diabetes respectively.

Diabetes has become a global burden affecting every country in the world. A study on global prevalence of diabetes carried out by Wild, Roglic, Green, Sicree, and King (2004) revealed that the total number of diabetic patients is projected to rise from 171 million in year 2000 to 366 million in 2030. However, a more recent diabetes prevalence reported by the International Diabetes Federation (IDF) in 2013 reveals that there were already more than 382 million individuals living with diabetes around the world, and this figure is inevitably to reach 592 million within a couple decades if immediate and effective actions were not taken. For the same reason, diabetes has caused 5.1 million deaths in year 2013 according to IDF. The efforts of maximizing healthy life expectancy are counterproductive if diabetes population continues to expand uncontrollably. IDF also pointed out that Western Pacific region where Malaysia is situated, is the region with the most rapid growth in diabetic population.

The speedy spread of diabetes populace is caused by several reasons such as population growth, aging, urbanization, over-eating habits, and increasing prevalence of physical inactivity (Wild et al., 2004). Malaysia, being a developing country that has successfully shifted its main source of income from agriculture to industrial for the past several decades, has been blessed with better economy and more advanced technologies. Such blessings have made electronic and automatic inventions, pricey tasty food, non-active recreations, and convenient transportation

very affordable to many. In other words, more and more Malaysians have resorted to sedentary lifestyle for work and for leisure. Directly or indirectly, industrialisation together with modernisation has heightened the health risks in its people for Malaysia, particularly the number of sufferers in diabetes mellitus (Bakri, 2007).

## **1.2 Statement of Problems**

### **1.2.1 Diabetes Community in Malaysia**

Obesity is highly associated with the cause of diabetes. The National Health Morbidity Survey revealed that 20.7% of Malaysian adults were overweight and 5.8% were obese (Ismail et al., 2002). In addition, a statement released from the Prime Minister's office said that 40% of Malaysians are now either overweight or obese (Putrajaya, 2010). Worse, Malaysia has been rated as the most obese country (45.3% of the population) in Asia, according to Science Advisor to the Prime Minister, Tan Sri Zakri Abdul Hamid (The Star Online, 2014); as obesity is one of the risk factors highly associates with diabetes mellitus. While World Health Organisation (WHO) has estimated Malaysia would have 2.48 million diabetics by year 2030 (Wild et al., 2004), the Ministry of Health Malaysia disclosed that at least 2.6 million adults in the country already have diabetes, based on the 2011 National Health and Morbidity Survey. There was an increase of 39.6% in the prevalence of diabetes within a 5 years span from 2006 to 2011 amongst Malaysians aged 30 years and older (Omar, 2013). Furthermore, Professor Dr Wan Mohamad Wan Bebakar of Universiti Sains Malaysia explained that 20.8% Malaysians have Type 2 diabetes, five per cent of them are young adults aged between 20 and 25 years (The Star

Online, 2012). All these statistics are reiterating the fact that diabetes is not well-controlled in Malaysia; its community is growing larger and younger. For a country with only a population of 27.17 million (Hussein, 2008), it is indeed disturbing to learn that as Malaysia strives toward a developed economy status, the health of its people deteriorates at an alarming rate.

### **1.2.2 Diabetes Management in Malaysia**

Besides the threat of its increasing population, the glycaemic control amongst the Malaysians is ranked as suboptimal (Ahmad, Khalid, Zaini, Hussain, & Quek, 2011) or even poor (Shafie et al., 2012). Despite the optimum achievable standard of haemoglobin Type A1C (HbA1c)  $\geq 30\%$  (MOH, 2009, p.v) for quality management, the research teams collectively found that either a small portion of the patients (28%) managed to achieve optimal glycaemic control with a HbA1c lower than 6.5% (Wong & Rahimah, 2004) or more than half of their sampling population reported a HbA1c higher than 6.5% (Mafauzy, Hussein, & Chan, 2011; Mohamed, Kadir, & Yaacob, 2012; Ng et al., 2012; Ahmad, Ramli, Islahudin, & Paraidathathu, 2013; Chew et al., 2014). From Wong and Rahimah's study to the more recent Ahmad et al. (2013)'s study, it is worth to notice that Malaysia is losing its grip on diabetes control. As a matter of fact, the outcomes of these studies have directly challenged the effectiveness of existing diabetes care education after huge fund was utilised to set up diabetes care centres in all sizeable public and private hospitals. At the same time, the ineffectiveness may also indicate possible oversights in the content of care delivery.

### **1.2.3 The Cost and Regimen in Diabetes**

Today, chronic disease is not only a health issue but also an economy issue. In Maine, United States, it is reported that the direct medical expenses for diabetics are projected to be five

times higher than for non-diabetics (Baldacci et al., 2006). Moreover, in year 2011 alone, Malaysia spent approximately RM18 billion treating non-communicable diseases of which diabetes is most prevalent. On top of that, diabetes also slows down workforce productivity when the disease gets severe and weakens a patient's functionality, causing employees to need more medical leaves as well as opting for premature retirement involuntarily (Mohindra, 2011). Thus, diabetes mellitus is indeed deemed as a public health crisis in countries with high prevalence because it is causing a huge financial burden on public healthcare services as well as on individuals. Care methods with high efficacy need to be developed in order to prevent loss of human resources in the nation and ceasing of main income in families; and to maintaining a good quality of life.

Apart from medication, the common self-management activities introduced to individuals with diabetes by their healthcare providers usually includes practice healthy eating, exercise regularly, maintain proper foot care, perform routine blood glucose examination, and to stop smoking (Wallston, Rothman, & Cherrington, 2007; MOH, 2015). To many diabetic individuals, incorporating these activities into their existing lifestyle is a challenge. Some of them consider this regimen as complex and demanding (Glasgow et al., 1989); and, adherence to these self-management activities is more difficult than to cope with the diagnosis of diabetes (Hurley & Shea, 1992). A review by Kadirvelu, Sadasivan and Ng (2012) discussed that diabetes self-management is not only strict compliance to the prescribed regimen. Rather, it involves a high level of control from the patients. However, a good size of the population was not able to keep up with the regimen (DiMatteo, 2004). Derived from the research findings, Glasgow et al. discussed about diabetic patients show higher adherence to testing blood glucose

and taking insulin than following healthy diet and physical exercise. Such finding suggests that diabetic patients perceive medically related self-care activities as more important than lifestyle-related behaviours. Having said that, the diabetes education programme should place equal emphasis on both especially in ways to cultivate and maintain life style changes. Thus, having a good understanding of the patients' psychological factors may yield valuable information to formulate strategic health counselling intervention that could effectively educate or re-educate the patients to adopt a balanced self-management practice. Nevertheless, most importantly as mentioned by Auerbach (1989), understanding the relevant psychological variables in the chronic patients is vital to design and deliver an effective healthcare education to the patients.

### **1.3 Justification of Study**

#### **1.3.1 Patients' Autonomy and Healthcare Dependency**

Fortunately, Type 2 diabetes is manageable despite its unknown cure at the moment. Blood normalisation and prevention of comorbidities are achievable with early detection and prompt diabetes care. In evaluating the long-term costs and effects of one per centum reduction in HbA1c in Malaysian patients living with Type 2 diabetes, Shafie et al. (2012) reported that life expectancy increased by 0.36 year and the future costs and clinical outcomes were reduced at a rate of 3.5% annually. Evidently, it is reasonable to believe that by promoting healthy lifestyle and reinforcing effective self-management amongst diabetic patients are highly viable to reduce the dependence on heavy medication and medical utilization. Another benefit of such achievement that it will also help to reduce long waiting period and queues for consultation, especially in public hospitals and clinics.

### **1.3.2 Cultural Differences and Beliefs in Care**

Over the years, Asia has been identified as the emerging diabetes epicentre (IDF, 2013). As a result, more research involving the local patients need to be carried out instead of over-dependent on Western research outcomes as there are differences in genetic make-ups and other environmental factors that are unique amongst Asian diabetic patients. Hence, being an addition to the library of local research, this study could serve as a reference to understand the differences that exist amongst diabetic patients from different parts of the world. Whether the hypotheses offered in this study are accepted or rejected, it can serve as a foundation to future researchers who want to retest the theories, either using the same sample or a different one. As always, this study can be used to compare and contrast to provide additional references into the differences or similarities in other studies.

### **1.3.3 Effective Ideas and Method for Diabetes Education**

The predicted outcomes of this study could potentially contribute insights into existing diabetes self-management education with gender-specific and/or ethnic-specific groups. They could then assist in recommending appropriate self-care approaches such as counselling, relaxation techniques, support groups, positive thinking and self-talk, and by giving specific emphasis to different psychological needs among patients of diverse background. By raising and emphasizing the importance of self-management especially at the early stage of the disease, it would significantly lower the risk of developing other complications and allow patients to live a sustainable quality of life.



Despite enormous amount of research has been conducted to unmask the mysteries of diabetes, its populace continue to rise globally. Therefore, research endeavours should be continued until effective solutions are identified and diabetes epidemic indicator has gone south.

### **1.4 Rationale of Study**

Along with statistical revelations, gradual but steady increment of attention has been centred on health-related research in Malaysian population. When a person lives with a chronic disease like diabetes, his or her psychological responses have been observed to play an important role in coping and adjusting to the new lifestyle as well as monitoring and maintaining their health condition. The exploratory study, *Barriers to Optimal Control of Type 2 Diabetes in Malaysian Malay Patients* was conducted by Ali and Jusoff (2009) with the intentions to obtain an understanding in why there is a lack of diabetic control amongst Malaysian patients by sampling 18 diabetic participants (Malay ethnicity) using interview methods. The thematic results of this qualitative study include coping skills, knowledge on diabetes and diabetes management, problem integrating the treatment regimen, literacy level, family support as well as psychological factor (i.e., depression). Ali and Jusoff noted that patients' "beliefs and ability to minimise these barriers shaped their attitudes toward disease management". Inspired by their work, the researcher set forth to extend the inquiry by carrying out a quantitative study with a bigger sample size. This current study included a fair representation of the three main ethnicities, gender, and diabetic patients from East and West coasts of Peninsular Malaysia to examine the factors that either promote or hinder diabetes self-management. The study examined these factors from the following aspects: personal

attributions, emotion management, social support and diabetes knowledge. As such, the researcher wished this study could shed some lights into Malaysian local research community to better understand diabetics and see how their self-management adherence behaviours affect their quality of life. The study also intended to find out the strength of each predictor in contributing to diabetes self-management. On top of that, it compared the impact of the psychosocial factors has on the participants' perceived self-care, self-care activities, and actual adherence reflected in their HbA1c results. Last but not least, this study examined the outcome of self-management between the East and West sides of Peninsular Malaysia as well as the differences among Malay, Chinese, and Indian groups.

In brief, the predicted findings of this study would benefit the Malaysian healthcare sectors in many areas by providing a more holistic understanding of the promoters and hindrances of self-management, specifically among Malaysians suffering from Type 2 diabetes. And, it is the researcher's wish to effort a healthier population among the different ethnic groups.

### **1.5 Research Objectives**

The overarching objective of the study was to identify the determining psychosocial factors in personal diabetes self-management within Malaysian diabetic community. It is also designed to investigate the interactions amongst perceived competence, care activities, actual adherence; and, how self-management affects the quality of life. For ease of understanding, the broad objective is broken down into five specific objectives:

1. To determine the relevant and strong predictors of diabetes self-management in the composites of personal attributions, emotional management, interpersonal relationship, and health literacy.
2. To investigate the effects of patients' self-perceived adherence, self-care activities, and actual adherence (glycaemic control) on their experience in quality of life.
3. To examine whether the patients' self-perceived adherence, self-care activities, and actual adherence (glycaemic control) are consistent among each other.
4. To explore the variations of the glycaemic control in different parts of Peninsular Malaysia within the study cohort.
5. To explore the variations of the glycaemic control in different ethnic groups within the study cohort.

## **CHAPTER 2**

### **THEORY AND LITERATURE REVIEW**

For diabetic individuals, a good quality of life requires persevered self-management that eventually be incorporated in their daily routine. In most cases, the success in optimal care heavily depends on the individuals. Thus, this research was designed and conducted based on two major psychological theories: the Social Cognitive Theory and the Self-Determination Theory, which were believed to have beneficial effects on health promotion and its research.

#### **2.1 Theoretical Bckground**

##### **2.1.1 The Social Cognitive Theory**

The first theory adopted in this study is the Social Cognitive Theory (SCT) introduced by Albert Bandura in 1986. SCT was formerly known as a theory of social learning and imitation proposed by Miller and Dollard in 1941, signifying the departure of human study from Behaviourism that regarded human functioning as the sole mechanical reactions of external forces (Pajares, 2002). Bandura continued to develop the social learning and imitation theory, stating and proving the presence of mental processes in human functioning; and later, added an element of self-beliefs (i.e. self-efficacy) in 1970s to now the theory is known as the Social Cognitive theory (Pajares, 2002). Today, SCT is one of the important theories proposed to understand personality and to predict behaviours, and thus, it is chosen for this research project because predicting self-management adherent actions via personality is one of the study scopes.

According to SCT, humans are proactive, capable of self-organizing, self-reflecting, self-regulating; and, human activities are self-generated. Bandura (1989) emphasised the critical role of cognition in people's capability to construct reality, acquire knowledge, and fire an action. He also clarified that humans are "neither autonomous agents nor simply mechanical conveyers of animating environmental influences", negating the ideas put forth by Behaviourists previously. In essence, thoughts mediate between knowledge and actions.

SCT subscribes to a model of emergent interactive agency (i.e. triadic reciprocity) to explain self-generated activities (Bandura, 1989). The key members in the triadic reciprocal system are behaviour (i.e. action), personal factors (i.e. cognitive, affective, and biological events), and environmental factors. Unlike Behaviourism that overemphasizes environmental factors as the sole explanation of human learning and action; and Evolutionism that attributes human development and adaptation to biological factors, Bandura pointed out that the complexity of human functioning is unexplainable without acknowledging the presence of thought processes. Hence, SCT attributes human functioning as the outcome of reciprocal interactions among behaviour, the person and the environment.

People acquire and develop knowledge through a series of mental events that includes observational learning, self-regulatory and reflective processes. These dynamic self-regulatory activities have allowed humans to cope, advance and adapt to changes in life. SCT regards each and every individual as both product and producer within his own social system- proactively engaging, exert personal control over his thoughts, feelings, and behaviours; and hence, producing desired outcomes by his actions. In essence, the SCT emphasises that the core of human functioning lies within the cognitive ability; highlighting the critical importance of

cognition to construct reality, self-regulate, interpret information, and deploy strategic responses. Such capabilities were further being observed in both individualistic and collectivistic societies (Bandura, 1998).

The SCT renders an explanation to diabetes management as a form of self-generating behaviour. The amount of commitment for self-care behaviours is the outcome of interactions within the patients' beliefs, emotions, and living context.

### **2.1.2 The Self-Determination Theory**

The Self-Determination Theory (SDT), a theory of motivation, provides another theoretical perspective in supporting the current study. The theory was explored and developed as a part of the research outcomes evolving from Deci and Ryan's earlier studies on intrinsic and extrinsic motivations (1985, 1991). SDT was formally introduced and accepted as a sound empirical theory around late 1980s and it is now widely applied in academic research related to human psychology such as education (e.g. Tsai, Kunter, Ludtke, Trautwein, & Ryan, 2008), psychological well-being (e.g. Vereneau, Koestner, & Abela, 2004), health behaviours (e.g. Kim, Carver, Deci & Kasser, 2008), and personality (e.g. Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005). The main focus of this research is motivational in nature, investigating psychosocial variables that encourage health-benefitting behaviours; and for that, the SDT is adopted as one of the theories.

SDT is seated on the claim that human nature consists of persistent positive features that can be understood as inherent growth tendencies. A person's effort, agency, and commitment in their lives are repeatedly seen as a consequence of such natural propensity. Ryan (2009) describes SDT as "a macro-theory of human motivation, personality development, and well-

being. The theory focuses especially on volitional or self-determined behaviour and the social; and, cultural conditions that promote it. SDT also postulates a set of basic and universal psychological needs, namely those for competence, autonomy, and relatedness.” The need for competence refers to a person striving to control the outcome of events; and hence, experiencing a sense of mastery and competency in dealing with the environment. The need for autonomy denotes the universal desire of a person to feel independent of external pressure, being in control, and behaviours guided by him/herself. The need for relatedness encompasses a person exerts oneself to care for others, to interact and be connected with the immediate society in genuine and supportive manners (Deci & Ryan, 1991; Ryan, 2009). The fulfilment of these needs generate self-determined behaviours. Nonetheless, to actualise the inherent potential and the fulfilment of these needs, it requires a nurturing social environment. In other words, the natural growth towards positive motivation would be thwarted without a nurturing environment to fulfil the basic psychological needs. Thus, satisfying the needs is considered necessary and essential for a person to achieve vital, healthy human functioning regardless of culture or stage of development. Ryan (1995) regards SDT as an ‘organismic psychology’ which indicates that it can be adopted to study human psychology and behaviours holistically.

Past research applying the SDT have proven that diabetic patients are more motivated to achieve optimal control and assume responsibility of self-management when they demonstrated a satisfactory level of attitudes (locus of control, self-efficacy, problem-solving skill, and optimism), emotion management (depression, anxiety, and distress) as well as receiving sufficient social supports (family, friends and healthcare providers). Hence, with the support of

numerous studies utilising SDT as the foundation of the academic inquiry in health issues, it is justifiable for the study to root itself on the theoretical ground of SDT.

In essence, SCT posits that human is a thinking being as its central argument and SDT maintains human is intrinsically striving for optimal functioning to warrant optimal diabetes self-management. Nonetheless, majority of the studies related to diabetes self-management behaviours are of western literatures. Thus, SDT and SCT provide the theoretical lens in guiding this study to extend the understanding within the Malaysian context.

## **2.2 Definitions and Literature Review**

The objectives of the study were to identify the determining psychosocial variables in personal diabetes care, the interaction between levels of care and quality of life, as well as the role of residential areas and ethnicity in blood glucose control. Collectively, previous research from different parts of the world have identified the variables in personality, emotions, social interactions, and health knowledge as established factors closely linked to health behaviours, personal disease management impacting quality of life as well as demographic variables connecting to diabetes care. These studies have served as valuable references for the research. In the following section, the intended variables were operationally defined and past literatures were reviewed.

### **2.2.1 Self-management**

Self-management is the cornerstone of diabetes care. The idea of “self-management” can be generally understood as an individual having control over his/her life and the surrounding



environment. In Health Psychology, “self-management” can be known as “at-home management” whereby the individuals living with chronic disease take up their personal responsibility to monitor their health conditions and to minimize its negative effects on both physical and psychological functioning (Clark et al., 1991; Kadirvelu et al., 2012). Amongst healthcare literatures, several other terms were used to represent the ideas in self-management, which includes “self-care activity”, “adherence”, “compliance”, “prudent care”, “concordance” and so forth. While each of them is being defined with slight differences, they could all be included in the context of self-management. Clark and colleagues attributed three key issues to effectively minimizing the negative impact of disease on daily life; and they are awareness and knowledge about the health condition and its treatments, ability to manage health issues under various situations, and the ability to manage feelings or emotions associating with the health condition.

Typically, individuals who are diagnosed with diabetes mellitus are prescribed with multidimensional approach to achieve blood glucose normalization and to avoid any sequela or complication. The diabetes care regimen usually includes regular blood glucose check, daily medication (oral or/and injection), healthy diet, regular exercise, and daily feet inspection (MOH, 2009, p.1; Sacco, Malone, Morrison, Friedman, & Wells, 2009; MOH, 2015). Other forms of control could include personal hygiene, weight control, reducing or quitting alcohol consumption and smoking (MOH, 2009).

Alongside daily self-care behaviours, patients are also going to develop the ability to gauge their own adherent levels over times. Such personal gauge is termed as perceived self-

care (Wallston, Rothman, & Cherrington, 2007) which refers to patients feeling confident based on how well they carry out their prescribed care activities on a daily basis.

Besides perceived self-care and care activities, the glycated haemoglobin (HbA1c) test could be used as a measure on diabetes self-management. HbA1c is an important blood glucose test in both diabetes diagnosis and monitoring because its result indicates the average amount of glucose resides in one's blood stream over a prolonged period. Haemoglobin, a form of protein is found inside plasma that carries oxygen throughout the body. Glucose in the blood attaches and combines with the haemoglobin (glycated) within the lifespan of 120 days in the plasma. For the same reason, HbA1c is a more realistic reflection of the blood glucose control as compared to the fasting blood glucose test. Consequently, the higher plasma glucose, the higher the HbA1C level, indicating a poorer glycaemic control and the higher risk for diabetes complications (Tidy, 2012).

For the study, self-management is operationally defined as the personal responsibility of disease management that includes perception, health activities, and actual compliance. Hence, the researcher took a three-fold approach to investigate diabetes self-management that has involved measuring self-perception, self-care activities, and glycaemic control in order to obtain a more thorough understanding of self-management that is being experienced, practiced, and achieved by Malaysian diabetics. In brief, the goal of good self-management is to reduce/avoid diabetes complications and improves quality of life.

### **2.2.2 Self-efficacy**

Self-efficacy is a key construct in SCT. Bandura (1977) introduced the concept of self-efficacy, which is defined as "people's levels of motivation, affective states, and actions are

based more on what they believe than on what is objectively true”. Continued the work in self-efficacy, Bandura (1997) later redefined the term in a modern tone as “the beliefs in one’s capabilities to organise and execute the courses of action required to produce given attainments.” The self-efficacy perceptions help to determine what individuals do with their knowledge and skills. The concept of self-efficacy is further explained by Ahola and Groop (2013) that “an individual with solid confidence in one’s abilities is not only more likely to initiate behaviours, but will also, in the case of an unforeseen obstacle, be more persistent in one’s attempts compared with a less confident counterpart.” Nonetheless, Bandura also pointed out that the belief people have about their abilities is a stronger predictor of their behaviours than their actual capability.

A high sense of self-efficacy can help to boost achievements and accomplishments in many ways, it influences decision making and courses of action. Extending the concise definition provided by Bandura, self-efficacy is also referred to patients’ ability to engage in prescribed self-care regimen such as choosing the right food and drink combination to make up a meal that is low in calorie and using a glucometer to test blood glucose at regular intervals, as well as correctly respond with appropriate actions when experiencing hypoglycaemia or hyperglycaemia- a condition when blood glucose falling too low or rising too high respectively, for this study.

Self-efficacy is one of the most frequently mentioned psychological factors in chronic disease management and self-care research. Numerous past studies have revealed the strong association between self-efficacy and self-reported adherence. It means the level of self-

efficacy in a person reflects his or her confidence to assume responsibility of self-management behaviour.

Johnston-Brooks, Lewis, and Garg (2002) carried out study to compare the impact of self-esteem and self-efficacy has on both self-care and HbA1c. Their result pointed out that self-efficacy was a better predictor in both cross-sectional and longitudinal analyses, among their young adults (aged 18-35 years) participants living with Type 1 diabetes.

Comparing the strength of the two predictors (self-efficacy and autonomous self-regulation), Senecal, Nouwen, and White (2000) found that self-efficacy is a stronger predictor for dietary self-care in adults with diabetes. In Kuwait, Aljasem and team (2001) have found similar study outcomes pointing out that higher sense of self-efficacy predicted better adherence to diet and medication, more frequent blood glucose testing, and less binge eating. At the other end, Sacco and team (2005) revealed that their participants tend to report higher adherence failure with lower self-efficacy.

In a study conducted to understand the self-care experience involving participants of different ethnicities (specifically Asians, Latino, Whites, and African Americans), Sarkar, Fisher, and Schillinger (2006) found that self-efficacy is consistent with self-management across ethnicity in the aspects of diet, physical exercise, self-monitoring blood glucose and foot care, but not medication adherence. Their study revealed that gender and low-income status did not alter self-management behaviour whereas racial background and health literacy level did not affect the connection between self-efficacy and self-management. Hence, Sarkar et al. posited that it is essential to enhance self-efficacy especially among diabetics with limited health knowledge in order to improve their self-care behaviours.

When examining Taiwanese patients' demographic variables (age, sex, education, duration of illness, sum of treatment types) and self-efficacy, Wu and colleagues (2013) acknowledged that only sum of treatment types and self-efficacy were predictive of self-care behaviours; and, self-efficacy was the stronger predictor between the two. Their 228 participants have shown significant improvements in body mass index, waistline circumference, HbA1c, anxiety, depression, self-efficacy, and self-care behaviours after attending the efficacy-based self-management programme (Wu et al., 2013). Similarly, interviews of 15 patients carried out in an urban hospital in Malaysia reported that low self-efficacy was one of the reasons why patients did not check their blood glucose as often as they should (Ong, Chua & Ng, 2014). Patients who were overwhelmed by the instructions to perform self-monitoring blood glucose (SMBG) and expected someone to do the SMBG for them displayed a sign of inadequate self-efficacy.

Besides having direct and favourable impact on blood normalization, self-efficacy is also found to positively associate with other healthful actions such as undergoing diabetes care education, visit healthcare providers regularly, received treatment, stop smoking as well as helping to reduce anxiety and depressed feelings (Wu et al., 2013).

On the other hand, self-efficacy was also found to be a core factor, mediating the association between body mass index vs. depression and adherence vs. depression in an American study involving 99 Type 2 diabetes adults (Sacco et al., 2007). Although most past studies have informed about self-efficacy affects adherent behaviours, Sacco's study provided an alternative view suggested a reciprocal relationship between adherence and self-efficacy.

Notwithstanding that, a vast majority of previous studies have identified self-efficacy as the strongest predictors of diabetes self-management; a more recent study involving 396 Iranian participants has otherwise showed that self-efficacy was not a significant influence (Tahmasebi, Noroozi, & Tavafian, 2013).

### **2.2.3 Internal Locus of Control**

The locus of control concept has its origin in social learning theory. The concept maintains that the assessments of situation, capability, and outcome value are used to predict one's behaviours. The internal locus of control construct attributes behavioural consequences to personal control whereas the external locus of control construct attributes behavioural consequences to external factors like powerful other, fate, and chance (Rotter, 1989). The locus of control can be used to understand health management behaviours, and it is understood as the perception of health control (Wallston & Wallston, 1978) whereby health locus of control is closely related to health care compliance such as personal diabetes management and health beliefs (Lau, 1982; Schlenk & Hart, 1984). Based on the same logic, this study refers the internal health locus of control as the belief that personal health care and outcomes are controlled and determined by one's own behaviours. The idea explains that people are inclined to manage their health condition when they believe that they have control over it.

In Iran, a study set forth to examine the locus of control to self-management adherence was conducted (Morowatisharifabad, Mazloomi, Baghianimoghadam, & Rouhani, 2009). The study concluded that high internal locus of control improves adherence to diabetes regimen. Macrodimitris and Endler (2001) also found similar findings as there is a negative relationship between perceived control and blood glucose level.

When it comes to gender differences, studies showed that male patients reported higher control over their personal care for the disease than their female counterparts, among Iranians (Morowatisharifabad et al., 2009) and African Americans (Montague, 2002). From a different angle, Brooks and Roxburgh (1999)'s study noted that sense of control (measured as mastery) turned out as a very salient psychological factor for diabetic women. Among female participants, diabetes-related distress reduced noticeably when mastery increased; low mastery women experienced significant stress as compared to low mastery males.

Unlike self-efficacy, health locus of control does not always guarantee good adherence. The study investigating psychological contributing factors (i.e., self-efficacy, self-esteem, and locus of control) on oral health habits and diabetes care compliance has informed that although locus of control was strongly correlated to dental habits, the same factor did not explain diabetes adherence (Syrjala, Ylostalo, Niskanen, & Knuuttila, 2004). Another study examining the predictive power of personal control and social support on adherence (measured by weight management) among 465 Type 2 diabetic patients also found a modest result between locus of control and adherence (Tillotson & Smith, 1996). The collective findings surprised the researchers, revealed that social support has a critical role to influence weight management than internality. Despite high level of personal control, their participants reported low adherence if the social support was low. In fact, the additional analyses showed that only self-blame- a subcomponent of the internality factor was observed to have a significant but relatively small effect on weight management.

#### **2.2.4 Problem-solving Ability**

“Problem-solving” can be defined as the self-directed cognitive-behavioural process by which a person attempts to identify or to discover effective or adaptive solutions for specific problems encountered in everyday living (D’Zurilla & Nezu, 2001). This definition indicates that problem-solving is conceived as a conscious, rational, and purposeful activity. In this study, the working definition of problem-solving ability is seen as a three-staged paradigm. First, a patient has to be able to identify and acknowledge a health problem has occurred, then source and implement the right solution, and finally, evaluate the outcome. Often times, the self-care routine could be interrupted by impromptu life events such as a change in career nature, working hours, going overseas for a vacation, religious fasting or observe a prolonged cultural celebration which can extend from days to weeks with sumptuous feasts. A good problem-solver would know the best action to take in order to adjust, avoid, or accommodate these events without risking their health management ultimately.

According to Elliot and Marmarosh (1994) in their health-related expectancies study, self-perceived positive problem solvers reported lesser health problems, higher internal locus of control, and less likely to attribute health issues to chance. They are also more inclined to seek out related information as compared to ineffective problem-solvers. Glasgow, Fisher, Skaff, Mullan and Toobert (2007) commented that problem-solving is a core aspect of effective diabetes and chronic illness self-management. Diabetics who are good in problem-solving are more able to overcome hindrances and adhere to the self-management regimen. The outcome of their study has shown that problem-solving skills are related to several key diabetes self-management factors. To assess the relationship between decision-making and successful



diabetes self-management, Lippa, Klein, and Shalin (2008) later discovered that effective problem-solving strategies were related to better adherence as well as greater glycaemic control. A German study involving 625 diabetic patients found that personality dispositions are remarkably relevant in achieving primary treatment goals whereby active coping style was the only personality factor significantly related to good metabolic glucose control (Rose, Fliege, Hildebrandt, Schirop, & Klapp, 2002).

Hill-Briggs (2003) introduced a theoretical model of problem-solving in diabetes self-management which consisted of four key components: (1) problem-solving orientation; (2) problem-solving process; (3) transfer of past learning; and (4) disease-specific knowledge. Her research team later used the model to conduct a qualitative study on a group of impoverished African Americans, equally divided into good and poor control groups. The main findings of their study have informed that the complaints experienced by both groups were similar that following the recommended diet was identified as the biggest problem. Nevertheless, the good control group predominantly expressed a positive problem-solving orientation, taking rational and constructive approaches when dealing with their health issues, and carrying a positive learning attitude of the past experiences. The team also observed that ineffective approaches often paired with negative emotional expression (Hill-Briggs, Cooper, Loman, Brancati, & Cooper, 2003). Besides improving self-care compliance, effective problem-solvers are believed to handle self-care barriers better (Hill-Briggs, 2003).

Derived from their analyses, Rose and associates (2002) identified that optimistic attitude, strong belief in self-efficacy, and good doctor-patient relationship were the enhancers for problem-solving ability. In Italy, a group of researchers (Trento et al., 2004) conducted a

five-year controlled study and concluded that patients who improved on their problem-solving ability have reported a better diabetes management adherence. Alongside with investigation on the impact of health provider supports in diabetic patients, Trento and colleagues discovered that educational levels especially lesser years in schooling correlated with lower scores in problem-solving ability. Seemingly, good problem-solving ability benefits young diabetics as well. It is reported that a group of Type 1 diabetic adolescents who went through coping skill enhancement training managed to achieve a better metabolic control and treatment goals (Grey, Davidson, Boland, & Tamborlane, 2001).

### **2.2.5 Dispositional Optimism**

Optimism is a personality trait; it is an attitude in people to interpret life events positively and to expect favourable outcomes (Scheier & Carver, 1987; Scheier, Carver & Segerstrom, 2010). The way people approach the world with the “anticipating good”- optimism versus “anticipating bad”- pessimism could have a profound impact in their life (Scheier et al., 2010). High optimism is believed to be health benefitting. Optimistic patients tend to attract more social support, resilient to health crisis, proactive in self-care that includes prescribed regimen and neutralizing bad feelings. Optimism in this study is understood as a patient’s optimistic life orientation in experiencing daily events.

In Netherlands, a study involving insulin-dependent diabetics, patients with rheumatoid arthritis and patients with multiple sclerosis was carried out to examine their optimism and adaptation to chronic disease (Fournier, De Ridder, & Bensing, 2002). One related finding has shown that optimism has various benefits on physical health dependent on how controllable the disease is. The study explained that optimistic attitude helps the patients to accept their health

condition by adopting more rational coping stances. In other words, optimistic patients are less emotional when it comes to caring for their health. The study also pointed out that male diabetics expressed significantly more optimistic responses in their gender comparison analyses. A meta-analysis was conducted by Rasmussen, Scheier, and Greenhouse (2009) to determine the strength of association between optimism and physical health has churned favourable results. It is concluded that optimism is a significant predictor of positive physical health outcomes. In addition, Rose, Fliege, Hildebrandt, Schirop, and Klapp (2002) have also identified that optimistic patients display more active self-care behaviours.

Having optimism as one of the manifest variables in a conceptual model to examine glycaemic control, Brody's research team found that a combination of depressive symptoms, low self-esteem and low optimism in either the diabetic patient or the immediate supporter impair the patient's HbA1c results (Brody, Kogan, Murry, Chen, & Brown, 2008). Although optimism is not an action-oriented factor, it has always been considered a "value-added" attribute for individuals living with chronic diseases. For example in Finland, Kivimaki's research team reported that optimism released substantial protective effect that has helped to lower the risk of sickness as well as faster recovery after a major life event (Kivimaki, Vahtera, Elovainio, Helenius, Singh-Manoux, & Pentti, 2005). Despite the fact that optimism is not a novel concept in health and personality research, testing optimistic attitudes among diabetics specifically did not receive sufficient focus.

### **2.2.6 Depression**

Just as important are the emotional regulations when a person is diagnosed and living with a chronic illness like diabetes mellitus. Compared with general population in United States,

it was found that people living with diabetes have higher levels of psychological disturbances, including depression (Gavard, Lustman, & Clouse, 1993). A recent Malaysian study conducted in the Northeast Peninsular revealed that 32 out of 260 (12.3%) diabetic respondents have depression (Mohamed, Kadir, & Yaakob, 2012). It shows that depression and depressive symptoms are often observed amongst diabetics; and an Australian study comparing the depression levels between diabetics and non-diabetics confirmed the claim by pointing out that adults with diabetes have significantly higher levels of depression than adults without diabetes within the same age range (Poulsen & Pachana, 2012). Thus, these observations have made depression as one of the most frequently examined psychological factors in psychosomatic research.

Signs of depression outlined in the Diagnostic and Statistical Manual of the American Psychiatric Association, 5<sup>th</sup> Edition (DSM-5) (American Psychiatric Association, 2013, p.198-199) include the following prolonged symptoms experienced by the patients or observed by others: (1) depressed mood most of the day, (2) markedly drop of interest in normal/daily activities, (3) unanticipated weight loss or weight gain, (4) frequent insomnia or hypersomnia, (5) psychomotor agitation or retardation, (6) low energy level, (7) feelings of excessive worthlessness or guilt, (8) diminished ability to think or make decisions, and (9) suicidal thoughts. As stated in DSM-5, depression can cause functional impairments. A severely depressed individual is unable to attend to basic self-care needs and “have more pain and physical illness and greater decreases in physical, social, and role functioning (p. 205). Nevertheless, this study was not intended to examine the interaction between clinical depression and diabetes. As the matter of fact, individuals who were clinically diagnosed with depression

were filtered at the point of sample recruitment. The term “depression” used in this study is referred to depressed feeling experienced by the patients; as research showed that depression can deplete motivation and disturbing a patient’s determination to follow a required health plan.

A study was conducted to examine the effect of depressive symptoms have on diabetes self-management adherence by Ciechanowski, Katon, and Russo (2000). The findings of their study showed that patients who are moderately and severely depressed demonstrate fewer adherents to self-care regimen, poorer physical and mental functioning, and higher health expenses, as compared to the less depressed. In the similar vein, the research team led by Lin (2004) detailed the non-adherence reported by the depressed diabetics as compared to the non-depressed group, including less fibre and more fatty diet, more sedentary, more smoking, and non-adherent to oral medication for diabetes, hypertension and cholesterol. However, there is no difference of self-monitoring blood glucose and foot checks between the depressed and non-depressed groups.

Apart from the fact that depression is negatively associated with self-management, the present of depression seemed to make the psychology enhancement an effort of futile. A study of Lin et al. (2006) indicated that individuals who have been diagnosed with both depression and diabetes complications did not show significant improvement on self-care activities even after being exposed to a series of depression enhancement programmes which including pharmacotherapy and problem-solving treatment for duration a of 12 months. Nevertheless, the body mass index has shown a slight improvement comparing with the group that received the usual care.

Are diabetics susceptible to depression? Or, depression in diabetics is triggered solely by the complex regimen and there are no other factors involved? Several studies attempted to seek clarity in their relationships. A study showed that depression gets intensified when body mass index (BMI) and symptoms of diabetes increase (Sacco et al., 2007). Sacco and team further explained that depressed feelings rise in two conditions: when the BMI is high and when adherence is low. Other contributing factors such as lower educational levels and the presence of complications (Mohamed et al., 2012), females, aging, lack family support (Olvera, Stewart, Galindo, & Stephens, 2007) and inadequate healthcare provider support (Sacco, Wells, Vaughan, Friedman, Perez, & Matthew, 2005) were believed to make the patients more vulnerable to depression.

From the previous literatures, it is observed that the depression and self-management formed a reciprocal relationship- the presence of depression obstructs good adherence and poor adherence exacerbates the feeling of depression.

### **2.2.7 Anxiety**

People experience anxiety when feeling unsure about living with a lifelong chronic disease and managing it. The words “fear” and “anxiety” were commonly used to represent one another, DSM-5 purports that “fear is the emotional response to real or perceived threat” whereas “anxiety is anticipation of future threat” (American Psychiatric Association [APA], 2013, p.189). According to the definition provided by APA (n.d.), anxiety is “an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure.” The excessive worries reside in a patient need to be dealt properly to prevent them to develop into a disorder. The description of anxiety disorder outlined by APA denotes “people

with anxiety disorders usually have recurring intrusive thoughts or concerns. They may avoid certain situations out of worry. They may also have physical symptoms such as sweating, trembling, dizziness or a rapid heartbeat” is in concordance with the anxiety scale being adopted in this study. However, this study is not intended to examine clinical anxiety but rather how the presence of general anxiety deters self-care behaviours. Therefore, anxiety is operationally defined as tense emotion, worries and avoidant behaviours due to uncertainty in living with chronic diseases.

Depression and anxiety were found as the most common psychological co-morbidities occurring in diabetic patients (Gavard et al., 1993); they suffered from anxiety as frequent as from depression (Peyrot & Rubin, 1997). Similar to depression, the presence of anxiety often leads to incapacity to control the disease and a personal failure in disease management (Wu, Huang, Liang, Wang, Lee, & Tung, 2011). Studies focusing on Type 1 diabetics and adolescents also confirmed that acute stress and anxiety increased the difficulty of insulin utilization (Moberg, Kollind, Lins, & Adamson, 1994; Cohen, Welch, Jacobson, de Groot, & Samson, 1997). Another study revealed that the anxious and emotional coping style while living with diabetes has a link to increased stress, reduced regimen adherence, and poorer glycaemic control (Peyrot, McMurry, & Kruger, 1999).

On the other hand, the study completed by Skinner and Hampson (1998) did not show any significant association between anxiety and diabetes cares, as compared to depression, family and peer support. And earlier, a study that tested blood glucose control by introducing stress to diabetic children with Type A personality concluded that only some of the children showed hyperglycaemic response (Stabler et al., 1987). Hence, Rubin and Peyrot (2001)

concluded that outcome of research investigating the effects of anxiety on glycaemia was inconsistent due to mixed-findings from different research teams.

### **2.2.8 Distress**

The diagnosis of diabetes followed by the need to adhere to the care regimen creates stress in patients. Although the words “stress” and “distress” were used interchangeably by some researchers, they are in fact two distinct concepts (National Research Council, 2008, p.13). Stress is a state of imbalanced physiological or psychological condition resulting from an interaction between a person and his environment. Psychology research found that stress can impact a person’s motivation both positively and negatively (Ridner, 2004). On the other hand, distress is a negative emotional reaction. It is caused when the coping ability is way below the demands (Ridner, 2004).

Daily practice of diabetes care may involve physical and psychological pain can be emotionally overwhelming. Hence, diabetes distress is defined by Gonzalez, Fisher, and Polonsky (2011) as “significant negative emotional reactions to the diagnosis of diabetes, threat of complications, self-management demands, unresponsive providers, and/or unsupportive interpersonal relationships”. The context of distress in this study is referred to the negative feelings and not psychiatric distress experienced by the patients and not when they failed or adapted poorly in living with diabetes. With the reference of the definition provided by Gonzalez et al., distress is operationally defined as negative feelings triggered by the diagnosis of diabetes, pressure of complicated regimen, inconsistent healthcare services, and unsupportive environment.



Diabetes and distress are influencing one another either directly or indirectly. As Fisher, Delamater, Bertelson, and Kirkley (1982) portrait a cyclical relationship between diabetes and stress by arguing that stress may interfere with adherence and undermine metabolic control. On the other hand, poor metabolic control might interfere with general functioning, and hence, aggravating other stressors. Reasons that cause or elevate psychological distress include unable to maintain optimal self-care (Fisher et al., 1982); compel to routine lifestyle (Kelleher, 1988) and fed up by the intrusiveness of the diabetes self-care regimen functions like a constant reminder of one's illness (Brooks & Roxburgh, 1999). A more recent study increased our understanding by showing that both self-efficacy and diabetes distress were found to be significantly influencing self-care outcomes, self-efficacy was a stronger predictor on HbA1c whereas diabetes distress has a stronger effect on patients' medication adherence (Walker, Gebregziabher, Martin-Harris, & Egede, 2014). Their study also identified other essential contributors to desirable outcomes included higher education level, higher socioeconomic status, and lower perceived stress among the patients. Nevertheless, self-efficacy and distress remained significant but the socioeconomic of patients (inclusive of education, income, and subjective social status) was found non-significant in predicting self-care behaviours when the data was analysed by using Structural Equation Model (Walker, Gebregziabher, Martin-Harris, & Egede, 2015).

In the gender differences study, Brooks and Roxburgh (1999) found that female patients were significantly more distressed than their male counterparts when diabetes was seen as interference; however, their distress feeling reduced when sense of control increased. On the other hand, sense of control and subjective experience of interference did not influence the

distress feeling in male patients. Additionally, Poulsen and Pachana's (2012) study showed that diabetics who are younger in age expressed higher levels of depression, anxiety, and distress; suggesting that older diabetics are more able to manage their emotion associated with diabetes.

The constant stress of maintaining desired glucose level could be emotionally burdening. Some patients may see the regimen particularly intrusive and stigmatizing (Fisher et al., 1982) especially when they need to carry a medicine box, lancet and insulin injection pack with them like going to work or travelling. This part of the regimen alone can lead to psychological discomfort, and the negative feelings need to be regulated properly.

### **2.2.9 Social Support**

Social support is gradually gaining its recognition in playing an important role to foster positive health outcomes among individuals living with chronic disease. As the daily management of diabetic conditions has become emotionally challenging, a good social support from significant other, family members, friends, co-workers, and healthcare providers can help to relieve distress feelings experienced by the patients (Kadirvelu et al., 2012). Shumaker and Brownell (1984) defined social support as "an exchange of resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient." Social support is also regarded as the functional aspect of interpersonal relationships that often involve emotion and feelings. Social psychologists explained that although social support comes in the form of external motivation, it plays a critical role to either reinforce or hinder health behaviours.

In this study, social support is referred to the system- the immediate patient-health related environment that involves significant other, family members, close friends, co-workers,

and healthcare providers. The influence of the system usually avails itself in emotional, tangible, informational, and appraisal support (Ahola & Groop, 2013). It is believed that the supportiveness and criticism displayed by the system could send a direct impact to the patients' self-management attitudes.

Early research that linked social support and diabetes care were mainly centred on young patients. Research found that diabetic adolescents with higher quality relationships with parents and less peer orientation were reported to have a better diabetes self-care. Skinner and Hampson (1998) have completed a study to learn about social support and personal models of diabetes related to self-care and well-being in adolescents with Type 1 diabetes. Their overall findings relate family support as a significant predictor of perceived efficacy in self-management. The study also found that girls reporting higher levels of depression, anxiety, better dietary self-management, more support from friends as compared to boys. In similar light, Type 1 diabetes adolescents were reported to demonstrate more effective coping with diabetes management when their stress was shared with their parents (Berg et al., 2009). Similarly, Gallant (2003) also confirmed that dietary control is particularly susceptible to social influences; members within the social support system play a key role to influence self-management behaviours. Further examining the significant role of social support and multidimensional health locus of control on diabetes care, Schlenk and Hart (1984) pointed out that social support and powerful other control turned out as the top predictors among their 30 insulin-dependent participants. Once again, it shows that the presence of social support could help conveying motivation to actions of self-care.

Besides family, friends and peers play a vital role in well-being and self-management as well. Encouraging, understanding and helpful friends increase the motivation and competence in their diabetic friends to engage further in adherent activities (Al-Qazaz, Hassali, Shafie, Sulaiman, & Sundram, 2011). According to Schiotz and team (2012), when individuals meet with friends that often offer a strong social support, they tend to engage more self-management behaviours, have higher patient activation levels, lower emotional distress and increased positive assessment of care.

Then, is social support equally relevant to adult diabetics as a determinant of self-care activities? The answer seemed positive when Brody's research team (2008) reported that African American diabetic patients (age range 40-65 years) responded positively to self-management if they are getting quality emotional and instrumental supports from their immediate social contexts. Additionally in other studies, spousal support was found equally important, if not more, in the management of the disease (August & Sorkin, 2010; August et al., 2013). Patients experience less stress and better in marital interactions when spouses extend their support (August et al., 2013).

Apart from significant other, family members and friends, the relationship between diabetic patients and their healthcare providers also has a mediate effect on their self-management adherence. The study carried out by Bodenheimer, Lorig, Holman, and Grumbach (2002) pointed out that self-management education and training are more effective when chronic patients are engaged in collaborative care with healthcare providers. In fact, empathic manner and competency were being identified as the key qualities in doctors that have positive impact in patients' metabolic control (Rose, Fliege, Hilderbrandt, Schirop, & Klapp, 2002). Apparently,

motivation from physicians is identified as another form of social support that can help to increase self-management and adherence to clinical care (Sieber, Newsome, & Lillie, 2012). A well-structured, progressive, and regular diabetes intervention can effectively improve the self-efficacy in diabetes care and blood normalization.

While several past studies have shown the positive effects of health provider support, Trento et al. (2004) argued that provider support that comes in group was more advantageous to the patients as compared to traditional one-to-one consultations and education sessions. Over a five-year period, their participants who received diabetes care assistance from a group of healthcare providers (comprised of one or two physicians and one educator) have shown improved knowledge, problem-solving ability, quality of life, and HbA1c scores when compared with participants received one-to-one consultations. A couple of Malaysian studies conformed to Trento's argument. A Malaysian study reported significant reduction in HbA1c, fasting blood glucose, and cholesterol levels among participants who signed up for a pharmacist-managed diabetes medication therapy adherence program after eight regular sessions (Lim & Lim, 2010). Similar and positive outcomes were found in another group of Malaysian participants upon completion of a 12-week monthly self-care training (Tan, Magerey, Chee, Lee, & Tan, 2011). Examining the determining effects of diabetes knowledge, self-efficacy, illness perception, personality, family support, and healthcare provider communication over diabetes self-management, Tahmasebi and colleagues (2013) found out in their study that illness perception and provider-patient communication were the only two factors that directly and significantly affecting the level of self-management. They also added that the rapport between patient and provider might improve patient's understanding and recall of information. On the

contrary, in a study conducted to investigate the attachment styles in patient-provider relationship, Ciechanowski, Katon, Russo, and Walker (2001) confirmed that patients who had distant and rigid relationship with their healthcare providers had shown poor self-management in caring for their own illness. Thus, it is believed that optimal disease control could be achieved when patients and healthcare providers work together interactively on a regular basis.

In brief, social support reduces the sense of loneliness in the patients; and, a supportive and empathizing environment is health benefiting.

#### **2.2.10 General Knowledge on Diabetes**

*Better the devil you know than the devil you don't.* Gaining knowledge of diabetes and how to care for the disease is believed to be vitally efficacious to achieve optimal adherence. Informed patients who have knowledge about the disease and its complications, effects of the medications, and appropriate self-care regimen are observed to be more compliant to treatment and lifestyle changes (Ali & Jusoff, 2009; Rise, Pellerud, Rygg, & Steinbekk, 2013). Therefore in this study, knowledge of diabetes is included as a subset of health literacy, refers to “the individual’s capacity to read, understand and make use of healthcare-related information for decision making and self-care” (Ahola & Groop, 2013). Meanwhile, the meaning of diabetes knowledge given by Ahola and Groop is adopted as the operational definition for this study. Being an informed patient does not mean that the patient must be highly conversant of every single issue related to diabetes mellitus. However, the patient is expected to possess sufficient understandings of its symptoms, the effects of medication, estimating calories in a meal, remedial options when hypoglycaemia happens, preventing comorbidities, and most importantly on the reliable sources for their questions.

Research found that knowledgeable patients displayed better attitudes in self-care (Ranjini, Subashini, & Ling, 2003). On the contrary, insufficient understanding of the disease and care has always been found as one of the top barriers of prudent adherence (Nagelkerk, Reick, & Meengs, 2006; Nair, Levine, Lohfeld, & Gerstein, 2007). In fact, Tan and Magerey (2008) pointed out that inadequate diabetes knowledge is the main factor for sub-optimal blood glucose control among their Malaysian participants. As reported in several past research conducted in Malaysia, such low health literacy could be contributed by several reasons including patients received none or minimum diabetes education after their diagnosis (Ali & Jusoff, 2009; Al-Qazaz et al., 2011), poor comprehension of medical advice or medication knowledge (Tan & Magerey, 2008; Ahmad et al., 2013), being older in age (Tan & Magerey, 2008; Ahmad et al., 2011; Ahmad et al., 2013), and low education level (Tan & Magerey, 2008; Ahmad et al., 2011).

Although knowledge alone does not always predict good diabetes self-management as Norris, Engelgau, and Narayan (2001) claimed in a review and noted in Aljasem et al.'s study (2001), Schillinger and his colleagues (2002) have found that limited health literacy has a negative effect on diabetes management. Another research has proven that increasing diabetes knowledge in patients has helped to increase their self-care ability (Trento et al., 2004). In Michigan, United States, Nagelkerk et al. (2006) have conducted a qualitative study to understanding the barriers and strategies to diabetes self-management. Their study has facilitated the understanding that patient-practitioner collaborations, which were seen as a source of diabetes knowledge, has a direct impact on patients' self-management behaviours. In Malaysia, Ali and Jusoff (2009) concluded that diabetic patients reported a better adherence to

self-management when they possessed more information in diabetes-related knowledge.

Nonetheless, metabolic controls showed no significant improvement even the participants were provided with diabetes education, according to a study carried out by Dunn, Beeney, Hoskins, and Turtle (1990). Similarly, a study conducted by Rose et al. (2002) showed that good metabolic control can be achieved with or without detailed knowledge on the disease, via means of routine or intuition. Nevertheless, the findings of their study also showed that older patients are better in blood glucose regulation.

The empirical supports for the use of diabetes knowledge and information to enhance self-management remain limited. Numerous studies disclosed that having sufficient knowledge does not certainly lead to behavioural change or optimal self-management. Tahmasebi et al. (2013) observed that diabetes knowledge has an indirect influence on diabetes self-management through self-perceived control and self-efficacy. However, improving knowledge alone would not help to increase health-benefitting behaviours. In addition, a study took place at an urban diabetes care centre in Malaysia reported that overall their participants managed to achieve satisfactory scores in Knowledge, Attitude and Practice (KAP) questions but yet recorded poor HbA1c and fasting blood glucose. In fact, the negative correlations between their KAP and diabetes control were statistically significant (Ng et al., 2012).

#### **2.2.11 Quality of Life**

When someone was diagnosed with a chronic disease and advised to incorporate the disease management regimen into their lifestyle, the concern for quality of life is imminent. Quality of life has become an important indicator to determine the impact of health care in chronic diseases, and much attention has been given to define and measure it in the last couple



of decades (Burckhardt & Anderson, 2003). Although researchers have not come to a unanimous definition for quality of life, Revicki and team (2000) described the term as “a broad range of human experiences related to one’s overall well-being. It implies value based on subjective functioning in comparison with personal expectations that is defined by subjective experiences, states, and perception”. Revicki et al. further elaborated, “quality of life, by its very nature, is idiosyncratic to the individual, but intuitively meaningful and understandable to most people”. The description befits the quality of life scale used in this study; and therefore it is adopted as the operational definition.

In a review paper written on quality of life and diabetes, Rubin and Peyrot (1999) mentioned that diabetics experience a worse quality of life as compared to people without a chronic disease; however, having a better blood glucose control is positively related to a better quality of life. The relationship between diabetes and quality of life is reciprocal- living with diabetes affects a person’s quality of life and the perceived quality of life in return influences the devotion to optimal self-care (Rubin, 2000). Rose et al. (2002) noted several factors that can influence a patient’s perceived quality of life in their review section. These factors include the number of other complications, severity of their diabetes, depression, personality such as coping styles, and illness perception. In fact, their participants reported to have higher quality of life when they engaged in active coping behaviours.

When Franciosi et al. (2001) carried out a study to examine the relationship between the frequency in self-monitoring of blood glucose and metabolic control, they found that patients who check blood glucose more frequently tend to have a better control and hence enabling them to adjust insulin dosage. Nevertheless, the same patients were also reported to have higher

distress, worries, and depressive symptoms, as they perceive frequent blood glucose checking as the reason that lowers their quality of life. Jacobson, de Groot, and Samson (1994) found that patients who were prescribed with oral medication rated lower in quality of life as compared to patients who were advised to monitor their diabetes condition through dietary control and exercise only. Those who have to rely on insulin injection expressed less satisfaction with quality of life than those on oral medication. Seemingly in a glimpse, the patients' quality of life is closely associated with the complexity of the self-management regimen. Nevertheless, the intensification of treatment did not reduce the quality of life in Type 1 diabetics as much as in Type 2 (Rubin, 2000). Hence, it seemed that there is a paradoxical relation between self-management and quality of life, that the more effort a patient devoted to achieve desired adherence, more time and resources were spent and resulted lower quality of life experiences.

#### **2.2.12 Self-perceived Care and Actual Management**

Are patients' self-perceived care and daily health activities good enough to keep them informed on their actual glycaemic control? Unfortunately, correlational studies linking the different aspects of self-management were rarely produced.

In the process of developing and validating the Perceived Diabetes Self-Management Scale (PDSMS) by Wallston et al. (2007), patients' self-care behaviours were assessed using the Summary of Diabetes Self-Care Activities (SDSCA) by Toobert, Hampson, and Glasgow (2000). Comparisons were made between patients' perceived confidence in general and specific self-report (on dietaries control, physical exercise, blood testing, foot care, frequency on smoking, and medication taking) in managing their diabetes condition. The outcome of the study demonstrated a positive association between PDSMS and SDSCA. Wallston and

colleagues contented that PDSMS is a reliable and valid instrument to measure general perceived self-competence in diabetes self-management. Given that many patients do not monitor their blood glucose as often as required due to various reasons, perhaps Wallston et al.'s findings may become a rudimentary knowledge indicating that perceived competence can be entrusted without the use of glucometer on a regular basis.

### **2.2.13 Cultural Background and Self-management**

Many factors surround adherence, and cultural influence can be one of them. Cultural background is a reference to any society or subcommunity that an individual identifies as his or her heritage or background that encloses the beliefs, behaviors and traits of an ethnic, social or age demographic (Gurung, 2010). Gurung's description of cultural background befits the nature of this study. Hence, it serves as a reference for the working definition of cultural background in this study.

Investigating self-management adherence through cultural background such as age, gender, ethnicity, education, family history, and socio-economic status were frequently carried out by health researchers. There were mixed findings in previous studies as some reported demographics variables were not affecting self-management behaviours (e.g., Glasgow et al., 1989; Hurley & Shea, 1992; Sarkar et al., 2006) and some found positive connections between the two (e.g., Montague, 2002; Olvera et al., 2007; Walker et al., 2014).

Amongst past studies done in Malaysian contexts, certain sociodemographic factors affecting diabetes care outcomes were observed. The appealing factors included geographical location of the patients/hospitals and ethnicity. For instance, a significant different in glycaemic control via the health data between urban and rural healthcare entities was reflected in Tan and

Magerey's study (2008) where the urban hospital was reportedly having better glycaemic control than the rural ones with average fasting blood glucose of 8.76 vs. 8.98 mmol/L. Some other Malaysian studies have indicated that patients reside in East Malaysia seemed to have the lowest HbA1score ([7.4%] Wong & Rahimah, 2004; [7.2%] Feisul & Azmi, 2013), the West Coast areas moderate ([8.3%] Ismail et al., 2000; [7.9%] Ng et al., 2012; ; [8.0%] Feisul & Azmi, 2013; [8.0%] Chew et al., 2014), and the East Coast being the highest ([9.1%] Ismail et al., 2000; [8.6%] Feisul & Azmi, 2013). In terms of glycaemic control amongst different ethnic groups, these studies unanimously reported Chinese diabetics have the best control followed by Indians and Malays (Ismail et al., 2000; Ahmad et al., 2011). In brief, it is necessary to conduct more studies to analyse the relevant demographics that influence the diabetes management and outcomes.

### **2.3 Limitations of Previous Studies**

The spread of diabetes mellitus in Malaysia is reportedly way faster beyond prediction. Its speed has definitely sent some shock to the national healthcare system. Naturally and initially, we referred to the established research findings of other countries for answers and solutions. With the guidance of the foreign research, health researchers began the endeavour in local studies in order to gain deeper understanding of the disease. In the past, most of the research was rooted in medicine and pharmacology disciplines. However, the study about the characteristics of the local diabetic populace, especially from the health psychology perspective remains sporadic. In the last 20 years, there were only a handful of psychology-related studies being conducted in the areas of self-efficacy, knowledge, depression, quality of life, and social

support. These research put together is still insufficient and inconclusive to form an insightful understanding of the population that grows bigger and more diversified every day, and to arrive at an effective approach to assist them in their daily management. Thus, other health-benefitting personality factors and emotion management skills need to be adequately addressed and researched to close the gap of knowledge.

Within the handful of health psychology studies conducted in Malaysian diabetics, a vast majority of them were sampling over patients utilizing public healthcare services. Only a few studies (e.g., Ahmad et al., 2011; Ng et al., 2012) have included patients from private medical centres. This disproportionate sampling practice might lead to a lack of comprehensive and incomplete understanding of the population as well as oversight the needs of private patients.

Amongst previous studies conducted in other countries, it is noticed that the number of research on locus of control has become less and less. In fact, most of the research was published before year 2000. Does that mean the loci of control variables are no longer important to predict self-care activities? There was hardly any related study carried out in Malaysian sample. Is locus of control not essential given that most diabetics are mature adults who are living in the most self-regulating period in their life? Ample research should be conducted to investigate their relationship before the variables can be ruled out in learning about diabetic patients and their disease management attitudes.

Comparative study is another big missing piece from the library of Malaysian research. Demographics variables such as educational levels, residential areas, use of alternative medicine, use of home remedy, physical distance to the healthcare entities, owning and using a personal glucometer as well as methods to obtain health information are topics deemed

important and yet under-researched. In addition, self-perceived and actual care should be juxtaposed to find out which one of them is the preferred reference that patients go by to determine the level of effort they should devote to their daily management.

Diabetes management regimen is perhaps the most cumbersome and demanding of any common care. It is not surprised that patients sometimes neglect the necessity to perform the self-monitor blood glucose (SMBG) test as frequent as prescribed by their doctors. They usually based the need for adherence on their personal guesses or perception and result in inconsistent blood glucose level records. Such incomplete record may have some negative impact on patients' glycaemic control in the long run. Unfortunately, this topic was rarely discussed in previous research.

With regards of the social support system, many scientific reports especially those published by the first worlds have attributed its importance to Type 1 diabetics (also known as juvenile diabetes). Few studies have investigated the link between the impact of support and self-management amongst the adult diabetics. Nevertheless, Malaysian society is collectivistic by nature, constructive social support may be valuable to generate better adherence even among the adults.

## **2.4 The Conceptual Framework**

Based on past research, this study roots itself in the Social Cognitive Theory and Self-Determination Theory. It is conceptualised to explore and to understand diabetes self-management from four main psychological components, namely attribution, emotion management, interpersonal relationship, and health literacy.

The Attribution component entails four variables; self-efficacy, locus of control, problem-solving ability, and optimism in the participants. In concise, past research has informed that individuals living with diabetes who possess personality traits such as self-efficacy, internal locus of control, problem-solving ability, and optimism are advantageous to their disease management routine. Being diagnosed and having to live with the disease can be emotionally burdening to the patients. It was observed that diabetics, who are able to manage their emotions, are more willing to adhere to their self-care regimen. For the same reason, poor emotional adaptations such as allowing one to get depressed, distressed or anxiety-stricken tend to obstruct the patients to practice optimal control on their health. Further, patients who are fighting the disease on a daily basis are in need of strong support from family and healthcare providers, evident by support in various forms received from significant others and healthcare providers increases their motivation for self-managements. Thus, the third component examines how a patient's interpersonal relationship within his/her ecosystem would affect the health management. The last component- Health Literacy attempts to seek understanding between knowledge of diabetes and adherence. It is believed that being knowledgeable of the disease would encourage and promote self-management adherence behaviours in the patients.

Apart from testing blood glucose levels, another commonly used approach to understand adherent behaviours is by asking some questions to the patients directly. The questions could come in the form of questionnaire via a self-care checklist or self-perceived survey. Can they have a good gauge of their self-care activity without a glucometer? Can their favourable perception of self-care be translated into good level of actual adherence? Hence, understanding

the association between self-perception and actual adherence becomes one of the scopes in this study.

The third scope of the study is to seek knowledge with regards of self-management and quality of life. Logically, high adherence tends to bring out optimal glucose control as a result. Nevertheless, high adherence also means more time devotion and compromise on other favourable activities and food; patients may need to modify or even forgo the lifestyle they are familiar with and adopt a new tougher and healthier lifestyle. Thus, does high adherence impair quality of life?

Refer to Figure 2.1 for the draw-up diagram of the conceptual framework.

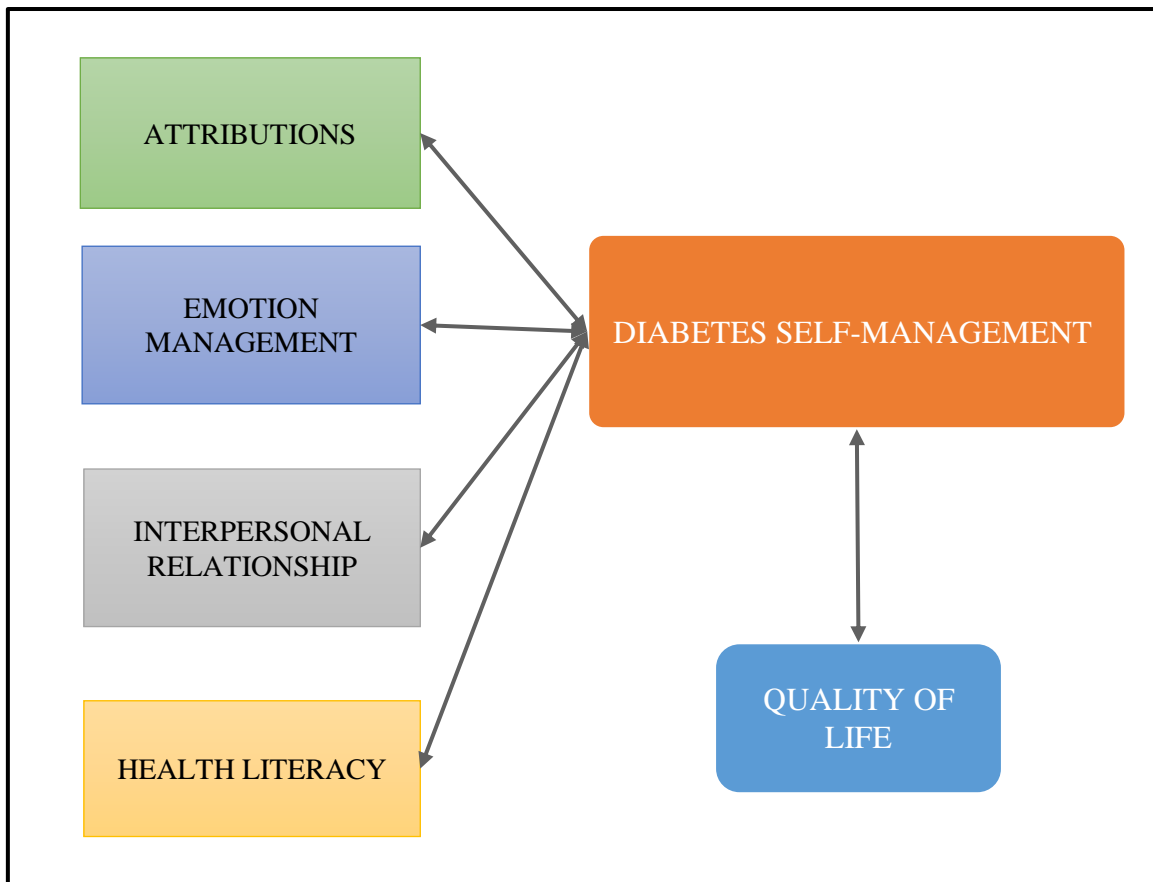


Figure 2.1. The Conceptual Framework



## 2.5 Rationale and Hypotheses

Hypotheses were developed to address the five research objectives. Hypothesis 1 – 4 were formed to answer Research Objective 1, which denotes the relevance and strength to determine self-management in the aspects of attributions, emotional management, interpersonal relationship, and health literacy.

Patients' attributions such as self-efficacy, locus of control, problem-solving ability, and optimism have been shown as the main variables that are highly related to patients' self-management adherence by several past studies (e.g. Glasgow et al., 2007; Brody et al., 2008; Morowatisharifabad et al., 2009; Ong et al., 2014; ). Therefore, the following hypothesis was suggested:

***H1: It is predicted that self-efficacy, internal locus of control, problem solving skill and optimism would be positively associated with self-management.***

It is believed that patients' ability to manage their emotions for being diagnosed as diabetics is highly correlated to their self-management. Past studies (e.g. Ciechanowski et al., 2000; Lin et al., 2004; Walker et al., 2015) found that patients who experienced different feelings in the grief cycle (such as anger and depression) and other feelings (such as anxiety and distress) for being diagnosed and/or having to live with diabetes mellitus responded differently towards the adherence of self-management regimen. In contrast, poor emotional regulation has been found as a hindrance to optimal self-care. Therefore, the following hypothesis was suggested:

***H2: It is predicted that feelings of depression, anxiety, and distress would be negatively associated with self-management.***

Beside patients' attributions and feelings that have significant effects on self-management, the amount of support available to patients in both social and health care contexts also predict their self-management adherence (e.g. Lin et al., 2006; August et al., 2013; ). Thus, the following hypothesis was suggested:

***H3: It is predicted that social support and healthcare provider support would be positively associated with self-management.***

From the perspective of health literacy and knowledge in diabetes cares, some diabetes-related studies have found that patients generally reported higher self-management adherence when they have better general knowledge and understanding about the disease (Ali & Jusoff, 2009; Rise et al., 2013). In the similar vein, non-adherence occurred when the knowledge in diabetes was low (Tan & Magarey, 2008; Ahmad et al., 2013). Therefore, the following hypothesis was suggested. Refer to Figure 2.2 for the hypothesized diagram.

***H4: It is predicted that the level of knowledge in diabetes would be positively associated with self-management.***

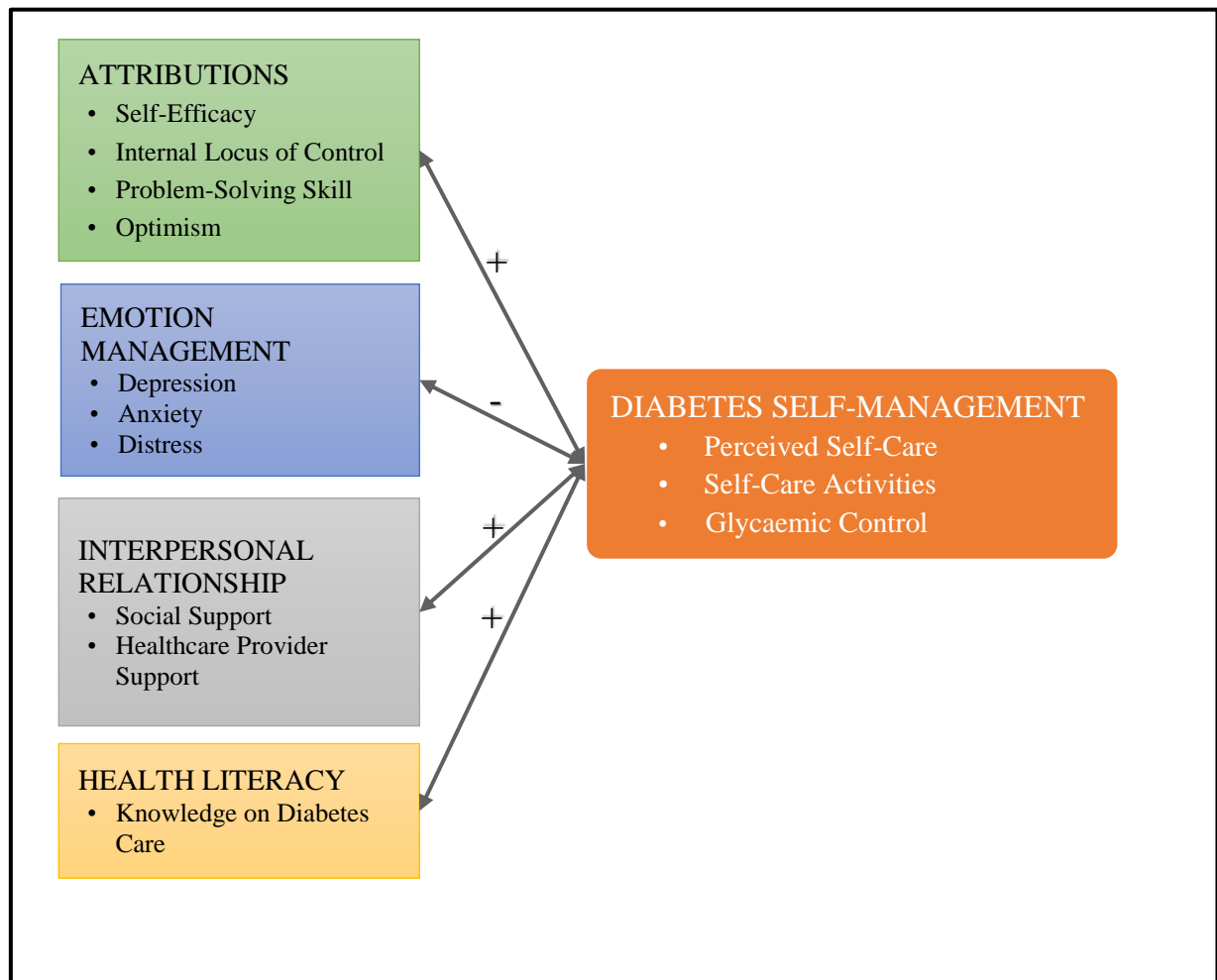


Figure 2.2. Hypothesized Diagram for Hypothesis 1 - 4

In general, the diabetes self-management regimen includes diet control, physical exercise, regular SMBG test, foot care, reduce or cease smoking and consuming alcohol, oral medication, and insulin injection. Research Objective 2 intended to understand if the level of self-management affected the quality of life for a diabetic patient. Past research conducted outside of Malaysia on diabetes self-management and quality of life reported a mixed finding. Usually, patients reported a higher quality of life when they actively involved in the disease management (Rose et al., 2002). However, some patients who are in severe diabetic conditions

expressed of having poorer quality of life because the regimen has taken up a lot of their time, money, and freedom. The disease may also affect their competency and stamina at work and major lifestyle shift may be necessary in order to accommodate the disease (Rubin & Peyrot, 1999). Indicated by the foreign studies, the following hypothesis was established. (See Figure 2.3.)

**H5:** *It is predicted that there is a significant association between diabetes self-management and quality of life.*

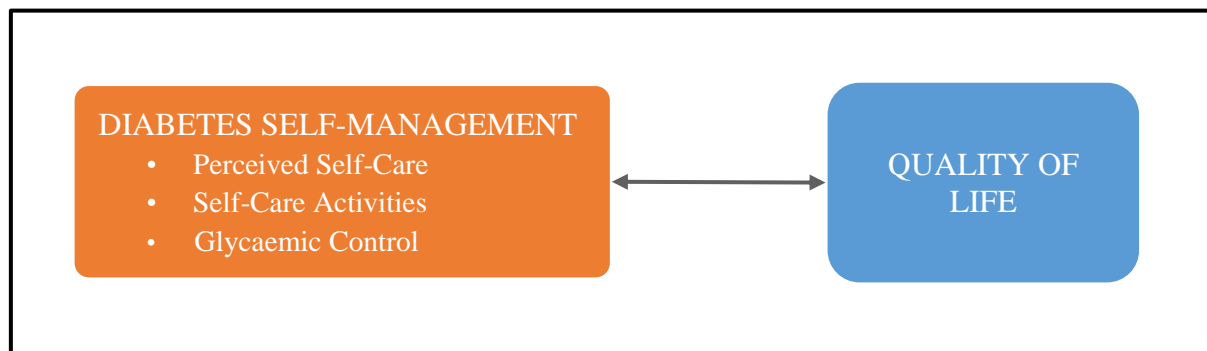


Figure 2.3. Hypothesized Diagram for Hypothesis 5

Research Objective 3 was outlined to determine the consistency within patients' self-perceived adherence, self-care activities, and actual adherence. There are usually three different ways to investigate the level of adherence in self-management; one is by patients' report on their self-perceived adherence; secondly, by using a self-care activity checklist; and thirdly, by the HbA1c score of the patients where good glycaemic control is referred to lower HbA1c scores. A study has reported a consistency between self-perceived and objective measurements (Wallston et al., 2007) indicating that patients' self-perceived management can be trusted to gauge their actual adherence. Therefore, the following hypothesis was suggested. (See Figure 2.4.)

***H6: There is a positive relationship between patients' self-perceived, self-care activities and glycaemic control in diabetes self-management adherence.***

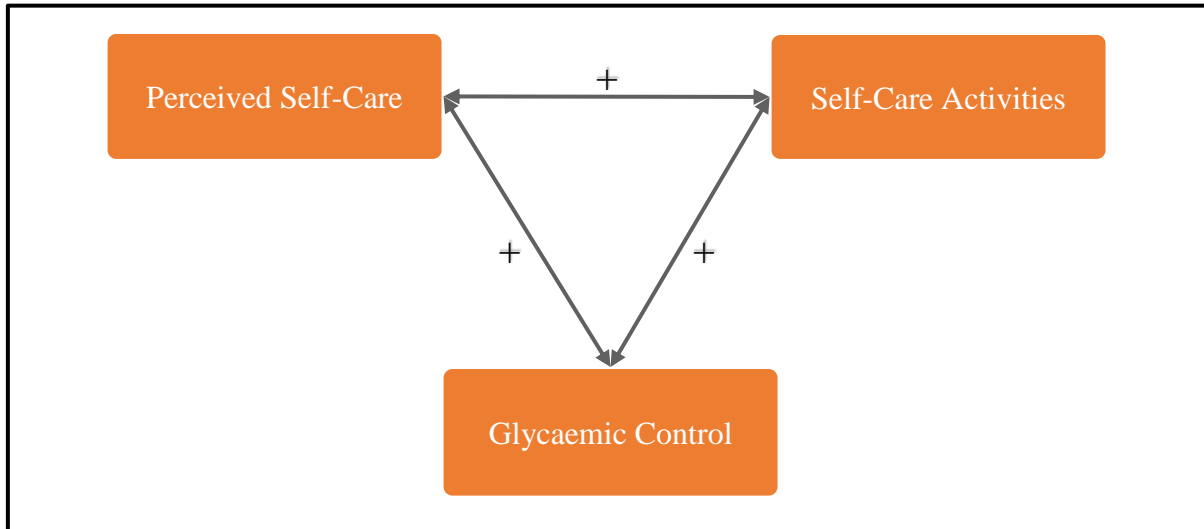


Figure 2.4. Hypothesized Diagram for Hypothesis 6

Malaysia as a multiracial country that is culturally rich has possibly the most diversified diabetic populace within the system. Health beliefs and practices are uniquely influenced by certain demographic parameters such as religions, locations, and ethnicity. Some past studies done in Malaysia revealed that the geographical location of the patients/hospitals and ethnicity as the appealing demographics that play a role in diabetes care outcome. Thus, Research Objective 4 and 5 were established to explore the variations of glycaemic control in different areas and ethnic groups within the sample (Ahmad et al., 2011; Feisul & Azmi, 2013). Hence, the following hypotheses were suggested. (See Figure 2.5 and 2.6.)

***H7: There is a significant variation of the glycaemic control in different parts of Peninsular Malaysia within the study cohort.***

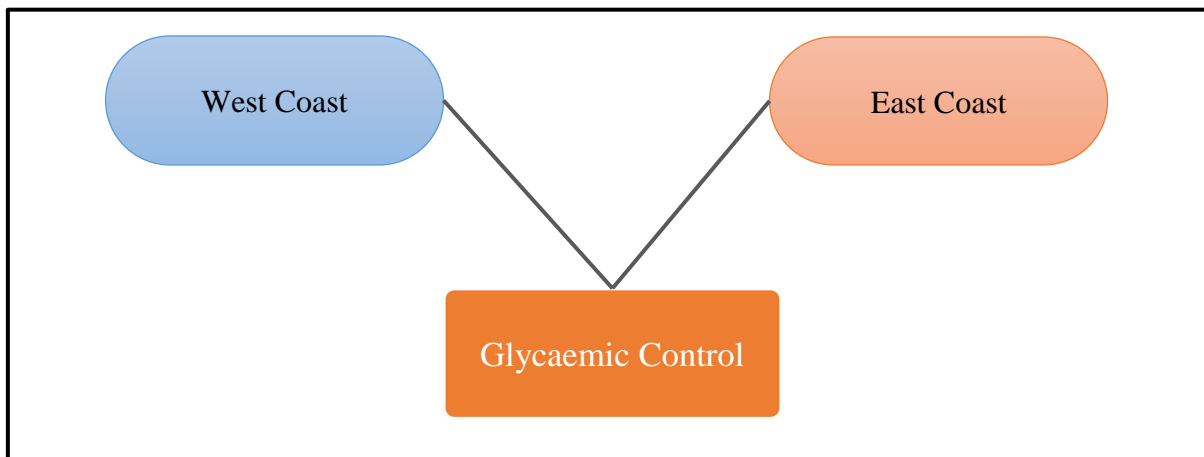


Figure 2.5. Hypothesized Diagram for Hypothesis 7

***H8: There is a significant variation of the glycaemic control in different ethnic groups within the study cohort.***

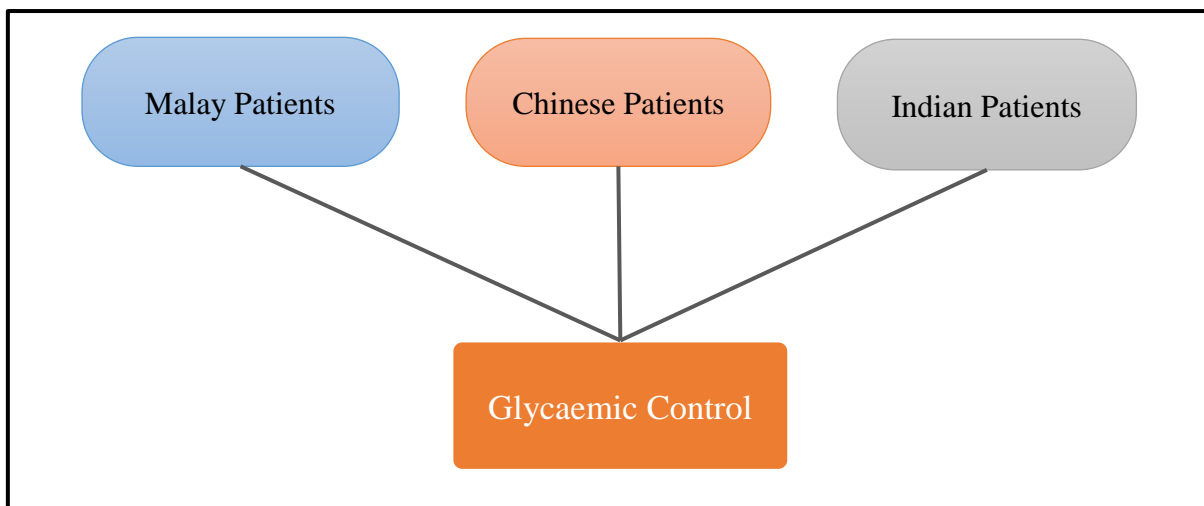


Figure 2.6. Hypothesized Diagram for Hypothesis 8

## **CHAPTER 3**

### **METHODS**

#### **3.1 Research Design**

The purpose of this study is to investigate the psychosocial prevalence or commonness of diabetes self-management outcome in the form of a survey. Therefore, a cross-sectional design is most suitably employed for this study to address the research objectives (Levin, 2006). Besides examining the relevance of the known psychosocial determinants identified in foreign research to local diabetes society, a simple and optional semi-structured interview was incorporated into the data collection process. The interview was meant to engage and to build rapport with the participants.

#### **3.2 Participants Demography and Sampling**

A demographic sheet was developed for the purpose and use in this study. This sheet contained 15 fields to gather relevant information of the participants, such as age, ethnicity, residential area, family history of diabetes, and length of living with diabetes. No other or sensitive demographic information (e.g., Identification Card number, household income) were collected to ensure the confidentiality of participants and the accompanying results. Refer to Appendix D for the sample of demographic sheet.

Based on the formula  $n \geq 50 + 8m$  (where  $m$  is the number of independent variables) proposed by Green (1991) for testing multiple correlation, a minimum of 154 Malaysians with Type 2 diabetes was recommended to complete the survey consisting of 13 measurement scales

and a demographics sheet. Participants aged 20 years and older were recruited to reduce the chances of mistakenly include Type 1 patients. Participation in this study was voluntary, which participants participated on individual responsibility and in no condition related to the healthcare organizations where they seek medical assistance. The inclusion criteria to recruit participants are individuals who have been diagnosed with Type 2 diabetes for three months or longer, Malaysians aged 20 and above, and practice self-management. The exclusion criteria are non-Type 2 diabetics, individuals who suspect but not being diagnosed for having Type 2 diabetes, and dependent on caregivers for daily management. To ensure that the participants meet the inclusion criteria, they are requested to produce health record cards issued by the healthcare provider, and also to declare whether they practise self-management.

The recruitment of participants was using community-based-purposive sampling method within a span of 26 months. However, the data-collection activity was paused for one to two months during major festive seasons such as *Ramadan*, *Hari Raya Aidilfitri*, year-end and New Year celebrations to avoid atypical responses caused by prolonged fasting or celebrations. The participants were referred via diabetes care centre, senior citizen clubs, doctors, pharmacists, religious fellowships, and acquaintances. There were total 212 sets of data collected but only 181 were used for analyses. The reasons to discard the other 31 data sets include not meeting the inclusion criteria, no HbA1c record, invalid HbA1c record, co-living with other severe illness (e.g., breast cancer), gestational diabetes, living with Type 1 diabetes, and incomplete questionnaire. The participants' demographics analyses and HbA1c scores were tabulated and presented in the Results section. See Table 4.1.



### 3.3 Research Instruments

#### 3.3.1 Diabetes Self-management

**3.3.1.1 Self-perceived care.** *Perceived Diabetes Self-Management Scale (PDSMS).* The PDSMS is an 8-item inventory to measure respondents' perception on self-management. The items are arranged on a 5-point Likert scale from 1= "strongly disagree" to 5="strongly agree". Respondents indicated their answers in questions such as "I handle myself well with respect to my diabetes" and "No matter how hard I try, managing diabetes doesn't turn out the way I would like". The total PDSMS scores could range from 8 to 40 with higher scores reflect more confidence in self-managing one's diabetes. The total scores was obtained by summing up all the eight items with items 1, 2, 6, 7 were being reverse-scored. A Cronbach's alpha of .83 indicates its internal consistency, with corrected item-total correlations ranging from .39 to .71. The scale is also positively correlated with the Summary of Diabetes Self-Care Activities Measure (Wallston et al., 2007).

**3.3.1.2 Daily self-care activity.** *The Revised Summary of Diabetes Self-Care Activities Measure (SDSCA-R).* The SDSCA-R is a brief self-report questionnaire that includes 11 core items and 14 additional items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood glucose testing, foot care, and smoking status (Toobert et al., 2000). Improving from its previous version, SDSCA-R is easier to score, with best items are retained, and relevant new items (e.g., foot care) are added. Questions such as "how many of the last seven days have you followed a healthful eating plan", "on how many of the last seven days did you test your blood sugar" and "... you check your feet" are included in the SDSCA-R. The strengths of the revised version are: 1) consistency in mean values across studies, 2)

sufficient variability and lack of ceiling or floor effects, 3) temporal stability, 4) internal consistency, 5) predictive validity, 6) sensitive to change, and 7) ease of interpretation. There are two different ways to calculate its scores for the use, either in general or clinical purposes. To gain a general understanding of the level in self-care activities carried out by the patients, sum up items 1, 2, 3, 4R, 5, 6, 7, 8, 9, 10. The scores range from 0 to 70, where higher scores indicate more frequent of self-care activities are being carried out. The SDSCA-R is reported to have adequate internal and moderate test-retest reliability.

**3.3.1.3 Glycaemic control.** *Glycated haemoglobin A1c (HbA1c).* HbA1c test is used to identify average plasma glucose concentration. Its results provide an overall picture of the average blood glucose levels over a period of weeks/months. In Malaysia, diabetic patients are recommended to test HbA1c every three to six months (MOH, 2009, p.26). As compared to measuring their fasting blood glucose, the test results of HbA1c are less likely to be manipulated by the patients. Therefore, HbA1c is regarded as the gold standard for outcome measure in diabetes self-management. HbA1c can be expressed as a percentage or as a value in mmol/mol. In this study involved diabetic patients, the results were recorded and analysed based on its percentage suggested by IDF; HbA1c < 6.5% = “excellent”, < 7.0% = “very good”, < 8.0% = “good”, 8.0-10.0% = “poor” and > 10.0% = “very poor” (Ahmad et al., 2011).

### **3.3.2 Personal Attributions**

**3.3.2.1 Self-efficacy.** *Diabetes Self-Efficacy Scale (DSES).* The DSES is an eight-item scale designed to measure diabetes-related psychological self-efficacy. Questions such as “how confident do you feel that you can choose the appropriate foods to eat when you are hungry?”, “... you know what to do when your blood sugar level goes higher or lower than it should be?”

and “... you can judge when the changes in your illness mean you should visit the doctor?” were presented to the participants to capture their responses to the confidence level in the aspects of lifestyle, health condition and awareness. This scale was made available by Stanford Patient Education Research Center (n.d.) and it could be used for free. The DSES has been tested on 186 diabetics and obtained good internal consistency reliability with Cronbach’s alpha of .83. All items are arranged on a 10-point Likert scale ranging from 1 “not at all confident” to 10 “totally confident”. Sum the scores in at least six items and calculate for its mean. Higher mean score indicates higher level of self-efficacy.

**3.3.2.2 Internal locus of control.** *Multidimensional Health Locus of Control Scale (MHLC).* To measure locus of control of health-related behaviour, the MHLC will be used. MHLC was developed by Wallston, Wallston, and DeVellis (1978). It is an 18-item instrument designed to measure three dimensions of locus of control, specifically in internality of health locus of control, powerful other locus of control, and chance locus of control. All 18 items are arranged on a 6-point Likert scale ranging from “strongly agree” to “strongly disagree”. The internal consistency reliability using Cronbach’s alpha ranged from .67 to .77 for all three dimensions. The scale has fairly good criterion validity and correlating with participants’ state of health. This study intended to examine the perceived personal control with regards to health; and thus, only the Internal Health Locus of Control (IHLC) subscale was calculated by summing up the scores in items 1, 6, 8, 12, 13, and 17. A couple of sample questions in the IHLC are “when I get sick, I am to blame” and “if I take the right actions, I can stay healthy”. The possible score from each respondent ranged from 6 to 36. A low score in IHLC indicates the respondents do not believe in personal or internal control over their health-related matters.

**3.3.2.3 Problem-solving ability.** *Problem-Solving Inventory (PSI).* To measure the perceived problem-solving attitudes, the Problem-Solving Inventory (Heppner & Petersen, 1982) was adopted. The PSI is a 35-item instrument designed to measure how individuals evaluate their awareness of problem-solving abilities. The three subscales in PSI are problem-solving confidence (items 5, 10, 11R, 12, 19, 23, 24, 27, 33, 34R, 35), approach-avoidance style (items 1R, 2R, 4R, 6, 7, 8, 13R, 15R, 16, 17R, 18, 20, 21R, 28, 30, 31), and personal control (items 3R, 14R, 25R, 26R, 32R). Questions like “I am usually able to think up creative and effective alternatives to solve a problem”, “when a solution to a problem was unsuccessful, I did not examine why it didn’t work”, and “sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead” were presented; each is an example of the subscales respectively. The subscales can be used independently or combined; however, the researcher of this study has opted to combine the subscales to obtain a single, general index of the construct. All items are arranged on 6-point Likert scale ranging from “strongly agree” to “strongly disagree”. The possible score ranged from 32 to 192, counted by adding up all the items except the filler items 9, 22, and 29. Lower scores reflect greater perceived problem-solving abilities. The PSI has good to excellent internal consistency, with alphas ranging from .72 to .85 on the subscales and .90 for the total measure. It also has excellent stability with two-week test-retest correlations for the subscales and total measure that range from .83 to .89.

**3.3.2.4 Optimism.** *Revised Life Orientation Test (LOT-R).* The LOT-R is one of the common and useful instruments to measure dispositional optimism and psychological well-being (Scheier, Carver, & Bridges, 1994). This revised version has 10 items which can be scored using 5-point Likert scale ranging from 0 (Strongly disagree) to 4 (Strongly agree). Items

1, 4, 10 are positively worded (example: in uncertain times, I usually expect the best), items 3, 7, 9 are negatively phrased (example: I rarely count on good things happening to me), and items 2, 5, 6, 8 are fillers (example: I enjoy my friends a lot). Score of item 3, 7, and 9 should be reversed and then summed up with 1, 4, and 10 to obtain the total score. Scores range from 0 to 24 with higher scores implying greater optimism. The Cronbach's alpha value for this scale is .78. The LOT-R has good internal consistency (Cronbach's alpha runs in the high .70s to low .80s) and is quite stable over time. Its test-retest reliability ranged from .56 to .79 in the interval of 4 months to 28 months. It also has a range of -.36 to .95 for its validity.

### **3.3.3 Emotion Management**

**3.3.3.1 Depression.** *Major Depression Inventory (MDI).* MDI is considered as a brief depression inventory that can be utilized as a diagnostic instrument as well as a rating scale to identify the intensity of the depressed feeling. There are 10 items in this instrument with a Cronbach's alpha of 0.89, and the correlation between the MDI and the depression subscale of the SCL-90 was 0.79 (Olsen, Jensen, Noerholm, Martiny, & Bech, 2003). "How much of the time have you lost interest in your daily activities?" and "...have you felt subdued or slowed down?" are two of the questions often asked to the respondents; and, each of the items can be scored from 0 (at no time) to 5 (all the time). The MDI score ranges from 0 to 50 after summing up all the items. For items 8 and 10, alternative *a* or *b* with the highest score was considered. Higher score indicates higher feeling of depress experienced by the respondents.

**3.3.3.2 Anxiety.** *Clinical Anxiety Scale (CAS).* The CAS developed by Westhuis and Thyer (1989) consists of 25 items were adopted and assessed on participants to measure their degree of general anxiety to live and deal with diabetes on a daily basis. The CAS is simply

worded and easy to understand (examples: I feel comfortable in crowds, such as shopping or at a movie; I feel suddenly scared for no reason). All items are arranged on 5-point Likert scale ranging from “rarely or none of the time” to “most or all of the time”. The CAS is scored by first reverse-scoring items 1, 6, 7, 9, 13, 15, 16; summing these and the remaining scores, subtracting the number of completed items, multiplying by 100, and dividing by the number of items completed times 4. Higher scores indicate higher level of anxiety. The CAS is reported to have an excellent internal consistency of .94 coefficient alpha as well as good stability of .64 to .74 with two-week test-retest correlations.

**3.3.3.3 Distress.** *Diabetes Distress Scale (DDS).* To measure the amount of distress experienced by diabetics, the 17-item Diabetes Distress Scale (Polonsky et al., 2005) was adopted. This scale consists of four subscales, namely emotional burden (items 1, 3, 8, 11, 14), physician-related distress (items 2, 4, 9, 15), regimen-related distress (items 5, 6, 10, 12, 16), and interpersonal distress (items 7, 13, 17). The subscales can be used separately to address a specific kind of distress or combined to obtain an overall index for diabetes distress. Examples of the question are “feeling overwhelmed by the demands of living with diabetes” (for emotional burden), “feeling that my doctor doesn’t know enough about diabetes and diabetes care” (for physician-related distress), “feeling that I am not testing my blood sugars frequently enough” (for regimen-related distress), and “feeling that friends or family don’t appreciate how difficult living with diabetes can be” (for interpersonal distress). All items are arranged on 6-point Likert scale ranging from “not a problem” to “a very serious problem”. The result can be obtained by summing the scores of all 17 items and calculate for its mean. Higher mean score

indicates higher level of distress. The internal validity of the DDS and the four subscales were adequate with Cronbach's alpha bigger than .87.

### **3.3.4 Interpersonal Relationship**

#### **3.3.4.1 Social support.** *Multidimensional Scale of Perceived Social Support (MSPSS).*

Studies showed that social support is one of the crucial factor determining diabetic's self-care behaviours. To measure to relevance of social support in personal care in diabetes, the Multidimensional Scale of Perceived Social Support (MSPSS) was used (Zimet, Dahlem, Zimet, & Farley, 1988). The 12-item inventory was developed to assess perceived social support from three sources: family (items 3, 4, 8, 11; example: I get the emotional help and support I need from my family), friends (items 1, 2, 5, 6, 7, 9, 12; example: I can talk about my problems with my friends), and significant other (items 1, 2, 5, 10; example: there is a special person who is around when I am in need). All items are arranged on 7-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). The overall index of MSPSS can be calculated by summing up each item score and then dividing by 12. Higher mean score indicates higher perceived support. The MSPSS has excellent internal consistency, with alphas of .91 for the total scale and .90 to .95 for the subscales.

#### **3.3.4.2 Healthcare provider support.** *Modified Health Care Climate Questionnaire (HCCQ-6).* The scale is developed to assess patients' perceptions of the degree of autonomy supportiveness of their formal health care providers (e.g. physician, nurse, and dietician). The HCCQ-6, consists of six items, is the shorter version of its original HCCQ-15. All items are arranged on 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). One of

the sample item in HCCQ-6 is “my physician tries to understand how I see things before suggesting a new way to do things”. The final score is computed by averaging the individual item scores. Higher average scores represent a higher level of perceived autonomy support from the healthcare providers. The Cronbach’s alpha for HCCQ-6 was reported as .80, and it is correlated 0.91 with the full version indicating that the modified scale was an adequate version of HCCQ-15 (Williams, Freedman, & Deci, 1998).

### **3.3.5 Health Literacy**

**3.3.5.1 General knowledge on diabetes.** *Diabetes Knowledge Test (DKT).* In order to understand the relationship between patients’ level of knowledge on diabetes and their self-management behaviours, the Diabetes Knowledge Test (Fitzgerald et al., 1998) was adopted. The test has two components: Part A, a 14-item general test and Part B, a 9-item insulin-use subscale. The coefficient alpha for general test and the insulin-use subscale indicate that both are reliable, with alpha bigger than .70. Since this current study was intended to understand diabetics and health knowledge in broader sense and not specifically targeting insulin-dependent participants, only the Part A in this test battery was utilised. This test was structured in multiple-choice form and the respondents were asked to identify the right answer in the several possible answers given, for each question. Sample items including “which of the following is a sugar-free food” and “for a person in good control, what effect does exercise have on blood glucose”. The total scores of Part A range from 0 to 14, with higher scores reflect better diabetes knowledge.



### 3.3.6 Patient's Quality of life

**3.3.6.1 Quality of life.** *The Quality of Life Scale (QOLS).* The QOLS has 16 items initially designed by Flanagan in 1978, later modified by Burckhardt and Anderson (2003) to measure the quality of life from the perspective of individuals with chronic illness, including diabetes mellitus. The items are arranged on a 7-point Likert scale ranging from 1 (terrible) to 7 (delighted). Respondents were asked to indicate their degree of satisfaction in the perspectives of their financial security, health, relationship with significant other, social activities, ability of self-expression, and independence. The general index of QOLS can be obtained by summing up all the 16 items with higher scores represents better quality of life. QOLS is reported to be internally consistent with a Cronbach's alpha of .82 to .92 and high test-retest reliability over 3-weeks in stable chronic illness groups ( $r = .78$  to  $.84$ ).

All related instruments were translated into Malay and Mandarin to cater for participants who are more comfortable with their native language than English. Slight adaptations were done to a few items to fit better into the local context. The changes did not affect the content validity of the scales. Refer to Table 3.1 for the list of items that have been modified slightly in concordance with the Malaysian context. (See Appendix D for the sample of all scales and their translated versions.)

Table 3.1

*Change of Words in Measurement Instruments for HCCQ-6 and DKT*

Scale	Item No.	Original word/phrase	Replaced with
HCCQ-6	1 - 6	<i>physician</i>	<i>doctor</i>
DKT	1	The diabetes diet is: a) the way most <i>American</i> people eat, b) a healthy diet for most people, c) too high in carbohydrate for most people, d) too high in protein in most people	The diabetes diet is: a) the way most <i>Malaysian</i> people eat, b) a healthy diet for most people, c) too high in carbohydrate for most people, d) too high in protein in most people
	2	Which of the following is highest in carbohydrate? a) baked chicken, b) <i>swiss cheese</i> , c) baked potato, d) peanut butter.	Which of the following is highest in carbohydrate? a) baked chicken, b) <i>cheese</i> , c) baked potato, d) peanut butter.

**3.3.7 Counterbalancing**

Keeping in mind that fatigue and boredom might occur in the participants while answering a long survey, the questionnaire tool was arranged in two versions that included its original order of Part A to Part N and an alternative order Part A, Part F to Part N, and Part B to Part G. A mean comparison was carried out between the two versions and result was reported in the Data Preparation section (Subheading 3.9.1).

**3.3.8 Engagement Process**

In order to build rapport with the participants and help them to focus on diabetes issues, a few conversational questions were formed. These questions were generally used as ice-breaker before administering the questionnaire to the participants. Listed below were some open-ended questions commonly used in the engagement process:

1. How did you find out that you have diabetes?

2. In your experience, what is the most important factor that motivates you to monitor your diabetes condition?
3. Having to live with diabetes, how do you see yourself different from your friends who don't have diabetes?
4. What is typically a good day to you in managing your health?
5. What is typically a bad day to you in managing your health?

### **3.4 Translation of Measurement Instruments**

In order to increase the representation of sampling in the multilingual population like Malaysia, the survey instrument was being translated into Malay and Mandarin. Despite English being widely used in Malaysia, most Malaysians are formally educated in Malay and their native languages like Mandarin and Tamil, which they are more comfortable to communicate in their preferred language. Therefore, it was reasonable to translate the measurement instruments into Malay and Mandarin to reach out to a wider range of diabetics in the Malaysian society.

#### **3.4.1 Translator Team - Malay version**

The initial translation was done by the researcher, back-translated by the main supervisor and vetted by Translator A. The researcher has 12 years of formal education with Malay language as the medium of instruction, the main supervisor has a total of more than 20 years of formal education and professional usage of the language; and, Translator A is a native Malay speaker as well as has used the language as a part of his education and professional development at the tertiary level.

### **3.4.2 Translator Team - Mandarin version**

The initial translation was done by the researcher, back-translated by the main supervisor and vetted by Translator B. The researcher has 12 years of formal education in Chinese language and she has been writing semi-academic related articles for several Chinese magazines and newspaper. The main supervisor has 12 years of training in commanding the language proficiently, and writing psychology-related topics for Chinese newspaper on regular basis. Translator B has a total of 17 years of formal training in the language. She has obtained a Bachelor degree in Chinese Literature from Nanjing University, China. All three members of the Chinese translator team are native speakers of the language.

## **3.5 Procedures**

Several channels were established to recruit participants. Permissions of data collection were obtained from the consented medical centre, pharmacy, private clinics, senior citizen clubs, and religious fellowships. To increase publicity, multi-lingual recruitment posters printed in colours were then distributed to the participating entities to reach out to prospective participants. The researcher contacted the participants who signed up for the study to arrange for an interview. The interviews were either conducted in a meeting room at these entities or the participants' house, depending on their preferences. Before the start of each datum collection, the researcher went over the purpose of study with the participants, who would then sign the consent form prepared by the researcher. Participants were advised to take their time in answering the survey questionnaire. They were also allowed to take a break when necessary. The duration for administering the questionnaire was 1.5 to 2 hours per participant.

### **3.5.1 Ethical Considerations**

The risk profile of this research is considered low. However, due to the length of the survey, participants were reminded to take a break whenever necessary to avoid exhaustion.

### **3.5.2 Permission for Using Scales**

Scales such as DSES, MHLC, LOT-R, MDI, SDSCA, and QoLS are available in the public domain for academic purposes, and the permissions for using other scales were granted by the original authors.

### **3.5.3 Ethics Approvals**

The entire study procedures and treatment of participants have gone under scrutiny by Monash University Human Research Ethics Committee and Sunway Medical Centre Independent Research Ethics Committee before being carried out the pilot study. The ethics approval number are [CF12/3382] and [003/2012/ER] respectively. Refer to Appendix A for a copy of the approved documents.

### **3.5.4 Participant's Consent**

The potential participants were approached to arrange for data collection. They were reminded to produce the health record card issued by the hospital when meeting up the researcher. From the health record card, the researcher can know their diabetes history (living with diabetes for  $\geq 3$  months) and their latest HbA1c results ( $< 6$  months).

### **3.5.5 Participant Filtration**

Any participants who do not meet the inclusion criteria will not be able to proceed with the survey. This include those who were recently diagnosed with diabetes (< 3 months), of type 1 diabetes, younger than 20 years-old, or being taken care by someone.

### **3.5.6 Quantitative Data Collection**

The compiled questionnaire was administered to the targeted participants. The purpose of the study was highlighted to the potential participants by going through the Explanatory Statement with them. Prior to answering the questionnaire, the participants granted their consent to participate by signing a consent form prepared by the researcher. Refer to Appendix B for the sample of Explanatory Statement and Appendix C for Consent Form.

### **3.5.7 Engagement Interview**

The initial purpose of the interview was to engage, warm-up and build rapport between the participants and the researcher. Nevertheless, the researcher would note down any valuable information disclosed. The participation in the interview was optional depending on the setting (public entity vs. home environment) at the point the data was collected. In fact, most of the engagement interviews were carried out in the participant's home where the environment was conducive for extended conversations. The information obtained from the interviews was treated as supplemental and utilised in the Discussion section, to explain or to strengthen the result findings.

### **3.5.8 Compensation**

Upon completion of the participation, a RM20 in cash was issued to the participants as a token of appreciation. The participants were encouraged to raise their questions or doubts should they

need any clarification before the data collection meeting ended. The researcher's telephone number and email address, which were stated in the Explanatory Statement, were highlighted to the participants again should they need to contact the researcher after the data collection.

### **3.6 Data Analysis**

To derive an accurate understanding in the research topic, the statistical analyses have included Pearson's correlation and multiple regression in the process in testing the hypotheses. Further, the data was analysed using independent sample t-test and analysis of variance (ANOVA) as additional analyses to discover deeper knowledge with regards of the sampling population.

#### **3.6.1 Analysis for Main Study Scopes**

Initially, Pearson's correlation was used to analyse the first three study scopes (Hypotheses 1 to 6) to find out the significant correlations. Based on the outcomes of initial analyses, the significant factors were further analysed by using multiple regression to sort out the ranking of the predictive power within the independent variables. After that, independent-samples t-test and ANOVA were carried out to examine Hypothesis 7 and 8 respectively. For multiple regression analyses, the independent variables are self-efficacy, locus of control, problem-solving skill, optimism, depression, anxiety, distress, social support, healthcare provider support, and diabetes knowledge whereas the dependent variables are perceived self-care, self-care activities, and glycaemic control. For independent-samples t-test, the independent variable is residential areas and the dependent variable is glycaemic control. For ANOVA, the independent variable is ethnicity and the dependent variable is glycaemic control.

### **3.6.2 Analysis for Engagement Interview**

The information noted in the interview log sheets were compiled and organised into a table according to the interview questions (Appendix G2). The information bits were coded and analysed for emerging themes and trends. To increase the trustworthiness of findings, the supervisors crosschecked the analysis processes and arrived at an agreement in the categories and themes with the researcher.

## **3.7 Pilot Study**

### **3.7.1 Purpose**

All of the 13 scales adopted in this study were developed and validated based on the American samples previously. Thus, it is necessary to conduct a pilot study to ascertain their suitability on Malaysians. Besides, the researcher wished to gather other relevant feedback from the participants to improve the data collection procedures if necessary.

### **3.7.2 Participants**

There were 70 participants selected based on the inclusion criteria to answer the survey via self-report questionnaire with some of them proceeded to the interview afterward. The volunteers were consisted of patients at Sunway Medical Centre and acquaintances living with Type 2 diabetes. Refer to Table 3.2 for their demographic information.



Table 3.2  
*Demographic Characteristics of Participants in Pilot Study (N = 70)*

Characteristics	<i>n</i>	%
Age (years)		
Range / Mean ( $\pm$ S.D.)	33-81 / 55.1 ( $\pm$ 9.9)	
Gender		
Male	32	45.7
Female	38	54.3
Ethnicity		
Malay	26	37.1
Chinese	41	58.6
Indian	3	4.3
Education		
Primary School	13	18.6
Secondary School	35	50.0
Form-6 / Diploma	12	17.1
Degree & higher	5	7.1
Others	5	7.1
Marital Status		
Single	8	11.4
Married	53	75.7
Divorced	2	2.9
Widowed	7	10.0
Residential Area		
Klang Valley (Selangor & Kuala Lumpur)	52	74.3
Other areas	18	25.7
Occupational Status		
Homemaker	21	30.0
Business owner	13	18.6
Professional	8	11.4
Administrator	5	7.1
Sales/Service	6	8.6
Retiree/Other	17	24.3
Living with Diabetes		
Range / Mean ( $\pm$ S.D.)	10 months – 33 years / 8.9 ( $\pm$ 7.4) years	

### 3.7.3 Reliability Analyses

There were 20, 24 and 26 questionnaires in English, Malay, and Mandarin version respectively distributed and answered by the diabetes participants. Hence, the reliability analyses were performed on all 13 scales and their subscales. See Table 3.3 for the Cronbach's alpha values for these scales.

The reliability analyses of the measurement scales in all three languages displayed acceptable alphas ( $\alpha > .30$ ) except the LOTR Mandarin version ( $\alpha = .21$ ). Subsequently, all 26 Mandarin questionnaires were scrutinised manually and using SPSS but with no unusual responses, sabotage or outliers were being detected. Hence, low alpha in this particular scale could have been due to the fact that it only consisted of six real items as well as caused by its small sample size. In the spirit of inquiry, the researcher decided to keep LOTR in the main data collection. Besides, an interviewed participant explicitly relating her motivation of self-management with optimism has further supported the retention of LOTR in this study.

Table 3.3  
*Display of Cronbach's Alpha for All Measures used in Pilot Study (N= 70)*

Measures	English (n=20) $\alpha$	Malay (n=24) $\alpha$	Mandarin (n=26) $\alpha$
Diabetes Self-Efficacy Scale	.86	.87	.80
Internal Health Locus of Control Scale	.79	.65	.71
Problem-Solving Inventory	.90	.81	.84
Revised Life Orientation Test	.67	.52	.21
Major Depression Inventory	.90	.90	.90
Clinical Anxiety Scale	.94	.88	.90
Diabetes Distress Scale	.95	.95	.93
Multidimensional Scale of Perceived Social Support	.91	.92	.92
Modified Health Care Climate Questionnaire	.87	.81	.92
Diabetes Knowledge Test	.70	.64	.43
Perceived Diabetes Self-Management Scale	.84	.77	.85
The Summary of Diabetes Self-Care Activities Measure	.65	.74	.66
Quality of Life Scale	.95	.91	.92

### 3.7.4 Outcomes

Based on the experience gained from the pilot test, a couple of adjustments were made in the approach of data collection.

For the self-report questionnaire, structured interviews were prepared for participants who were less literate, instead of requiring them to read and answer the questionnaire by themselves. By doing so, it helped the participants to understand the meaning of the questions better and also helped to maintain the face validity of the scales. Apart from that, the subsequent questionnaires were printed in a larger font size for easy reading because many participants were middle-agers who might have presbyopia.

It was observed that a few participants were highly conversant and informative during the engagement process. They gave detailed responses that could help widen the understanding of a diabetic patient's life; and hence, induced the needs to note down the conversations. Thus, an interview log sheet was designed and utilized to capture this extra information in the subsequent data collection exercise. (Appendix G1).

### **3.8 Reliability Analyses of Measurement Instruments on Total Sample**

Overall, 181 questionnaires were completed by the participants in all three languages. Amongst them, 48 (26%) were in English, 92 (51%) were in Malay, and 41 (23%) were in Mandarin. Once again, the reliability tests were performed to identify the alpha values in the effort to ascertain a good level of alphas. It is worth noting that the alpha values for Mandarin LOT-R scale has improved from .21 to .61 when the sample size increased to  $n=41$ . The overall Cronbach's alpha values ranged from .61 (good) to .93 (excellent) suggested that the responses made by the participants are reliable for analyses. See Table 3.4.

Table 3.4  
*Display of Cronbach's Alpha for All Measures*

Measures	Overall ( <i>N</i> =181) <i>α</i>	English ( <i>n</i> =48) <i>α</i>	Malay ( <i>n</i> =92) <i>α</i>	Mandarin ( <i>n</i> =41) <i>α</i>
Diabetes Self-Efficacy Scale	.88	.83	.88	.78
Internal Health Locus of Control Scale	.72	.77	.63	.75
Problem-Solving Inventory	.88	.92	.81	.90
Revised Life Orientation Test	.61	.71	.54	.61
Major Depression Inventory	.93	.91	.92	.90
Clinical Anxiety Scale	.92	.94	.89	.91
Diabetes Distress Scale	.93	.88	.91	.94
Multidimensional Scale of Perceived Social Support	.90	.86	.88	.92
Modified Health Care Climate Questionnaire	.85	.89	.82	.91
Diabetes Knowledge Test	.70	.58	.61	.39
Perceived Diabetes Self-Management Scale	.81	.89	.69	.88
The Summary of Diabetes Self-Care Activities Measure	.71	.78	.68	.69
Quality of Life Scale	.93	.84	.95	.91

### 3.9 Data Preparation

Data preparation for multiple regression analyses was completed at four levels; counterbalancing, treating missing values, screening for overly influential cases, and checking for assumptions.

#### 3.9.1 Counterbalancing

In order to detect possible fatigue and impatience experienced by some participants and hence answered the survey casually towards the end, an independent-samples t-test was conducted to compare the mean scores of each scale between the original (*n* = 85, 47%) and the alternative (*n* = 96, 53%) versions. The mean scores compared were DSES, IHLC, PSI, MDI, CAS, DDS, MSPSS, HCCQ-6, DKT, PDSMS, SDSCA, and QOLS. The results showed non-significant difference between the two versions in all scales except IHLC. The IHLC revealed a

significant difference in scores for Original version ( $M = 26.2$ ,  $SD = 5.2$ ) and Alternative version ( $M = 24.4$ ,  $SD = 5.0$ ;  $t(179) = 2.39$ ,  $p = .018$ ). Thus, it is safe to assume that fatigue did not affect the responses made by the participants significantly.

### **3.9.2 Missing Value**

There were no missing values in the dataset. The case of missing value was minimised in two ways. First, for the participants who chose to work on the questionnaire by themselves, they were reminded to answer all questions in the questionnaire. Secondly, for those participants who have lost interest to participate halfway in the process, their questionnaires were deemed incomplete and hence excluded from the analyses.

### **3.9.3 Influential Cases**

Occasionally, regression analysis is subject to be influenced by the extraordinary observation in the dataset. The possibility of having any overly influencing case in the data was checked by using Mahalanobis distance, Cook's distance and leverage value. None of these analyses indicated any need to concern about having overly influential cases in the dataset. To check the assumptions for Multiple Regression, the outputs of HbA1c vs. psychosocial predictors were used as an example. (Appendix I5c.)

Mahalanobis distance values for the current data ranged from 1.699 to 29.671 which were slightly above the critical value of 29.588 (chi-square value using  $df = 10$ ,  $p < .001$ ) (see Pallant, 2010, p.160; Tabachnick & Fidell, 2013, p.952). Casewise Diagnostics table noted two cases in the sample fell outside the range of the standardised residual values of  $\pm 3.3$ , showing values of 3.50 and 3.34.

Cook's distance was used as another indicator for identifying influential cases. Although Cook and Weisberg (1982) suggested the cut-off value as 1, it is usually preferred that Cook's distance value is below 0.5. In the present study, Cook's distance values ranged from .000 to .153 which were far below the suggested cut-off value, meaning that no individual cases had excessive influence on the estimates.

Centred leverage value ranged from .009 to .165 which were below the maximum leverage value of 1 ( $N$  of participants – 1 /  $N$  of participants) and the mean = .055 ( $N$  of predictors + 1 /  $N$  of participants) was below the suggested average cut-off point of .061. These findings demonstrated that there is no concern for the influence of observed values over the predicted values (Field, 2013, p.307).

In sum, it is common to find a few outlying residuals within a large sample. The values reflected by Cook's distance and centred leverage have indicated that these two outliers posit no undue influence on the results and therefore no action was taken to discard them from the further analyses.

#### **3.9.4 Checking Assumptions**

Regression statistics are calculated based on certain assumptions regarding the variables, data, and data distribution. Violation of these assumptions can lead to faulty or weakened estimates and thus causes inappropriate inferences. For the variables and data used in the present study, most of the assumptions were met. The following sections present details on the most important assumptions checked.

**3.9.4.1 Type of Variable.** Regression analysis requires the variables to be at categorical or interval level. The variables involved in the regression analyses were interval data, quantitative in nature, estimated by summated rating scales.

**3.9.4.2 Linearity of Relation.** Examination of Normal Probability Plot between the pairs of variables suggested linear relations.

**3.9.4.3 Absence of Multicollinearity.** Multicollinearity refers to the association amongst independent variables. Intercorrelation matrix with all the predictors was used as the first check of multicollinearity. According to rule-of-thumb, any bi-variate correlation  $r > .90$  is an indication of multicollinearity (Pallant, 2010, p.151). All intercorrelations among the predictors in this study were ranged between .15 and .72, which indicated an absence of perfect multicollinearity. Furthermore, Tolerance and Variance Inflation factor (VIF) values of the predictors were all above .33 and below 3.0 respectively. These values indicate an absence of perfect multicollinearity.

**3.9.4.4 Homoscedasticity.** Homoscedasticity means that the variance of errors is the same across all levels of the independent variables (Field, 2013). This assumption can be checked by visual examination of a plot of the standardized residuals (the errors) by the regression standardized predicted value. Ideally, residuals are randomly scattered around the 0 point (the horizontal line) providing a relatively even distribution. Scatter plots on standardized predicted values and standardized residuals for the dependent variables were roughly rectangularly distributed with most of the scores concentrated in the centre, indicating no violation of homoscedasticity assumption.

**3.9.4.5 Independence of Errors.** Durbin-Watson test was used to assess the independence of error assumption. The reported value was 1.81, which fell within the acceptable range suggested by the rule-of-thumb (between 1 and 3, with 2 being the best). Thus, the value suggested that the residuals were uncorrelated and assumption of independence of error was met. (Appendix I5c.)

**3.9.4.6 Normally Distributed Residuals.** For regression analysis, it is assumed that the residuals of the dependent variable are normally distributed. Normal p-p plots of Regression Standardized Residual were examined to check for meeting the assumption that the residuals or error terms are normally distributed. The points lie in a reasonably straight diagonal line from bottom left to top right, suggested the plots of residuals fit the expected pattern well enough to support a conclusion that the residuals are normally distributed.

Another way to examine normality is by calculating the skewness and kurtosis values. It can be done by using SPSS Explore command. The rule-of-thumb for normality suggests that a distribution with skewness and kurtosis values between -1.0 and +1.0 can be considered as normal. In this study, the skewness scores (range -.889 to +.056) and the kurtosis scores (range -.730 to -.008), suggested that the residuals are normally distributed.



## CHAPTER 4

### RESULTS

#### 4.1 Demographics and HbA1c

The study cohort was consisted of 181 adult participants aged 23 to 73 with a mean age of 52 and standard deviation of 12 years. The sample was made up of the three main ethnic groups in Malaysia with the most being Malay (45%), followed by Chinese (38%) and Indian (17%) participants, giving a fair reflection of the ethnicity ratio of Malaysia (Department of Statistics Malaysia, 2010). See Table 4.1 for the demographic details and their HbA1c scores.

Table 4.1

*Analyses on Demographics and HbA1c of Participants (N=181)*

Characteristics	n	%	HbA1c (%) - Mean & Standard Deviation
Age (years)			
Range	23-73		8.6 ± 2.0
Mean (S.D.)	52.3 (±11.7)		
< 30	7	3.9	8.6 ± 2.1
30 - 60	128	70.7	8.5 ± 1.9
> 60	46	25.4	8.8 ± 2.1
Gender			
Male	87	48.1	8.6 ± 1.9
Female	94	51.9	8.6 ± 2.0
Ethnicity			
Malay	82	45.3	9.6 ± 1.8
Chinese	68	37.6	7.6 ± 1.7
Indian	31	17.1	8.0 ± 1.7
Education Level			
No formal education	15	8.3	10.7 ± 2.4
Primary	38	21.0	9.2 ± 2.1
Secondary	73	40.3	8.4 ± 1.6
Pre-U / Diploma	28	15.5	8.1 ± 2.0
Degree and higher	27	14.9	7.6 ± 1.2
Marital Status			
Single	26	15.6	
Married	123	73.7	
Divorced	10	6.0	
Widowed	8	4.8	

Residential Area			
West Coast (Kedah, Penang, Perak, Kuala Lumpur, Selangor, Negeri Sembilan, Malacca, Johore)	105	58.0	$7.7 \pm 1.6$
East Coast (Terengganu, Kelantan, Pahang)	76	42.0	$9.8 \pm 1.7$
Occupational Status			
Homemaker	47	26.0	
Eco-cultural	13	7.2	
Business owner	30	16.6	
Professional	18	9.9	
Administrator	22	2.2	
Sales/Service	25	13.8	
Retiree	16	8.8	
Others	10	5.5	
Family History			
No	52	28.7	$8.4 \pm 1.8$
Yes	129	71.3	$8.6 \pm 2.0$
Diabetes-related Complications			
No	92	50.8	$8.4 \pm 1.6$
Yes	89	49.2	$8.7 \pm 2.3$
Healthcare Provider			
Public	128	70.7	$8.9 \pm 2.0$
Private	53	29.3	$7.8 \pm 1.7$
Weight Group based on Body Mass Index			
≤ Normal Weight (≤24.9)	49	27.1	$8.1 \pm 2.0$
≥ Overweight (≥25.0)	132	72.9	$8.7 \pm 1.9$
Treatment Mode			
Without Medication/By Lifestyle	17	9.4	$7.5 \pm 1.4$
Oral Medication Only	123	68.0	$8.4 \pm 1.7$
Insulin Dependent	41	22.7	$9.7 \pm 2.3$
Use of Home Remedy/Alternative Medicine			
No	105	58.0	$8.3 \pm 1.9$
Yes	76	42.0	$9.0 \pm 2.0$
Living with Diabetes			
< 3 years	54	29.8	$8.0 \pm 1.5$
3 – 10 years	81	44.8	$8.7 \pm 1.9$
> 10 years	46	25.4	$9.0 \pm 2.4$
Smoker			
No	143	79.0	$8.3 \pm 1.9$
Yes	38	21.0	$9.5 \pm 1.9$
HbA1c Groups			
Excellent (<6.5%)	23	13.8	
Very Good (<7.0%)	13	7.8	
Good (<8.0%)	36	21.6	
Poor (8.0-10.0%)	63	37.7	
Very Poor (>10.0%)	32	19.2	

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## **4.2 Main Analyses of Study**

In this study, Pearson's correlation, standard multiple regression, independent sample t-test, and one-way analysis of variance were utilized to answer the research objectives and to test the hypotheses.

### **4.2.1 Pearson's Correlations between Self-management and Psychosocial Variables**

Initially, statistical analyses were conducted to examine the relationships between diabetes self-management (perceived self-care, self-care activities, and glycaemic control) and the factors in all four psychosocial components (attributions, emotion management, interpersonal relationship, and health literacy). Hence, Pearson's correlation analyses were performed to test Hypothesis 1 (predicting a positive relationship between self-efficacy, internal locus of control, problem-solving skill, optimism and diabetes self-management), Hypothesis 2 (predicting a positive relationship between depression, anxiety, distress and diabetes self-management), Hypothesis 3 (predicting a positive relationship between social support, healthcare support and diabetes self-management) and Hypothesis 4 (predicting a positive relationship between knowledge in diabetes and diabetes self-management). See Table 4.2 for their means and standard deviations for perceived self-care, self-care activities, HbA1c and psychosocial variables.

Table 4.2

*Means and Standard Deviations for Perceived Self-care, Self-care Activities, HbA1c and Psychosocial Predictor Variables (N=181)*

Variables	<i>M</i>	<i>SD</i>
Perceived Self-care	26.81	5.26
Self-care Activities	32.62	11.09
HbA1c	8.57	2.00
Predictor variables		
1. Self-efficacy	6.11	1.84
2. Internal control	25.23	5.13
3. Problem-solving skill	103.01	19.95
4. Optimism	15.17	4.07
5. Depressed feelings	14.19	10.39
6. Anxiety	27.13	17.21
7. Distress	2.35	.91
8. Social Support	4.92	1.07
9. Health provider support	4.91	1.18
10. Knowledge in diabetes	7.76	3.02

#### 4.2.1.1 Perceived self-care and Psychosocial Variables

A correlational analysis was conducted to identify the connection between perceived self-care and psychosocial factors. Results showed that there were highly significant relationships between perceived self-care and self-efficacy,  $r(181) = .52, p < .001$ ; internal locus of control,  $r(181) = .43, p < .001$ ; problem-solving ability,  $r(181) = -.56, p < .001$ ; optimism,  $r(181) = .53, p < .001$ ; depressed feelings,  $r(181) = -.49, p < .001$ ; anxiety,  $r(181) = -.55, p < .001$ ; diabetes distress,  $r(181) = -.58, p < .001$ ; multidimensional social support,  $r(181) = .39, p < .001$ ; healthcare provider support,  $r(181) = .29, p < .001$ ; and diabetes knowledge,  $r(181) = .45, p < .001$ . It means high level of perceived self-care is strongly associated with high level of self-efficacy, internal locus of control, problem-solving ability, optimism, social support,

healthcare provider support, knowledge in diabetes; and, low level of depressed feelings, anxiety, and distress. See Table 4.3.

Table 4.3

*Intercorrelations between Perceived Self-care and Psychosocial Predictor Variables*

No	Items	1	2	3	4	5	6	7	8	9	10
1	Perceived Self-care	-									
2	Self-efficacy	.52**	-								
3	Internal control	.43**	.54**	-							
4	Problem-solving skill <sup>1</sup>	-.56**	-.52**	-.55**	-						
5	Optimism	.53**	.47**	.50**	-.59**	-					
6	Depressed feelings	-.49**	-.58**	-.40**	.48**	-.47**	-				
7	Anxiety	-.55**	-.62**	-.44**	.58**	-.57**	.72**	-			
8	Distress	-.58**	-.55**	-.41**	.48**	-.44**	.61**	.63**	-		
9	Social support	.39**	.47**	.38**	-.46**	.49**	-.51**	-.47**	-.44**	-	
10	Health provider support	.29**	.34**	.20**	-.27**	.29**	-.27**	-.18**	-.21**	.32*	-
11	Knowledge in diabetes	.45**	.64**	.50**	-.49**	.38**	-.55**	-.58**	-.53**	.46**	.15*

Notes. \* $p < .05$ , \*\* $p < .01$ ; <sup>1</sup> negative direction indicates good problem-solving skill.

#### 4.2.1.2 Self-care Activities and Psychosocial Variables

A correlational analysis was conducted to determine the relationships between self-care activities and psychosocial factors. Results showed that there were highly significant relationships between perceived self-care and self-efficacy,  $r(181) = .53$ ,  $p < .001$ ; internal locus of control,  $r(181) = .35$ ,  $p < .001$ ; problem-solving ability,  $r(181) = -.35$ ,  $p < .001$ ; optimism,  $r(181) = .40$ ,  $p < .001$ ; depressed feelings,  $r(181) = -.34$ ,  $p < .001$ ; anxiety,  $r(181) = -.27$ ,  $p < .001$ ; diabetes distress,  $r(181) = -.27$ ,  $p < .001$ ; multidimensional social support,  $r(181) = .26$ ,  $p < .001$ ; healthcare provider support,  $r(181) = .25$ ,  $p < .001$ ; and diabetes knowledge,  $r(181) =$

.32  $p < .001$ . It means higher frequency of self-care activities is strongly associated with higher level of self-efficacy, internal locus of control, problem-solving ability, optimism, social support, healthcare provider support, knowledge in diabetes; and, lower level of depressed feelings, anxiety, and distress. See Table 4.4.

Table 4.4  
*Intercorrelations between Self-care Activities and Psychosocial Predictor Variables*

No	Items	1	2	3	4	5	6	7	8	9	10
1	Self-care activities	-									
2	Self-efficacy	.53**	-								
3	Internal control	.35**	.54**	-							
4	Problem-solving skill <sup>1</sup>	-.35**	-.52**	-.55**	-						
5	Optimism	.40**	.47**	.50**	-.59**	-					
6	Depressed feelings	-.34**	-.58**	-.40**	.48**	-.47**	-				
7	Anxiety	-.27**	-.62**	-.44**	.58**	-.57**	.72**	-			
8	Distress	-.27**	-.55**	-.41**	.48**	-.44**	.61**	.63**	-		
9	Social support	.26**	.47**	.38**	-.46**	.49**	-.51**	-.47**	-.44**	-	
10	Health provider support	.25**	.34**	.20**	-.27**	.29**	-.27**	-.18**	-.21**	.32*	-
11	Knowledge in diabetes	.32**	.64**	.50**	-.49**	.38**	-.55**	-.58**	-.53**	.46**	.15*

Notes. \* $p < .05$ , \*\* $p < .01$ ; <sup>1</sup> negative direction indicates good problem-solving skill.

#### 4.2.1.3 HbA1c and Psychosocial Variables

A correlational analysis was conducted to identify the connection between psychosocial factors and glycaemic control (measured by HbA1c). The results showed there were highly significant relationships between HbA1c and self-efficacy,  $r(181) = -.59$ ,  $p < .001$ ; internal locus of control,  $r(181) = -.43$ ,  $p < .001$ ; problem-solving ability,  $r(181) = .46$ ,  $p < .001$ ; optimism,

$r(181) = -.44, p < .001$ ; depressed feelings,  $r(181) = .60, p < .001$ ; anxiety,  $r(181) = .58, p < .001$ ; multidimensional social support,  $r(181) = -.41, p < .001$ ; and diabetes knowledge,  $r(181) = -.50, p < .001$ . The results also indicated a significant relationship between HbA1c and healthcare provider support,  $r(181) = -.15, p = .023$ . It means low score in HbA1c is associated with high level of self-efficacy, internal locus of control, problem-solving ability, optimism, social support, healthcare provider support, knowledge in diabetes; and, low level of depressed feelings, anxiety, and distress. See Table 4.5.

Table 4.5  
*Intercorrelations between HbA1c and Psychosocial Predictor Variables*

No	Items	1	2	3	4	5	6	7	8	9	10
1	HbA1c <sup>1</sup>	-									
2	Self-efficacy	-.59**	-								
3	Internal control	-.43**	.54**	-							
4	Problem-solving skill <sup>2</sup>	.46**	-.52**	-.55**	-						
5	Optimism	-.44**	.47**	.50**	-.59**	-					
6	Depressed feelings	.60**	-.58**	-.40**	.48**	-.47**	-				
7	Anxiety	.58**	-.62**	-.44**	.58**	-.57**	.72**	-			
8	Distress	.54**	-.55**	-.41**	.48**	-.44**	.61**	.63**	-		
9	Social support	-.41**	.47**	.38**	-.46**	.49**	-.51**	-.47**	-.44**	-	
10	Health provider support	-.15*	.34**	.20**	-.27**	.29**	-.27**	-.18**	-.21**	.32**	-
11	Knowledge in diabetes	-.50**	.64**	.50**	-.49**	.38**	-.55**	-.58**	-.53**	.46**	.15*

Notes. \* $p < .05$ , \*\* $p < .01$ ; <sup>1</sup> negative direction indicates good glycaemic control; <sup>2</sup> negative direction indicates good problem-solving skill.

In summary, the Pearson's correlation analyses conducted in 4.2.1 to test the significant associations between attributions (self-efficacy, internal locus of control, problem-solving skill,

and optimism), emotion management (depression, anxiety, and distress), interpersonal relationship (social support and healthcare provider support), and health literacy (knowledge in diabetes) components against diabetes self-management (perceived self-care, self-care activities, and glycaemic control). Based on the results reported in section 4.2.1.1, 4.2.1.2, and 4.2.1.3, Hypothesis 1- a positive relationship between the attribution component and diabetes self-management, Hypothesis 2- a positive relationship between the emotion management component and diabetes self-management, Hypothesis 3- a positive relationship between the interpersonal relationship component and diabetes self-management, and Hypothesis 4- a positive relationship between the health literacy component and diabetes self-management, are supported.

#### **4.2.2 Multiple Regression Analyses on Self-management and Psychosocial Predictors**

The initial correlational analyses revealed that all 10 psychosocial variables are significantly connected to diabetes self-management. Thus, they were treated as predictors on the subsequent regression analyses in attempts to identify the strength of each predictor. A standard multiple regression– Enter method was utilized to answer Research Objective 1. The regression analysis was carried out three times separately on the outcome variables- perceived self-care, self-care activities, and HbA1c.

##### **4.2.2.1 Perceived Self-care and Psychosocial Predictors**

Result has shown the linear combination of predictors was significantly related to the self-care index,  $F(10, 170) = 16.53, p < .001$ . The multiple correlation coefficient was .493, indicating that approximately 49% of the variance of the perceived self-care index in the sample can be accounted for by the linear combination of psychosocial measures. In Table 4.3, indices



to indicate the relative strength of the individual predictors are presented. All bivariate correlations between the psychosocial measures and the perceived self-care index were significant. Further, the multiple regression analysis indicated that the useful predictors are diabetes distress, problem-solving ability, and optimism; they accounted for a total 8.1% unique contribution to the variance of the perceived self-care index, while the rest of the seven variables contribute only an additional 1.2%. See Table 4.6.

Table 4.6

*Regression Analysis Summary for Psychosocial Variables Predicting Perceived Self-care*

<i>Variable</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Self-efficacy	.28	.24	.10	1.15	.251
Internal control	.01	.07	.01	.18	.869
Problem-solving skill	-.05	.02	-.21	-2.63	.009
Optimism	.23	.10	.18	2.32	.022
Depressed feelings	-.01	.04	-.02	-.22	.826
Anxiety	-.02	.03	-.05	-.57	.570
Distress	-1.69	.44	-.29	-3.85	.000
Social support	-.20	.35	-.04	-.56	.573
Health provider support	.38	.27	.08	1.38	.171
Knowledge in diabetes	.03	.14	.02	.23	.816

*Note.*  $R^2 = .49$  ( $N = 181$ ,  $p < .001$ )

#### 4.2.2.2 Self-care Activities and Psychosocial Predictors

Result has shown the linear combination of predictors was significantly related to the self-care activities index,  $F(10, 170) = 9.06$ ,  $p < .001$ . The multiple correlation coefficient was .348, indicating that approximately 35% of the variance of the self-care activities index in the sample can be accounted for by the linear combination of psychosocial measures. In Table 4.4, indices to indicate the relative strength of the individual predictors are presented. All bivariate correlations between the psychosocial measures and the self-care activities index were

significant. Further, the multiple regression analysis indicated that the useful predictors are self-efficacy, anxiety, and optimism; account for a total 16.1% unique contribution to the variance of the perceived self-care index, while the other seven variables contribute only an additional 1.6%. See Table 4.7.

Table 4.7

*Regression Analysis Summary for Psychosocial Variables Predicting Diabetes Self-care Activities*

<i>Variable</i>	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>t</i>	<i>p</i>
Self-efficacy	3.00	.58	.50	5.16	< .001
Internal control	.07	.18	.03	.39	.701
Problem-solving skill	-.04	.05	-.08	-.90	.371
Optimism	.67	.24	.24	2.80	.006
Depressed feelings	-.15	.10	-.14	-1.45	.150
Anxiety	.19	.07	.29	2.71	.007
Distress	.40	1.05	.03	.38	.708
Social support	-.72	.83	-.07	-.87	.388
Health provider support	.26	.65	.03	.40	.691
Knowledge in diabetes	-.01	.33	.01	.04	.968

*Note.*  $R^2 = .35$  ( $N = 181$ ,  $p < .001$ )

#### 4.2.2.3 HbA1c and Psychosocial Predictors

Result has shown the linear combination of predictors was significantly related to the self-care index,  $F(10, 170) = 16.18$ ,  $p < .001$ . The multiple correlation coefficient was .488, indicating that approximately 49% of the variance of the HbA1c index in the sample can be accounted for by the linear combination of psychosocial measures. In Table 4.5, indices to indicate the relative strength of the individual predictors are presented. All bivariate correlations between the psychosocial measures and the HbA1c index were significant. Further, the multiple regression analysis indicated that the useful predictors are self-efficacy and depressed feeling,

account for a total 5.4% unique contribution to the variance of the HbA1c index, while the other eight variables contribute only an additional 2.4%. See Table 4.8.

Table 4.8  
*Regression Analysis Summary for Psychosocial Variables Predicting HbA1c*

<i>Variable</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Self-efficacy	-.28	.09	-.27	- 3.11	.002
Internal control	-.02	.03	-.05	-.67	.505
Problem-solving skill	.01	.01	.06	.70	.483
Optimism	-.02	.04	-.05	-.65	.516
Depressed feelings	.05	.02	.25	2.86	.005
Anxiety	.01	.01	.07	.71	.478
Distress	.29	.16	-.09	1.79	.075
Social support	-.06	.13	-.03	-.45	.656
Health provider support	.16	.10	.10	1.59	.114
Knowledge in diabetes	-.01	.05	-.01	-.09	.931

*Note.*  $R^2 = .49$  ( $N = 181$ ,  $p < .001$ )

Summing up the multiple regression analyses conducted in 4.2.2, it shows that six of the ten predictors namely self-efficacy, problem-solving skill, optimism, depression, anxiety, and distress are the significant contributors to different parts in the diabetes self-management measures. Specifically, perceived self-care are predicted by distress ( $\beta = -.29$ ), problem-solving skills ( $\beta = -.21$ ), and optimism ( $\beta = .18$ ); self-care activities by self-efficacy ( $\beta = .50$ ), anxiety ( $\beta = .29$ ), and optimism ( $\beta = .24$ ); and, glycaemic control by self-efficacy ( $\beta = -.27$ ) and depression ( $\beta = .25$ ). On the other hand, other predictors such as internal locus of control, social support, healthcare provider support, and diabetes knowledge do not have significant contribution on any of the diabetes self-management components. For the ease of understanding, Figure 4.1 summarises the outcome of the multiple regression analyses above.

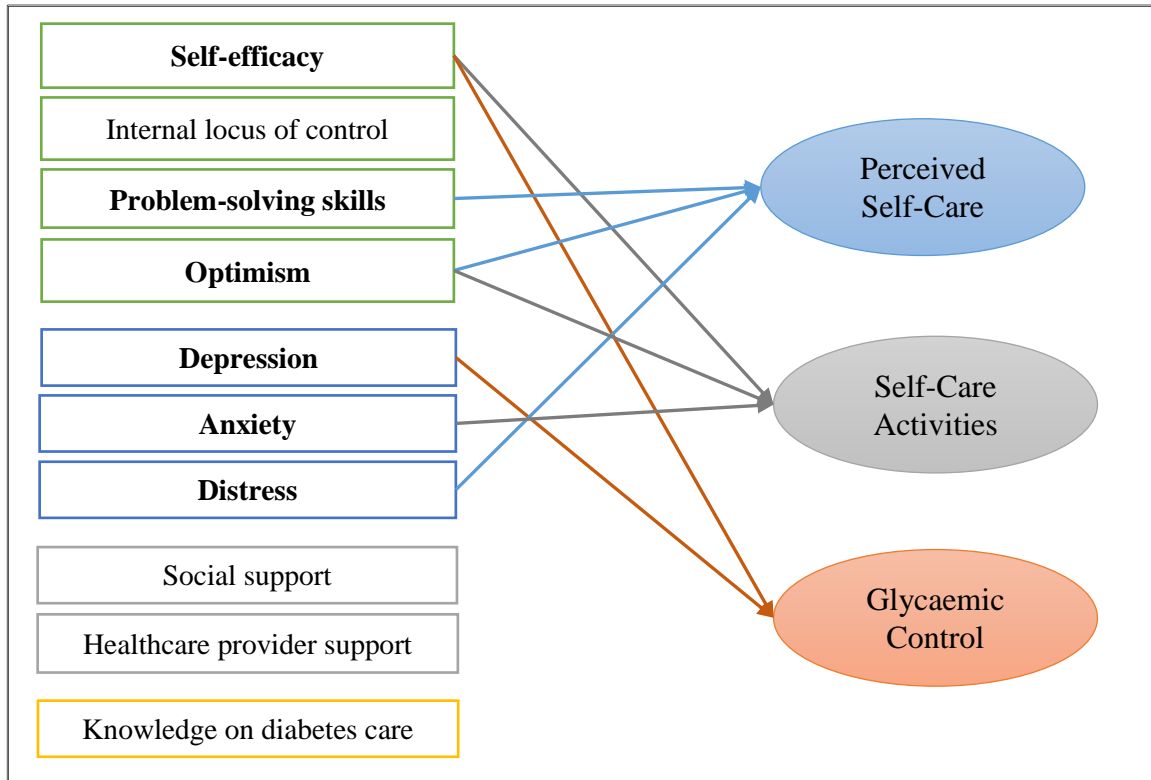


Figure 4.1. Summary of Findings for Research Objective 1

#### 4.2.3 Analyses between Quality of Life and Self-Management

To understand if high level of adherence to self-care regimen associates with the quality of life and to test Hypothesis 5, another Pearson's correlation was carried out. The results showed highly significant relationships between participants' quality of life and all three factors in self-management. The HbA1c reported  $r(181) = -.47, p < .001$ , perceived self-care,  $r(181) = .56, p < .001$ , and, self-care activities  $r(181) = .48, p < .001$ . In brief, the results can be understood as participants tend to report higher quality of life when they achieved lower scores in HbA1c, perceived higher adherence as well as engaged more in self-care behaviours. At the same time, Hypothesis 5- predicting a significant association between diabetes self-management

and quality of life, is supported. See Table 4.9 for the means and standard deviations of the variables involved and Table 4.10 for their intercorrelations.

Table 4.9

*Means and Standard Deviations for Quality of Life and Self-management Predictor Variables (N=181)*

Variable	<i>M</i>	<i>SD</i>
Quality of Life	77.00	15.57
Predictor variable		
1. Perceived Self-care	26.81	5.26
2. Self-care Activities	32.62	11.09
3. HbA1c	8.57	2.00

Table 4.10

*Intercorrelations between Quality of Life and Self-management Predictor Variables*

No	Items	1	2	3	4
1	Quality of life	-			
2	Perceived self-care	.56**	-		
3	Self-care activities	.48**	.43**	-	
4	HbA1c <sup>1</sup>	-.47**	-.50**	-.37**	-

*Note.* \*\* $p < .01$ , two-tailed; <sup>1</sup> negative direction indicates good glycaemic control.

Moving on, a standard multiple regression– Enter method was conducted to find the predictive power among the self-management variables on quality of life as well as to answer Research Objective 2. Result has shown that the linear combination of predictors was significantly related to the self-care index,  $F(3, 177) = 40.67, p < .001$ . The multiple correlation coefficient was .408, indicating that approximately 41% of the variance of the quality of life index in the sample can be accounted for by the linear combination of self-management adherence measures. In Table 4.10, indices to indicate the relative strength of the individual predictors are presented. All bivariate correlations between the self-management measures and the quality of life index were significant. Further, the standardized coefficients ( $\beta$ ) in the

regression analysis indicated that perceived self-care adherence is the strongest predictor, followed by self-care activities and HbA1c. Each of the predictors has accounted for 8%, 5.4% and 2.7% unique contribution to the variance of the quality of life index respectively. The result suggested that the quality of life is heavily influenced by how well the participants feel about how well they carry out their diabetes self-care. See Table 4.11.

Table 4.11

*Regression Analysis Summary for Self-management Variables Predicting Quality of Life*

<i>Variable</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Perceived self-care	1.02	.21	.35	4.90	< .001
Self-care activities	.37	.09	.26	4.01	< .001
HbA1c	-1.54	.54	-.19	-2.84	.005

*Note.*  $R^2 = .41$  ( $N = 181$ ,  $p < .001$ )

#### 4.2.4 Self-Perceived Adherence, Self-Care Activities and Glycaemic Control

To determine whether the patients' self-perceived adherence, self-care activities, and actual adherence are consistent among each other as stated in Research Objective 3 as well as to test Hypothesis 6 (predicting a positive relationship between perceived care, self-care activities, and glycaemic control), the result showed in Table 4.10 indicated an obvious connection between these variables. There were highly significant relationships between perceived self-care and self-care activities,  $r(181) = .43$ ,  $p < .001$ , perceived self-care and HbA1c,  $r(181) = -.50$ ,  $p < .001$ ; and, self-care activities and HbA1c,  $r(181) = -.37$ ,  $p < .001$ . The strength of the relationship reflected by the value of the correlation coefficient ranges from medium to large, suggested by Cohen (1992). Hence, Hypothesis 6 is supported.

#### 4.2.5 Independent-Samples T-test on Glycaemic Control in Residential Areas

To find the answer for Research Objective 4 and to test Hypothesis 7 (predicting a significant variation of the glycaemic control in different parts of Peninsular Malaysia), the mean scores of HbA1c (glycaemic control) between the participants from East and West Coast of Peninsular Malaysia was conducted using an independent-samples t-test. From the SPSS output, it showed that the significance for Levene's test is .06, bigger than .05; hence, the value stated in the Equal variance assumed is referred. The result revealed a significant difference in scores between West Coast ( $M = 7.67$ ,  $SD = 1.57$ ) and East Coast ( $M = 9.81$ ,  $SD = 1.77$ ;  $t(179) = -8.67$ ,  $p < .001$ , two-tailed). The magnitude of the difference in the means (mean difference = -2.15, 95%  $CI$ : -2.64 to -1.66) was large (eta squared = .30). In other words, the glycaemic control among diabetics living in the West Coast was remarkably more successful than their East Coast counterparts; and hence, Hypothesis 7 is supported. See Table 4.12.

Table 4.12

*T-test Results Comparing Residential Areas and HbA1c*

	West Coast ( $n = 105$ )		East Coast ( $n = 76$ )		$t(179)$	$\eta^2$
	$M$	$SD$	$M$	$SD$		
Glycaemic controls						
HbA1c	7.67	1.57	9.81	1.74	-8.67***	.30

Note. \*\*\* $p < .001$

#### 4.2.6 Analysis of Variance on Glycaemic Control amongst Ethnic Groups

A one-way between groups analysis of variance (ANOVA) was conducted to examine the differences on HbA1c scores in ethnicity (Malay, Chinese, and Indian) and to test Hypothesis 8 (predicting a significant variation of the glycaemic control in different ethnic groups). Despite unequal sample size among the groups, the significance value for Levene's test

was .151 (greater than .05), indicating the assumption of homogeneity of variance is met. The results yielded significant variation among the ethnic groups,  $F(2, 178) = 26.74, p < .001$ ; and Hypothesis 8 is supported. Besides reaching highly significant difference in HbA1c scores, the difference in mean scores between the groups was large. The effect size, calculated using eta squared, was .23. Post-hoc comparisons using the Tukey HSD test indicated the mean score for Malay ( $M = 9.58, SD = 1.79$ ) was significantly different from Chinese ( $M = 7.59, SD = 1.66$ ) and Indian ( $M = 8.01, SD = 1.66$ ). However, the Chinese and Indian groups did not differ from each other significantly. See Table 4.13 and 4.14.

Table 4.13

*One-Way Analysis of Variance of Ethnic Differences in HbA1c (N = 181)*

Source	df	SS	MS	F	p	$\eta^2$
Between groups	2	158.90	79.45	26.74	< .001	.23
Within groups	178	528.88	2.97			
Total	180	687.77				

Table 4.14

*Post Hoc Mean Comparisons on Ethnic Differences and HbA1c (N = 181)*

	Malay (n = 82)		Chinese (n = 68)		Indian (n = 31)	
	M	SD	M	SD	M	SD
Glycaemic controls						
HbA1c	9.58 <sub>a</sub>	1.79	7.59 <sub>a</sub>	1.67	8.01 <sub>a</sub>	1.66

*Note.* Means in a row sharing subscripts are significantly different from each other. For all measures, higher means indicated poorer glycaemic controls.

### 4.3 Additional Analyses

A couple of between-group analyses were conducted to seek further knowledge with regards of the results of glycaemic controls between the East and West Coast as well as the



Malay, Chinese and Indian ethnic groups. Informed by the demographic information (Table 4.1) that glycaemic controls (HbA1c scores) improved positively with years of education and worsened with smoking status, a Pearson Chi-Square test was performed to investigate the participants' education levels and smoking habit whereas an independent-samples t-test and ANOVA were used to compare their frequency engaging in self-care activities by comparing the Diet, Exercise, Blood Glucose Testing, and Foot Care subscales in SDSCA.

#### 4.3.1 A Comparison between East and West Coast Groups

The Chi-square tests for independence were done on educational levels and smoking status against participants' residential areas. The results yielded significant associations between East/West coasts and educational levels,  $\chi^2(4, n = 181) = 20.97, p = .001$ , *Craver's V* = .34 and smoking/non-smoking status,  $\chi^2(1, n = 181) = 12.46, p = .001, \phi = .28$ ; indicating the East Coast group was significantly less educated and has more smokers (Table 4.15 and 4.16).

Table 4.15

*Prevalence of Education Levels in East and West Coast Groups (N = 181)*

Education Level	West Coast (n = 105)		East Coast (n = 76)		$\chi^2(4)$	p
	n	%	n	%		
No formal education	3	3	12	16	20.97	< .001
Primary school	17	16	21	27		
Secondary school	43	41	30	40		
Pre-U/Diploma	19	18	9	12		
Degree & higher	23	22	4	5		

Table 4.16

*Prevalence of Smoking Status in East and West Coast Groups (N = 181)*

Residential Area	Smoker		Non-Smoker		$\chi^2(1)$	p
	n	%	n	%		
East Coast	26	34	50	66	13.80	< .001
West Coast	12	11	93	89		

Further, an independent-samples t-test was conducted to compare the scores of self-care activities in the four subscales of SDSCA between the East and West Coast group. It showed significance for Levene's test ranges from .40 to .91, bigger than .05; hence, the values stated in the Equal variance assumed were referred. The results revealed a significant difference only in Diet scores for West Coast ( $M = 4.50$ ,  $SD = 1.14$ ) and East Coast ( $M = 3.69$ ,  $SD = 1.13$ ;  $t(179) = 4.74$ ,  $p < .001$ , two-tailed). The magnitude of the difference in the means (mean difference = .81, 95%  $CI$ : .47 to 1.15) was moderate (eta squared = .11). In other words, the West Coast group ate healthy diet more frequently than the East Coast group. Other subscales (Exercise, Glucose test, and Foot care) did not report significant differences between the two groups. See Table 4.17.

Table 4.17

*T-test Results Comparing Residential Areas and Self-Care Activities (N = 181)*

SDSCA	West Coast ( $n = 105$ )		East Coast ( $n = 76$ )		$t(179)$	$\eta^2$
	$M$	$SD$	$M$	$SD$		
Diet	4.50	1.14	3.69	1.13	4.74***	.11
Exercise	3.14	1.94	2.69	1.99	1.51	.01
Glucose test	2.40	2.18	2.64	2.09	-.77	<.01
Foot care	2.60	2.10	2.33	2.12	1.14	<.01

Note. \*\*\* $p < .001$

### 4.3.2 A Comparison of Malay, Chinese and Indian Ethnic Groups

Two additional analyses were carried out in attempts to further understand the possible reason behind the discrepancies in glycaemic controls among the ethnic groups. These analyses were a Kruskal-Wallis test against the psychosocial predictors, and an ANOVA against the subscales in SDSCA.

The Kruskal-Wallis test showed several significant differences in ethnicities (Gp1,  $n = 82$ : Malay, Gp2,  $n = 68$ : Chinese, Gp3,  $n = 31$ : Indian) and the diabetes self-management psychosocial predictors. Among them, there are self-efficacy,  $\chi^2(2, n = 181) = 24.01, p < .01$ ; problem-solving skill,  $\chi^2(2, n = 181) = 5.99, p = .05$ ; depression,  $\chi^2(2, n = 181) = 28.82, p < .01$ ; anxiety,  $\chi^2(2, n = 181) = 31.98, p < .01$ ; and distress,  $\chi^2(2, n = 181) = 32.96, p < .01$ . However, there was no significant connection between optimism and ethnicities,  $\chi^2(2, n = 181) = 3.73, p = .155$ .

A post hoc analysis using Mann-Whitney U test was done to determine which of the ethnic groups were statistically different from one another. To control for Type 1 error, a Bonferroni adjustment to the alpha values was applied,  $p < .017$ . The results revealed a significant difference in the DSES scores between Malays ( $Md = 5.38, n = 82$ ) and Chinese ( $Md = 6.88, n = 68$ ),  $U = 1635, z = -4.35, p < .001, r = .32$ , Malays and Indians ( $Md = 6.75, n = 31$ ),  $U = 706, z = -3.64, p = .001, r = .27$ ; the PSI scores between Malays ( $Md = 110.50$ ) and Chinese ( $Md = 99.00$ ),  $U = 2140, z = -2.45, p = .014, r = .18$ ; the MDI scores between Malays ( $Md = 19.00$ ) and Chinese ( $Md = 8.00$ ),  $U = 1470.50, z = -4.98, p < .001, r = .37$ , Malays and Indians ( $Md = 9.00$ ),  $U = 709.50, z = -3.62, p < .001, r = .27$ ; the CAS scores between Malays ( $Md = 39.50$ ) and Chinese ( $Md = 16.50$ ),  $U = 1434, z = -5.11, p < .001, r = .38$ , Malays and Indians ( $Md = 16.00$ ),  $U = 641.50, z = -4.05, p = .001, r = .30$ ; and, the DDS scores between Malays ( $Md = 2.74$ ) and Chinese ( $Md = 1.82$ ),  $U = 1314.50, z = -5.57, p < .001, r = .41$ , Malays and Indians ( $Md = 2.12$ ),  $U = 790, z = -3.10, p = .001, r = .23$ . The other between-groups comparisons did not yield any significant results. See Table 4.18.

Table 4.18

*Ethnic Differences in Psychosocial Predictors Using Kruskal-Wallis and Post Hoc Analyses (N=181)*

DSES	Mean rank	Mann-Whitney U			
		<i>U</i>	<i>z</i>	<i>p</i>	<i>r</i>
Malay ( <i>n</i> =82)	61.44	1635	-4.35	< .001	.32
Chinese ( <i>n</i> =68)	92.46				
Malay ( <i>n</i> =82)	50.11	706	-3.64	.001	.27
Indian ( <i>n</i> =31)	75.23				
Chinese ( <i>n</i> =68)	49.83	1042.50	-.09	.931	< .01
Indian ( <i>n</i> =31)	50.37				
PSI					
Malay ( <i>n</i> =82)	83.40	2140	-2.45	.014	.18
Chinese ( <i>n</i> =68)	65.97				
Malay ( <i>n</i> =82)	59.44	1071	-1.29	.198	.09
Indian ( <i>n</i> =31)	50.55				
Chinese ( <i>n</i> =68)	49.60	1026.50	-.21	.836	.02
Indian ( <i>n</i> =31)	50.89				
MDI					
Malay ( <i>n</i> =82)	91.57	1470.50	-4.98	< .001	.37
Chinese ( <i>n</i> =68)	56.13				
Malay ( <i>n</i> =82)	63.85	709.50	-3.62	< .001	.27
Indian ( <i>n</i> =31)	38.89				
Chinese ( <i>n</i> =68)	49.37	1011.00	-.33	.745	.02
Indian ( <i>n</i> =31)	51.39				
CAS					
Malay ( <i>n</i> =82)	92.01	1434	-5.11	< .001	.38
Chinese ( <i>n</i> =68)	55.59				
Malay ( <i>n</i> =82)	64.68	641.50	-4.05	.001	.30
Indian ( <i>n</i> =31)	36.69				
Chinese ( <i>n</i> =68)	49.74	1036.00	-.13	.895	.01
Indian ( <i>n</i> =31)	50.56				
DDS					
Malay ( <i>n</i> =82)	93.47	1314.50	-5.57	< .001	.14
Chinese ( <i>n</i> =68)	53.83				
Malay ( <i>n</i> =82)	62.87	790	-3.10	.001	.23
Indian ( <i>n</i> =31)	41.48				
Chinese ( <i>n</i> =68)	47.02	851.50	-1.53	.126	.11
Indian ( <i>n</i> =31)	56.53				

Further, an ANOVA was performed to compare the subscales in SDSCA. The results indicated significant differences in Diet  $F(2, 178) = 5.27, p < .01$ ; and, Glucose test  $F(2, 178) = 3.35, p < .05$ . However, the Tukey HSD post-hoc analyses revealed that only the Malay-Chinese comparison in Diet was significant in between-groups means comparisons, for Malay ( $M = 3.85, SD = 1.09$ ) was significantly different from Chinese ( $M = 4.43, SD = 1.31$ ) with moderate effect size (eta squared .06). The other between-groups comparisons did not yield any significant variations. In brief, the Chinese participants followed good diet plan more frequently as compared to the Malay participants. See Table 4.19 and 4.20.

Table 4.19

*One-Way Analysis of Variance on Ethnic Differences and Self-Care Activities (N = 181)*

SDSCA	Source	df	SS	MS	F	p	$\eta^2$
Diet	Between groups	2	14.53	7.26	5.27	.006	.06
	Within groups	178	245.56	1.38			
	Total	180	260.09				
Exercise	Between groups	2	4.97	2.49	.64	.639	.001
	Within groups	178	692.58	3.89			
	Total	180	697.55				
Glucose test	Between groups	2	30.01	15.01	3.35	.037	.04
	Within groups	178	797.99	4.48			
	Total	180	828.00				
Foot care	Between groups	2	20.19	10.10	2.30	.103	.03
	Within groups	178	780.54	4.39			
	Total	180	800.73				

Table 4.20

*Post Hoc Mean Comparisons on Ethnic Groups and Self-Care Activities (N = 181)*

SDSCA	Malay (n = 82)		Chinese (n = 68)		Indian (n = 31)	
	M	SD	M	SD	M	SD
Diet	3.85 <sub>a</sub>	1.09	4.43 <sub>a</sub>	1.31	4.40	1.08
Exercise	2.77	2.02	3.10	2.02	3.11	1.72
Glucose test	2.94	2.20	2.17	2.20	2.05	1.64
Foot care	2.74	2.26	2.12	1.89	2.94	2.06

*Note.* Means in a row sharing subscripts are significantly different from each other. For all measures, higher means indicated higher self-care activities.

### 4.3.3 Engagement Interview

During each data collection process, the interviewer initiated casual dialog to establish rapport to help the interviewees to express their views on diabetes self-care freely. (Refer to Subheading 3.3.8, and 3.7.4 for the rationale and questions of the interview.) Out of 181 participants, only 22 of them gave detailed and valuable responses in the conversations. Refer to Table 4.21 for simple demographic information of the interviewees.

Table 4.21

*Demographic Characteristics of Participants in the Engagement Interview (n = 22)*

Characteristics	n	%
Age (years)		
Range	33-68	
Mean (S.D.)	55.0 ( $\pm$ 10.0)	
Gender		
Male	7	31.8
Female	15	68.2
Ethnicity		
Malay	3	13.6
Chinese	15	68.2
Indian	4	18.2
Living with Diabetes		
Range	9 months – 25 years 0 month	
Mean (S.D.)	9.8 ( $\pm$ 7.8) years	

The extra information captured in the interview log sheet was then transferred to the master interview log (Appendix G2); and with that, a preliminary summary was conducted. The compiled details were organised and derived for meanings. Subsequently five main ideas were consolidated and they are diagnosis of diabetes, motivation for self-management, adaptation, personal evaluation of self-care, and acknowledgement.

#### **4.3.3.1 Diagnosis of diabetes**

Via the conversation, it was understood that patients generally realised they have diabetes either through personal awareness or by surprise. The interviewees who came to learn about their diabetes by personal health awareness explained that they usually take a proactive stance to understand their health condition through an annual health check. They regard the health screening as an essential annual event to them due to the family history of chronic illness such as heart disease and diabetes.

*“My family has a history of diabetes and high blood pressure, so I make it a point to go for health examination every year. I came to know about my diabetes through the annual body health check.”*

Other participants who came from family with diabetes history were informed of its symptoms and therefore paid close attention to the changes in their health. They did not subscribe to an annual health check plan but look out for diabetes-related symptoms instead.

*“... My family has the history, so, I read up about diabetes, listen to [diabetic] friends' sharing, paid attention to its symptoms. One day, I realized I had some of the diabetes symptoms such as frequent thirst and hunger, get tired easily...and I went for a check.”*

On the other hand, more of the participants admitted that diabetes caught them by surprise. They usually experienced prolonged symptoms of diabetes such as unusual hunger,

thirst, fatigue, and frequent urination that handicapped their normal performance and brought them to visit a doctor consequently.

*“I was 60 that year, which is 2 years ago...I lost weight drastically, from 62 kg to 55 kg, thirsty and tired all the time. I complained to my daughter and she brought me for a check and found out I have diabetes.”*

Others found out the disease through other incidents such as underwent surgery or encountered an accident at work. Although less common, one can get diabetes as a result of the medical treatment for other disease. The side effects of the treatment can harm the pancreas and trigger diabetes in the patient.

*“My doctor said I have unattended diabetes. How did I find out that I have diabetes? My story is sometime last year; I tripped and fell on my left arm. I broke my thumb and my arm was dislocated. I needed to go for a surgery to fix it. Before the surgery, the doctor asked me whether I have diabetes and I said I don’t know. So, he did several blood tests and informed me that I have diabetes.”*

*“...I was admitted to the hospital because I had difficulty breathing...due to flu, and later the doctor said it’s pneumonia. The breathing problem was so severe that I almost went into a coma...and actually, I fainted in the hospital. According to the doctor after I regained conscious, he injected a medicine with steroid to ease my breathing problem so that I could breathe normally. But the side-effect of the injection is that it triggered my diabetes.”*

#### **4.3.3.2 Motivation for self-management**

For individuals who practice self-care, the source of motivation is extremely important. It can come from within the individual or from external parties. Many respondents revealed that their primary motivation of self-care is to avoid health deterioration and inflict other complications due to diabetes. They added that health deteriorations cause by the diabetes



complication would weaken their autonomy and independence. They acknowledged their concern and fear when seeing other diabetics suffered from organ failures or lost limbs.

*“Fear; fear of other diabetes-related complication. One of my relatives had her toes amputated due to diabetes, another one has kidney problem. I don’t want to get those problems. So I try my best to control my diet by eating healthily and in moderation.”*

Interviewees also expressed their worry of premature death. They wish for longevity and hope for living a happy life with quality. They viewed good quality of life is to be fully autonomous and self-regulating, without depending or troubling their family members.

*“In the past, I was busy making a living and raising my children. And now as I finally have the time for myself, I want myself to be able to enjoy it. Of course without good health, it’s impossible. Yea, it’s time for me to enjoy life after all these years of hard work.”*

Uniquely, a respondent pointed her optimistic personality and positive thinking were her primary force for care adherence. Positivity and happy feelings were particularly needed to sooth the distress when living with a lifelong disease.

*“Be positive and happy as day goes by. I think a happy heart is important.”*

Adherent behaviours in self-management can also be charged by external factors. The middle-aged interviewees revealed that their motivation came from their role and responsibilities in the family and at the workplace. Their devotions in these roles require optimal vitality and stamina, and therefore urge them to work harder towards high self-care compliance.

*“My motivation comes from knowing my roles, a role as a father, husband, boss, etc. ... there are many people under my care and responsibility. So, I must take good care of myself, and my health. ”*

Besides, having an immediate society that offers emotional and instrumental supports energised self-care activities as well. Interviewees informed that the supportive system that is sensitive to their needs has made lifestyle changes easier for them.

*“Get support. I ganged up with some friends who are also diabetics, five of us to exercise together, three times a week.”*

*“My motivation ...to exercise comes from my son. Every Saturday he will accompany me to play badminton. It’s fun to have him playing badminton with me.”*

#### **4.3.3.3 Adaptation**

When asked about their experience living with diabetes as compared to their non-diabetic peers, the information shared by the interviewees could be generally grouped into two categories; without differences and with differences. The differences ranged from small to obvious.

A couple of interviewees expressed that they did not find any differences from their peers whom are not diabetics in managing their health. They explained that practicing a healthy lifestyle is essential to everyone of their age whether having diabetes or otherwise.

*“Not much difference, actually. All my friends who wish to enjoy good health would have to lead a healthy lifestyle whether they have diabetes or not. ”*

At the other end, most of the interviewees pointed out a small difference when adjusting their usual lifestyle to incorporate the care regimen. They acknowledged some differences in terms of diet, routine, and physical fitness but these differences did not hinder their interactions and activities with peers significantly.

*“Not much difference except I have a fixed schedule when it comes to food, drink, and medication. When I need to eat, I eat; I don’t delay it. Of course when I am*

*out socializing, I will remind myself to choose my food wisely. Oh, I sweat a lot, I am sweaty all day long, need to change clothes from time to time.”*

Nevertheless, some interviewees viewed their diabetic condition and management regimens as a hindrance to their social life. They claimed less enjoyable during social gathering due to diet constraints or were forced to reduce the frequency of social meals.

*“The choice of food, especially during social hang-outs, there are a lot of food that I can’t eat. I feel left out sometimes, watching them enjoying the food that I can’t eat. I feel less and less interested to hang out with my gang.”*

*“Oh, the biggest difference is I have to cut down on sugar, which means no more afternoon tea with colleagues. I also eat my dinner earlier nowadays, which means less social dinners with friends... as you know social dinners usually start around 7:30 pm and last for 1 – 2 hours, with lots of good food. And, I have to say ‘no’ to after meal desserts. Usually they eat I watch. Oh, the doctor even asks me to go easy on certain kind of fruits that contain too much glucose. And for weekends, I have to get up early to join my neighbours for morning walk and exercise...and less driving around to hunt for good food.”*

It seemed like adaptation to a new lifestyle with diabetes care regimen incorporated, is particularly challenging especially to those who found pleasure in enjoying food. Among the interviewees, some showed continuous effort to change and maintain healthier lifestyle but some confessed their unwillingness to make a major change despite the health risks.

#### **4.3.3.4 Personal evaluation of self-care**

The interviewees were invited to describe their personal evaluation with regards of their self-care on a regular day. Their descriptions can be grouped into two categories: succeed and failed in self-care regimens.

Unanimously, they referred a “good day” as doing something constructive to manage their health, ranging from physical exercise, healthy eating, refrain from sweet food or drink, to

measuring their blood glucose level. Some regarded their workdays as a good day because the day was planned and mostly predictable. Thus, it was easier to organise self-care activities around their work schedule.

*“My good day is my working days. I work as a security guard at a factory. Every night I will have to walk my rounds. So, I consider that as my daily exercise.”*

*“I call my good day as “good patient day” as in I eat healthy food like having oatmeal for breakfast, more veggies, less rice, less meat, and less oil for lunch and dinner, in the appropriate portion, drink teh-tarik [tea with milk] or coffee without adding sugar, no extra tit-bits or junk food ... and I manage to walk more at work instead of sitting there for hours just to do work. Then, have my dinner before 7 pm.”*

Nonetheless, a “bad day” for them was generally referred to falling short of their personal expectations or objectives for self-care. On top of that, bad weather and busy work schedule that disrupted the plan for exercise and delayed dinner were the most frequently mentioned reasons contributed to a bad day.

*“Typical bad day for me is I get too tied up with my errands or bad weather that I couldn’t go out of the house to exercise...and worse, end the day with heavy dinner. I try my best not to let it happen too often. ”*

Many interviewees addressed weekends or festive celebrations that always associated with excessive good food as the most challenging moments for self-care management. They tended to expose to higher risk of overeating. Interviewees admitted that the abundant of good food weakened their will for diet control. Worse, they usually felt tired and tend to skip the plan to exercise after feasting.

*“Overeat, especially during festive seasons like Chinese New Year, wedding dinners...inactive, going to bed feeling guilty.”*

*“Bad day is when I have too many celebrations or business dinners to attend; and, they take away my time for exercise.”*

At the same time, not being understood by the immediate society tends to make a person feels bad for having diabetes. Others’ ignorance or insensitive remarks could be disturbing and hence evoke stress in the patients.

*“...when my friends do not seem to understand my feelings. Sometimes they made intimidating remarks when seeing me eating food that contains sugar or carbohydrate. Those remarks such as “you will die faster”, “you will lose your arms or legs if you don’t keep to your diet” ruin my mood and de-motivate me even though I know they said these for my own good.”*

#### **4.3.3.5 Acknowledgement**

Overall, the interviewees acknowledged the importance of prudent adherence. They were cognizant that diabetes can be managed and health deterioration can be prevented. They were also aware of what an optimal diabetes self-care entails. They highlighted the needs to control diet, exercise regularly, do not skip medication, and test blood glucose routinely. In addition, some of them also believed and tried out home remedies to help lower the blood glucose level.

*“I suggest, manage your diabetes condition while you still can and don’t let it get worse. The best way is to do your best to change to a healthier lifestyle, learn up how to estimate the calories in your food drink make exercise part of your daily or weekly routine, and check your blood glucose regularly.”*

*“Must take the prescriptive medicine, don’t simply skip or stop it. Don’t miss doctor’s appointment, have the fear for complication...occasionally try out alternative methods to control blood sugar level.”*

The extra findings obtained from the engagement interview were summarized and presented in Figure 4.2 below.

DIAGNOSIS OF DIABETES	MOTIVATION FOR SELF-MANAGEMENT	ADAPTATION	PERSONAL EVALUATION OF SELF-MANAGEMENT	ACKNOWLEDGEMENT
<ul style="list-style-type: none"> <li>• <b>By Personal Awareness</b> <ul style="list-style-type: none"> <li>• Regular health check</li> <li>• Family history</li> </ul> </li> <li>• <b>By Surprise</b> <ul style="list-style-type: none"> <li>• Incidental discovery</li> <li>• Symptom triggered</li> <li>• side-effect of other treatment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Intrinsic Motivation</b> <ul style="list-style-type: none"> <li>• Fear of complications</li> <li>• Avoid premature death</li> <li>• Quality of life</li> <li>• Optimistic attitude</li> </ul> </li> <li>• <b>Extrinsic Motivation</b> <ul style="list-style-type: none"> <li>• Social supports</li> <li>• Personal responsibility</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Without Differences</b></li> <li>• <b>With Differences</b> <ul style="list-style-type: none"> <li>• Small differences</li> <li>• Obvious differences</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Successful in Self-Care</b></li> <li>• <b>Failure in Self-Care</b> <ul style="list-style-type: none"> <li>• Lack of exercise</li> <li>• Excessive eating</li> <li>• Lack of social empathy</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Importance of prudent adherence</b></li> </ul>

Figure 4.2. Summary of Engagement Interviews

In brief, the researcher gathered that most interviewees discovered the illness by accident instead of via the planned physical examinations. Understandings were gained from interviews that fear of death and fear of diabetes-related complications seemed to be the potent motivating factors for self-management. It means the interviewees generally acknowledged the severity of health consequences if the illness is not managed properly. Despite the complex regimens, most of the interviewees do not see their lifestyle being significantly different from their non-diabetic friends. This disclosure informs that once the patients successfully integrated the regimens into their daily routine, they are able to live like a normal individual. Their good day in self-management is strongly linked to sufficiently engage in some health benefiting activities whereas a bad day is as going loose or slacking in the prescribed regimens. Finally yet importantly, the interviewees acknowledged the importance of prudent adherence and aware of what self-management entails.

## **CHAPTER 5**

### **DISCUSSION**

This chapter commences to discuss, interpret and explain the result findings of the analyses that have been conducted to prove/disprove the hypotheses and to answer the research objectives following the order stated in the last section of Chapter 1 and Chapter 2. Then, the discussion extends to the supplementary findings derived from the engagement interview, and ends with the elaboration on the strength and limitation of study.

#### **5.1 Patients' Psychological Variables and Self-management**

The study began by surveying the associations between Malaysian diabetic patients' psychological determinants and self-management. Variables included self-efficacy, internal locus of control, problem-solving ability, optimism, feelings of depression, anxiety, distress, social support, healthcare provider support, and diabetes knowledge were tested in the initial exploratory analysis. The outcome of the statistical analyses showed significant relationships among all the variables, indicating that each psychosocial component, namely personal attributions, emotion management, interpersonal relationship, and health literacy has a unique role in determining self-care adherent behaviours. Hence, Hypothesis 1 (predicting self-efficacy, internal locus of control, problem-solving skill, and optimism are positively associated with self-management), Hypothesis 2 (predicting feelings of depression, anxiety, and distress are negatively associated with self-management), Hypothesis 3 (predicting social support and healthcare provider support are positively associated with self-management), and Hypothesis 4

(predicting knowledge in diabetes is positively associated with self-management) were supported.

The findings indicate that good mental health state has a positive impact on chronic diseases such as diabetes. Individuals with good mental health are believed to be more psychologically and socially engaged, more inclined to face their physical illness with positive attitudes and are more driven to involve in health benefiting activities (Ibrahim, 2011). These findings supported numerous studies that were carried out previously (e.g. Ciechanowski et al., 2000; McCleary-Jones, 2011; Rise et al., 2013; Schiotz et al., 2012). The findings lend supports to the Social Cognitive Theory. SCT posits that a person is both a product and a producer within the environment, proactively engaging and exerting control over his thoughts, feelings, and behaviours to produce desirable outcomes. This propensity for self-regulation has allowed one to cope and to adapt to changes in life (Bandura, 1998). The results obtained in the initial analyses indicated favourable connections between diabetes self-management and the psychosocial variables of interest. It illustrates the diabetes patients who reported higher index of self-efficacy, internal locus of control, problem-solving skill, optimism, social support, health provider support, diabetes knowledge; and, lower index of depression, anxiety, and distress tend to generate a better diabetes management. In other words, the propensity for self-regulation has allowed a patient to cope and to accommodate the demands of prudent adherence when living with a chronic disease like diabetes.



## 5.2 Predictors of Self-management

Next, the multiple regression analysis was carried out to examine the unique predictive power of the abovementioned psychosocial factors over self-management to find answers for Research Objective 1. The findings pointed out that problem-solving ability, optimism, and distress are useful predictors for patients' perception of self-care. At the same time, self-efficacy, optimism, and anxiety are powerful predictors for patients to engage in their care activity routine whereas self-efficacy and feelings of depression were two critical variables that influence their glycaemic controls. Looking at the big picture, it seemed that six out of ten predictors coming from the personal attribution and emotion management components dominated the influence for self-management over interpersonal relationship and health literacy.

The results reflected in the personal attribution component have indicated that skill-based confidence and positive attitude are essential qualities to self-management routine. The confidence arises from self-efficacy and problem-solving ability is skill-oriented by nature. Sometimes, feeling efficacious is inconsistent with actual/desired outcomes. Therefore, self-efficacy should be founded on the actual capability to perform effective care activities. Otherwise, the patients would likely to experience the "illusion of success" that in fact may counter the purpose of diabetes care.

As for optimism, it is found to have a protective effect on individuals who live with health crisis (Kivimaki et al., 2005). As seen in Table 4.3, there are significant but negative connections between optimism against depression, anxiety and distress with the coefficients ( $r$ ) of -.47, -.57, and -.44, suggesting that higher optimism relates to lower emotional disturbances. This result can be interpreted as optimistic attitude tends to neutralize negative feelings in the

patients. In addition, the information derived from the open-ended engagement interviews also pointed optimism as a source of self-care motivation. Thus, being optimistic can be an advantage when living with diabetes and its complex regimen.

Likewise, emotion regulation has turned out to be an important component in self-management. Informed by the results, strong emotion reactions shed lights in the anticipation of success or failure when living and dealing with diabetes. Feelings of depression, anxiety, and distress can be toxic and potentially ruin the desired adherence if these feelings were overwhelming and drain the motivation to fight the health treat. Therefore, keeping negative feelings at bay could possibly reinforce optimal adherence. In fact, the patients' psychological well-being needs to be assessed by using standardized and validated tools at timely basis. Unfortunately, emotion regulation seems to be an area that has been overlooked by healthcare research. In addition, psychological implications of diabetes self-care have not been adequately converted to proper psychological healthcare for diabetic individuals (Snoek & van Ballegooie, 2004).

The interpersonal relationship component was not predictive of adherent behaviours significantly, unlike several past studies. It is speculated that participants of this study are predominantly mature adults with 97% of them older than 30 years of age. Members in this age group are usually recognised as more autonomous, self-regulating and less dependent on the emotional support from external sources such as family, friends and healthcare providers to carry out their care activities as compared to younger diabetics (such as adolescents). In addition, the regression analysis also pointed out that diabetes knowledge did not predict self-care activities. It also means that having detailed knowledge about the illness does not trigger

much self-care actions. This finding might shed some lights on our understanding that perhaps desired adherence can be achieved by abiding to the self-care routine and attitudinal change with or without a high level of diabetes knowledge, as suggested by Sarkar et al. (2006). By the same token, healthcare providers should be cautious when working with knowledgeable patients as a proxy measure for competency in self-management.

The findings lend partial support to the Self-Determination Theory. SDT posits that the motivation to strive for personal well-being is generated when the needs for competence, autonomy, and relatedness are fulfilled (Ryan, 2009). The need for competence is referred to a person gaining mastery and competency in order to control the outcome of events. The need for autonomy denotes a person's desire to feel independent and self-directed in guiding his own behaviours. The need for relatedness explains a person exerts to interact and be connected with the immediate environment. Ryan further explained that these psychological needs are regarded as basic and universal, satisfying the needs is essential for a person to achieve vitality and healthy human functioning regardless of developmental stage. The results generated by multiple regression analyses reflected that self-efficacy, problem-solving skill, optimism, depression, anxiety, and distress are strong and unique predictors for one or more outcome variables in diabetes self-management whereas internal locus of control, social support, healthcare provider support, and knowledge on diabetes care have no significant predictive power. In other words, the findings inform that satisfying the needs for competence and autonomy is essential for a diabetic individual be vitally managing their condition as well as maintaining a functional life whereas the need for relatedness is optional.

### **5.3 Self-management and Quality of Life**

High diabetes care adherence leads to good glycaemic control. Does prudent adherence to a complex regimen undermine quality of life? Research Objective 2 was established to investigate the effects of patients' perceived adherence, self-care activities, and actual adherence on their experience in quality of life. Despite mixed findings gathered from the past research carried out using non-Malaysian samples, the results pointed out that participants reported higher quality of life with higher level of self-management. The strength of relationship between quality of life and self-management ranged from medium to large (Cohen, 1992) and quality of life helped to explain 31% on perceived self-care, 23% on self-care activities and 22% of the variance on HbA1c. This finding also highlighted that personal perception has the strongest influence on perceived quality of life over self-care behaviours and actual plasma glucose test results. By the same token, Hypothesis 5 (predicting a positive relationship between self-management and quality of life) was supported. The finding can be explained as when the patients managed to maintain a healthy lifestyle and succeed in blood glucose normalization consistently, they are free from worrying about diabetes-inflicted complications. Such freedom that puts their mind at ease could energise their self-confidence and restore emotional balance; enabling them to focus more energy in the desired activities or passions, enjoying the quality of life no lesser than a normal individual.

### **5.4 The Reliability of Self-gauged Adherence**

Being familiarized with the fluctuation patterns of blood glucose level in different time points is deemed important to a diabetic person. The purpose to perform SMBG is to gather

detailed information about blood glucose levels at various time points. This information could then be used by healthcare providers to develop or revise a more precise and personalised regimen, as well as for the patient to make the best decisions and choices in their day-to-day care in terms of diet, exercise, insulin injection or other relevant matters. Despite the importance of SMBG being repeatedly emphasised by healthcare providers, some diabetic individuals do not test their blood glucose as regular as they wished or advised in reality. The reasons not to adhere include the cost, frustration related to high glucose reading, misunderstood the purpose of SMBG, fear of needles and pain, stigma, uncondusive workplace, and lack of self-efficacy (Ong et al., 2014). These patients monitor their needs for adherence through “feelings”. The question is, can the patients make an accurate gauge of their diabetes management without the frequent use of glucometer? Hence, the Research Objective 3 was developed to examine the consistency amongst self-perceived adherence, care activities, and actual glycaemic control in the patients. The highly significant relationship amongst HbA1c scores, perceived self-care, and self-care activities checklist revealed in the results showed the coefficient ( $r$ ) of -.50, -.37, and .43; indicating that the patients’ glycaemic control, perception and activity adherence predict each other by 25%, 14% and 19% respectively (Table 4.10). The strength of the relationships was ranged from medium to large, suggesting that patients’ self-guaged adherence is fairly consistent with their actual glycaemic control. The findings may suggest that patients can trust their “feelings” for their self-management performance. And for Hypothesis 6- predicting a positive association between perceived self-care, care activities and glycaemic control, was supported. Nevertheless, the finding should be carefully interpreted and treated as basic information about the interactions of the three variables, providing a

rudimentary understanding that patients can trust their “feelings” within a limited period if they have no access to blood glucose tests regularly, but not totally omitting SMBG in their self-management regimen.

### **5.5 Glycaemic Control between East and West Coast of Malaysia.**

The Peninsular Malaysia is generally divided into two large territories, namely the East and the West Coast. East Coast is particularly used to describe the states facing the South China Sea: Kelantan, Pahang, and Terengganu. The West Coast refers informally to a congregation of states facing Straits of Malacca including Perlis, Kedah, Penang, Perak, Selangor, Kuala Lumpur, Putrajaya, Negeri Sembilan, Malacca and Johor.

The distinction between East and West Coast is significant beyond the sphere of geography. The West Coast consists of mostly urban cities where major hubs for politic, banking, education, healthcare, and information technology are situated. The East Coast is less commercially developed and is an important eco-cultural hub in the Peninsular. Thus, there is a valid reason to compare the glycaemic control between the patients living in East and West Coast who are exposed to such a huge difference in demographics; and hence, Research Objective 5 was formed to explore the variations of glycaemic controls in different parts of Peninsular Malaysia.

In the effort to gain a closer understanding of the sample and the answer the 5<sup>th</sup> research objective, the average scores of HbA1c were compared between the residential areas of East and West Coast. The outcome of the comparison showed one level difference between the two groups where the East Coast diabetics was ranked “poor” and the West Coast “good”, in their

HbA1c scores. Such difference has reached statistical significance; and hence, Hypothesis 7 (predicting a variation of glycaemic control in different parts of Peninsular Malaysia) was supported.

Malaysia has a sophisticated system of modern healthcare with doctors trained in advanced biomedicine. However, these services are concentrated in the urban areas and radiated out in decreasing availability. Hence, the uneven availability of healthcare services spreading from West to East coasts could explain why the West has a better control over their blood glucose. Further, the difference could also be due to the level of care deliverance. Specialists and senior medical officers mainly serve at the urban health institutions whereas medical assistants and junior medical officers in the rural districts who might have heavier patient load, lacking of experience, and have limited access to advanced medicine (Chew et al., 2014). Hence, the patients in the West Coast received higher quality of cares.

With reference to the additional analyses comparing the participants' education levels, smoking habit and daily self-care activities, it was found that patients from the East Coast reported lower education levels, eat less healthily, and smoke more. Poorer eating habits and smoking behaviours are in fact harmful to glycaemic controls. Nonetheless, literacy level that is believed to have a relevant connection with personal health awareness, the use of healthcare services and health information seeking (Sarkar et al., 2006) could be the additional reasons to explain the discrepancy of actual adherence between the East and West coasts diabetic patients.

### **5.6 Glycaemic Control in Malay, Chinese, and Indian Ethnic**

The majority of people in Peninsular Malaysia are ethnic Malays. Large Chinese and Indian populations also exist. Each of the ethnics has their own unique lifestyle, food preferences as well as health beliefs. Research Objective 5 intended to find out if there is a difference in glycaemic control among the three main ethnics. To answer the Research Objective 5 and to examine Hypothesis 8, the average scores of HbA1c were compared within Malay, Chinese, and Indian participants. The result has shown significant differences among the ethnicities, indicated that Hypothesis 8 (predicting a variation of glycaemic control in different ethnic groups) was supported. The outcome of the mean comparisons revealed that the Chinese participants have the best glycaemic control followed by Indians and Malays. The findings were concordant with the results obtained by Ismail et al. (2000) and Ahmad et al. (2011) earlier.

It is speculated that psychological well-being, residential areas, eating habits, cooking styles, and even eating methods- each has a role in influencing the glycaemic controls among the three ethnics. First, regarding the residential areas, the Malay participants were mainly recruited from the East Coast whereas the Chinese and Indians were from the West. As explained earlier, the West Coast sample is more convenient in accessing to healthcare services and therefore more well-informed of the disease; and, having higher health awareness allows them to better control their blood glucose.

The study extended a further analysis to examine the significant psychosocial predictors (self-efficacy, problem-solving skill, optimism, depression, anxiety, and distress) of self-management and ethnicities. The outcome of analysis yielded favorable results to Chinese and



Indian groups where they experienced higher self-efficacy and problem-solving ability at the same time lower in depression, anxiety, and distress level as compared to the Malay group. In brief, the poor glycaemic control reflected by Malay participants could be closely associated with some concerns in self-efficacy and problem-solving skills, as well as the inability to regulate mood disturbances.

Furthermore, diet could be another explanation for the findings. The additional analysis conducted using ANOVA to compare scores in four of their daily self-care activities revealed that the Chinese participants practiced healthy eating for the average of 4.43 days per week, the Indians, 4.39 days, and the Malays, 3.85 days whereby the discrepancy between the Chinese and the Malay group was significant. Seemingly, the Chinese participants were more watchful on their diet as compared to the Malay counterparts.

As far as eating habits and food preparation, regular Malay and Indian dishes are spicy by large as compared to the Chinese dishes. The use of spices makes dishes more appetizing and encourages more rice intake. Besides, it is a common practice to add sugar to enhance the taste when cooking hot and spicy food, particularly in some Malay dishes. This cooking style increases sugar and carbohydrate consumption. Tan and Magarey's study (2008) in ethnicity comparisons also reported that Malay participants consumed the most amount of sweet intake. Comparatively, common dishes serve on the Chinese dining table are usually non-spicy. The common home cooking styles are steam and stir-fry, which require less seasoning and oil.

Apart from cooking styles, eating methods such as using chopsticks, spoon, or fingers are believed to have an impact on blood glucose regulation. Using chopsticks for meals is a unique and common eating method among the Chinese that seems to facilitate blood glucose

regulation. A recent study carried out in Singapore reported that the glycaemic response was significantly lower when participants eat rice using chopsticks instead of using a spoon (Sun, Ranawana, Tan, Quek, & Henry, 2015). They reasoned that the eating tools determine the amount of rice per feeding. Chopsticks users eat lesser amount of rice in each feeding and therefore it takes them longer time to finish the rice as compared to spoon users. Sun et al.'s study concluded that lesser rice per mouthful and longer chewing time result in lower glycemic response and lower glycaemic index of the rice which in turn are benefitting to mitigate the diabetes conditions. Incidentally, using chopsticks for meals is a prevalent eating method among the Chinese.

Besides solid food, the three ethnics show differences in liquid consumption. The preferred drinks for Malays and Indians usually contain sugar or milk or both beside plain water. As for Chinese, *Chinese tea* (plainly brewed tea without sugar or milk) is a common preference between plain water and sugared drinks, on a daily basis. In other words, the Chinese have an extra option for sugar-free drink besides plain water when it comes to liquid intakes.

### 5.7 Supplementary Findings

Additional knowledge was obtained through the initial researcher-participant engagement process. It is worth taking note that *personal responsibility* and *fear of death* are the newfound motivators, deduced from the engagement interview compilation. *Personal responsibility* and *fear of death* seem to be the concepts that have not been receiving much research emphasis within the library of Malaysian studies.

Nearly 71% of the sample was individuals aged 30 to 60 years (Table 4.1), suggesting that majority of them are active contributors to their family, profession, and their community. They were either living in the peak of life or reaching out to their peak. Nonetheless, they shoulder a lot of responsibilities and are indispensable to their family. Hence, do their best to look after their health could not be neglected. Thus, their sense of personal devotion may be a powerful motivator to mobilize the optimal self-management behaviours in them.

The other two age groups are aged below 30 (4%) and over 60 years (25%). These individuals would aid the explanation for the *fear of death*. Many interviewees expressed disbelief when they were diagnosed with diabetes in their 20s. Some have the thought that diabetes belongs to geriatrics. Apparently they were unprepared to face death at such a young age. At the other end of the age groups were the individuals above 60. They were mostly retirees who have just retreated from a full time profession. They considered their retirement as the time to reward themselves with leisure and interests after working for three to four decades. Certainly they wished their health would grace them an enjoyable retiree life for as long as possible with quality. Hence, *fear of death* is deemed another potential motivator that worth to be investigated further.

### **5.8 Response to Limitations of Previous Studies**

The outcomes of this research project have helped to narrow some gaps of knowledge as identified in Section 2.3 *Limitations of Previous Studies*.

First of all, past Malaysian research that studied the connection between diabetes populace and health psychology in personal diabetes management was focused on variables

such as efficacy, knowledge, depression, quality of life, and social support. This research project has expanded the understanding by examine additional but relevant variables that include other attributional factors such as health locus of control, problem-solving skill, optimism as well as emotion management such as anxiety and distress.

Besides discovering more psychological factors are highly associated to diabetes self-management, this study also managed to identify different predictors that exert influence on different parts in self-management. Further, variables like locus of control, social support, health professional support, and knowledge on diabetes care that were identified as significantly important in foreign research did not seem to carry profound influence within the Malaysian diabetic community.

As mentioned in Section 2.3 that comparative study is a missing piece from the library of Malaysian research, the project has attempted some analyses on demographic comparisons. The results have improved the knowledge on how glycaemic controls be differed by participants' residential areas, ethnicities, educational levels, eating habits, and smoking status. In other words, this study managed to churn up a rudimentary knowledge on how demographic factors can impact both the similarities and dissimilarities in blood glucose normalisation.

In addition, research studies that catered to cross-examine the intercorelation among different parts of diabetes self-management were hardly found; and hence, little is known about how much these parts affect and explain each other when they are being compared. The result findings in this study have managed to fill in the knowledge gap by pointing out there is a significantly consistent relationship connecting the different parts in self-management namely self-peiceived adherence, adherence activities, and glycaemic control results.

### **5.9 Strength and Limitation**

One of the strengths of this study is the heterogeneity in its sampling population. The advantage of community based sampling method that is being adopted in this study allows diabetics of different backgrounds, localities, health beliefs, and cared by either public or private health facilities to be included. This diversified database could reflect a more realistic and fairer representation of the diabetic community as compared to the other studies, which focused the sampling exercise mainly on one or two medical entities.

A few aspects of this present investigation were identified for improvements. Demographic items such as the geographical distance to healthcare facilities and the possession of a personal glucometer should be added in order to gain a more thorough understanding of the participants in terms of their convenience in assessing healthcare services as well as how informed are they of their blood glucose levels on a regular basis.

The use of cross-sectional design for survey study is most popular because it can capture high amount of information at a single point in time. Despite all the advantages, cross-sectional design is not without its limitations. As the data was gathered at a specific point in time, it could not indicate the sequence of events (Levin, 2006). In this study, the researcher only learnt how certain psychological variables interacted with diabetes self-management at one time point but the long term effects of these factors could not be known. It is difficult to determine whether the outcome followed the psychosocial exposure in time or the psychosocial exposure was in fact resulted by the outcome; and hence, it is inappropriate to infer causality. By its very nature, survey research involves reactive measurement because participants are aware that their responses were being recorded. Such awareness might evoke the social desirability reaction in

them. When the reaction is strong, some people tend to respond as they “should” instead of as what they “actually” believe (Shaughnessy, Zechmeister, & Zechmeister, 2012, p. 174).

Another limitation of the study is the use of a log sheet over a voice-recorder during the engagement interviews. There was a possibility of information loss during this manual process. Therefore, the completeness of the information could not be verified.

Nevertheless, by engaging a diversified sample in a largely self-report study, the outcome findings were susceptible to certain confounding issues. Despite depression is commonly observed in the diabetic populace (Mohamed et al., 2012; Poulsen & Pachana, 2012), it could be a potential confounder to quality of life. It could not be utterly clear that low quality of life was a result of poor diabetes self-management when the study sample was exposed to depression due to the reason that depressed individuals has the propensity to rate the their life quality in the less favourable light.

## **CHAPTER 6**

### **CONCLUSION AND RECOMMENDATION**

Diabetes mellitus is regarded as the initial cause of numerous other health complications such as diseases of heart, kidney, and eyes. Without proper medical attention and prudent self-care from the patients, the disease can potentially impair future quality of life, as well as incurring additional costs to the healthcare system. The conventional diabetes self-care regimen, which includes SMBG, diet, exercises, medication, and foot care places huge responsibility on the patients. Thus, it is vitally important to understand the psychosocial determinants to achieve optimal self-care adherence; and hence, sustaining a functional life with quality. This research study was designed and conducted using the Social Cognitive and the Self-Determination theories as its background. The initial analyses of this study suggested that patients' personal attributions, emotion management, interpersonal relationship, and health literacy positively influence the adherence. The significant findings in these four psychosocial components have proven the usefulness of SCT in explaining the crucial connections between psychology and health management. Further, self-efficacy, problem-solving skill, optimism, depression, anxiety, and distress turned out to be the strongest predictors of self-management compliance. As some predictors are either trainable (i.e., self-efficacy, problem-solving ability) or manageable (i.e., anxiety, stress), they should be addressed sufficiently in the diabetes education programmes because good quality of life demands a successful self-management. On the contrary, personal control, knowledge on diabetes care, and supports from immediate society

and healthcare provider did not play a prominent role to project adherent behaviours. The findings obtained in this research study indicated the Self-Determination Theory may not be fully applicable to Malaysian diabetes society because its results did not support the importance of social relatedness- one of the three core elements in SDT.

## **6.1 Implication and Recommendation**

Good mental health which comprises of several psychosocial factors is essential to slow down the deterioration of diabetes and other cardiovascular diseases (Ibrahim, 2011). Thus, there is a need to include mental health elements in the content of healthcare education. Diabetes care providers should assist the patients to develop effective methods of coping with stress and anxiety, addressing concerns and worries as well as strengthening positive thinking skills on top of giving medical advices.

### **6.1.1 Skill-based Diabetes Care Workshop**

Self-regulatory behaviours in health care tend to cease if the behaviours do not result in expected benefits (Clark et al., 1991). By knowing that diabetes self-efficacy is the most important quality in promoting good diabetes self-care, the diabetes education programmes should deviate from lecture-based and gear towards competency-based in training the patients to master and be proficient in their daily diabetes care activities (Krichbaum, Aarestad, & Buathe, 2003; Wu et al., 2013). It is worth taking note that assimilation of health advice and self-care information may be extremely thin at the point of diagnosis (Tan & Magarey, 2008; Ahola & Groop, 2013); and therefore, refresher courses and information update sessions should be



conducted by various diabetes care entities to motivate and to reinforce the importance of blood glucose normalization and healthy living amongst the patients at regular intervals. On top of that, regular meetings should contain programmes such as new health information updates, practice on using a glucometer, checking on shoes interior and feet as well as brainstorming on how to handle special situations. Finally yet importantly, assisting the participants to review and renew their self-management goals is utterly relevant in the programme as people work more effectively with goals that set at the appropriate levels (Reeve, 2015, pp. 220-224).

### **6.1.2 Psychological Counselling**

As indicated in the results, emotional issues or concerns should not be neglected but to be properly addressed. The awareness of mental health importance should be translated into clinical practice (Snoek & van Ballegooie, 2004). In other words, professional counselling services should be installed as a part in diabetes healthcare package. When diabetic patients experience overwhelming feelings of depression, distress, or anxiety, they usually express their concern to their diabetes nurses or doctors, in current practice. Mild level of depression, anxiety and distress may be temporarily relieved by listening to the patients, possibly with some advices given to them. However, medical practitioners who are usually equipped with very basic counselling skills are inadequate to give professional counselling assistance to the patients when emotional issues are severing. In fact, what the patients really need is to learn to manage their negative feelings competently so that the emotion disturbances would not interfere and wear down their self-care determination.

### **6.1.3 Ethnic-specific and Regional-specific Intervention Programmes**

The results showed significant differences of glycaemic control in ethnicities and residential areas. It is evident that the current “one-size-fits-all” approach to diabetes education could not meet the real needs for diabetics of different backgrounds. Self-management programmes should be tailored to target the actual needs according to patients’ ethnicity and residential area as well as other relevant demographic characteristics. For example, medical advice and diabetes education ought to be made easy to understand especially to patients who are less educated and/or using examples that are familiar to them. Home visits that involve demonstrations of healthy cooking, meal planning, and calorie estimation could be helpful to patients and their family who have little knowledge in the area.

### **6.1.4 Dissemination of Health Information**

What are the methods for Malaysia to disseminate health information? A typical Malaysian usually exposes to health information via medical consultation, printed-materials, Internet, radio and television. Is diabetes-related information successfully transmitted to its targeted audiences? How many of them have the habit of reading or are shrewd Internet users to look up health materials? The educated group who lives in urban areas do not seem to have much difficulty to obtain the desired information but not so with the less educated from the rural areas. It is speculated that disseminating diabetes care information to the latter would be more effective via television broadcast in multi-language at the right hours because TV programmes are still their main source of entertainment on a daily basis. Since more than 20% Malaysian adults are diabetics (Wan Nazaimoon et al., 2013), it is justifiable to host a range of diabetes

topics on TV at regular intervals. Most importantly, the health messages should be made captivating, engaging and need addressing; expressed in various forms such as forums, interviews, animations, call-in question-and-answer session, short movies, jingles, and even utilizing public figures with positive influence.

### **6.1.5 Increase and Improve Exercise Facilities**

Physically inactive is a common issue among Malaysian public in general. One of the main reasons is its hot and humid weather. People living in hotter regions like Malaysia prefer to organise their activities around shelter, shade and indoor (Van de Vliert, 2009). The World Health Organization recommends a maximum temperature of 24°C ( $\pm$  75°F) for “comfortable” exercise (Gerstacker, 2014); however, the average temperature is 27 °C ( $\pm$  81°F) and humidity level is >75% in Malaysia. In other words, the warmth a person actually *feels* (Heat Index; Oklahoma Climatological Survey, 2006) at the outdoor is about 30 °C ( $\pm$  86°F). People are advised to take caution because it can cause fatigue with prolonged exposure and/or physical activity in the temperature of 26 - 32°C (Appendix E). Apart from the heat, rainy weather brought by the two monsoon winds also makes outdoor activities less feasible.

As an effort to promote active lifestyle amongst Malaysians, it is sensible to improve recreational parks by building more covered walking tracks, partial-indoor and indoor recreational entities with proper ventilation would definitely attract its people to exercise. Zoning and land use policies should be reviewed to protect the recreational spaces free from industrial dusts, fumes and haze. The government could also provide incentives for the development of alternative transportation systems that encourage walking and cycling for work

purposes. The authority should also propagate convenient, simple and creative ideas to encourage physical activities such as using the stairs instead of elevator or escalator, 5-minute stretching exercise at workstation, 10-minute simple exercise during lunch hour break, and exercise while watching TV programmes like lifting a dumbbell or playing a hula hoop.

## **6.2 Future Research Direction**

In the future, a more wholesome intervention approach that integrates psychosocial aspects, particularly personal attributions and emotion management should be made available to improve the effectiveness of the diabetes self-care education. Apart from that, gender differences in terms of promoters and barriers to self-management can also be examined as indicated by previous research (Bakri, 2007; Tan & Magarey, 2008). As indicated in the results, other factors such as fear of death, personal role and responsibility, and cultural practices that are potentially influencing an individual's health management attitudes should be covered in future research. As Malaysia is a multicultural country, similar studies should also be conducted in Borneo Malaysia to gain greater knowledge of the similarities and differences in personal diabetes care between East and West Malaysia.

## **6.3 Conclusion**

Diabetes mellitus is regarded as the initial cause of numerous other health complications such as diseases of heart, kidney, and eyes. Without proper medical attention and prudent self-care by the patients, the disease can potentially impair the quality of life as well as increase financial burden to the health care system. The conventional self-care regimen that include

blood glucose monitoring, diet, exercise, medication, and foot care places huge responsibility on the patients. What happens after diabetes education? Whether the patients adhere to such a complex regimen conscientiously would definitely depend on the relational psychosocial factors. The initial analyses of this study suggested that patients' personal attributions, emotion management, interpersonal relationship, and health literacy positively influence their adherent behaviours. In addition, self-efficacy, optimism, diabetes distress, anxiety, depression, and problem-solving ability turned out to be the strongest contributors for self-care compliance. Residential areas and ethnicities reflected differences in glycaemic controls. To improve the efficacy of self-management in diabetic patients in the future, it will be important to provide regular trainings to the patients to master and be proficient in diabetes care activities.

Professional counselling services should also be included as part of the healthcare services to assist patients to properly manage their negative feelings living with the disease. Moreover, the emphasis of self-management education should be patient-centred, tailored to accommodate the important demographic factors to further increase the effectiveness in self-management for the patients. Meanwhile, dissemination of health information to the targeted community should be strategically planned. Facilities and ideas to encourage active lifestyles should be functional and practical. In this way, we hope to improve the adherence of diabetic patients and going forward, minimise the occurrence of comorbidities, ascertain the quality of life in the diabetic community; and most important of all, a healthier Malaysia.

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## APPENDICES

## APPENDIX A

### A1 Ethics Approval –MUHREC



# MONASH University

Monash University Human Research Ethics Committee (MUHREC)  
Research Office

#### Human Ethics Certificate of Approval

**Date:** 21 November 2012

**Project Number:** CF12/3382 – 2012001623

**Project Title:** Psychosocial variables in affecting diabetes self-management and life quality

**Chief Investigator:** Dr Cai Lian Tam

**Approved:** From: 21 November 2012 To: 21 November 2017

#### Terms of approval

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, and a copy forwarded to MUHREC before any data collection can occur at the specified organisation. **Failure to provide permission letters to MUHREC before data collection commences is in breach of the National Statement on Ethical Conduct in Human Research and the Australian Code for the Responsible Conduct of Research.**
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must contain your project number.
6. **Amendments to the approved project (including changes in personnel):** Requires the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.



Professor Ben Canny  
Chair, MUHREC

cc: Dr Saravanan Muniyandy, Dr Amudha Kadirvelu, Ms Chin Choo Yap

Postal – Monash University, Vic 3800, Australia  
Building 3E, Room 111, Clayton Campus, Wellington Road, Clayton

[www.monash.edu/research/ethics/human/index.html](http://www.monash.edu/research/ethics/human/index.html)  
ABN 12 377 614 012 CRICOS Provider #00008C

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## A2 Ethics Approval –Sunway Medical SREC

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12<sup>th</sup> December 2012

Grace Yap Chin Choo  
Principal Investigator  
School of Medicine & Health Sciences,  
Monash University Sunway Campus,  
Jalan Lagoon Selatan,  
46150 Bandar Sunway,  
Selangor.

Dear Grace,

Re: Ethics Review for the study protocol

Psychosocial variables in affecting diabetes self-management and life quality

SREC Reference No. : 003/2012/ER

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With reference to the above, Sunway Medical Centre Independent Research Ethics Committee (SREC) would like to inform you that your application for the above study is given a full ethics approval. Please refer to the attached Decision Notification Form for further details.

If you need further information or clarification, please contact Mr. Edwin Tan, the Secretary of SREC at 03 7491 1307 / 1256 or through email: [edwinbt@sunway.com.my](mailto:edwinbt@sunway.com.my).

Thank you.

Yours sincerely,  
SUNWAY MEDICAL CENTER INDEPENDENT RESEARCH ETHICS COMMITTEE

PROF. [REDACTED] MD ZAIN  
CHAIR [REDACTED]

*Dedicated to Improving the Lives We Touch*

## APPENDIX B

### B1 Explanatory Statement - English

MONASH University



1 December 2012

#### Explanatory Statement

**Title:** Psychosocial variables in affecting diabetes self-management and life quality

**This information sheet is for you to keep.**

My name is Grace Yap Chin Choo and I am conducting a research project with Dr Tam Cai Lian, lecturer in the Jeffrey Cheah School of Medicine & Health Sciences towards a PhD at Monash University. This means that I will be writing a thesis which is the equivalent of a 300-page book.

You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

#### **Why were you chosen for this research?**

The study requires volunteers who meet the below criteria:

1. Individual with Type 2 diabetes
2. Malaysian
3. Age 20 and above

#### **The aim/purpose of the research**

The aim of this study is to increase understanding in individuals who are living with diabetes and their self-care management, as well as their quality of life. The knowledge obtained in this study will aid your healthcare providers to better assist you with a more current and holistic approach in dealing with your health conditions.

#### **Possible benefits**

The knowledge gained from this study will give insights to the health psychology and sectors in improving the existing diabetic education as well as to develop new approaches in reducing other diabetes-related complications.

#### **What does the research involve?**

The study involves a questionnaire survey and a semi-structured interview (optional). Your volunteer indicates your consent in taking part in the study.

1. You will be given a survey booklet which consists of a demographic sheet and 12 diabetes-related questionnaires.

#### **Option 1:**

2. You can work on the survey at the allocated place by the hospital and return the booklet to the researcher. *The researcher will be available to assist you should you have any question related to the study.*
3. *Optional:* Upon completion of the survey booklet, you are further invited for a short interview by the researcher. The purpose of the interview is to enable you to further elaborate your relevant experience which is not captured in the survey booklet.

#### **Option 2:**

4. You can work on the survey at home and post it back to the researcher by using the envelope and postage provided.

**How much time will the research take?**

The survey booklet requires about 1- 1.5 hours of your time to complete it. And the interview would take about 10 to 20 minutes.

**Inconvenience/discomfort**

The survey contains about 204 questions. Please take your time to work on it. Take a break if you feel tired.

**Payment**

RM20 in cash will be issued to you when you have completed the participation. If you choose to do it at home, you are required to fill in your bank account number in a separate sheet attached with the survey booklet for RM20 to be deposited into your account.

You can withdraw from the research

**Being in this study is voluntary and you are under no obligation to participate. It is important for you to understand that your decision to participate or not will have no bearing on your medical treatment. You do not need to answer all the questions, but once you have mailed/submitted your response, you cannot withdraw your answers, as responses are anonymous.**

**Confidentiality**

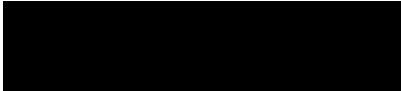

1. Your personal information such as residential address and IC number are not required in any part of the study.
2. Your responses will only be used for research purposes only and there will not be any attempt to identify you and your information.
3. For the interviewee: You will be addressed with a fake name in the conversation.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

**Results and Questions**

If you have any questions with regards of the study or would like to be informed of the aggregate research finding, please contact Grace Yap via Email: ccyap2@student.monash.edu or Handphone: 0182251428. The findings are estimated to be finalized by April 2015.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research <LR 2012001623> is being conducted, please contact:
<p>Dr Tam Cai Lian Monash University Lecturer</p> 	<p>Ms Joyce Tang Head, Planning &amp; Research Management Monash University Sunway Campus Jalan Lagoon Selatan 46150 bandar Sunway Selangor Darul Ehsan, Malaysia</p> 

Thank you.

Grace Yap

**B2 Explanatory Statement - Malay**

MONASH University

**1 Disember 2012****Penyata Penjelasan****TAJUK:** Faktor-faktor psikososial dalam mempengaruhi pengurusan dan kualiti hidup diabetes**Penyata maklumat ini adalah untuk simpanan anda .**

Nama saya ialah Grace Yap Chin Choo dan saya sedang menjalankan projek penyelidikan dengan Dr. Tam Cai Lian, pensyarah di Jabatan Perubatan & Sains Kesihatan, Jeffrey Cheah ke arah Doktor Falsafah di Universiti Monash. Ini bermakna saya akan menulis tesis bersama dengan sebuah buku sebanyak 300 muka surat.

Anda dijemput untuk mengambil bahagian dalam kajian ini. Sila baca Penyata Penjelasan dengan teliti sebelum anda membuat keputusan.

**Kenapa anda dipilih untuk mengambil bahagian dalam kajian ini?**

Kajian ini memerlukan penyertaan sukarelawan yang memenuhi kriteria-kriteria di bawah:

1. Individu yang menghadapi Diabetes/Penyakit Kencing Manis Jenis 2
2. Warganegara Malaysia
3. Individu yang berumur 20 tahun dan ke atas

**Matlamat/ Tujuan Penyelidikan**

Tujuan kajian ini adalah untuk meningkatkan pemahaman, penjagaan diri, serta kualiti kehidupan antara individu-individu yang menghadapi penyakit kencing manis. Pengetahuan yang diperolehi dalam kajian ini akan membantu penjagaan kesihatan supaya anda boleh merawat penyakit anda dengan pendekatan yang lebih berkesan dan holistik apabila berurusan dengan kesihatan anda.

**Manfaat daripada kajian**

Pengetahuan yang diperolehi daripada kajian ini akan memberi ilham kepada pakar psikologi kesihatan dan sesetengah sektor untuk meningkatkan pendidikan diabetes yang sedia ada, serta memperbaharui perkhidmatan dengan pendekatan yang baru untuk mengurangkan komplikasi penyakit kencing manis yang lain.

**Apakah yang akan terlibat dalam kajian ini?**

Kajian ini melibatkan soal-selidik dan temuduga yang ringkas (secara pilihan anda). Kerelaan anda dinyatakan daripada persetujuan anda untuk mengambil bahagian dalam kajian ini.

1. Sebuah buku kecil akan diberikan kepada anda di mana ia mengandungi satu lembaran maklumat demografik dan 12 borang soal-selidik mengenai penyakit kencing manis.

**Pilihan 1:**

2. Anda boleh jawab soalan-soalan kajian ini di tempat yang disediakan oleh pihak hospital dan kembalikan buku kecil itu kepada penyelidik (*Penyelidik akan bersedia membantu anda sekiranya anda mempunyai pertanyaan soalan yang berkaitan dengan kajian ini*).
3. *Pilihan (tidak diwajibkan):* Setelah anda siap menjawab soalan di dalam buku kecil ini, anda akan dijemput untuk bertemuduga dengan penyelidik. Tujuan temuduga ini adalah untuk membolehkan anda meghuraikan pengalaman anda mengenai penyakit kencing manis yang tidak termasuk di dalam buku kecil ini.

**Pilihan 2:**

4. Anda boleh jawab soalan dalam buku kecil ini di rumah dan kembalikannya kepada penyelidik dengan sampul surat berselem yang disediakan.



### Berapa banyak masa penyelidikan ini akan mengambil?

Soal-selidik dalam buku kecil ini akan mengambil masa kira-kira 1 – 1.5 jam. Manakala, temuduga pula akan mengambil masa kira-kira 10 - 20 minit.

### Risiko kemungkinan, kesulitan dan ketidakselesaian

Kajian ini mengandungi kira-kira 204 soalan. Sila mengambil masa anda untuk menyiapkannya. Sekiranya anda berasa letih, anda boleh berehat sebentar dari masa ke semasa.

### Tanda penghargaan

Wang tunai sebanyak RM 20 akan diberikan kepada anda selepas anda menyelesaikan penyertaan. Peserta yang memilih Pilihan 2 perlu mengisikan nama dan nombor akaun bank di borang yang dilampirkan bersama buku kecil kajian ini dan RM 20 akan dimasukkan ke dalam nombor akaun tersebut.

Anda boleh menarik penyertaan anda pada bila-bila masa tanpa sebarang denda.

**Penyertaan dalam kajian ini adalah secara sukarela dan anda tidak semestinya perlu menyertai.**

**Kamu perlu memahami bahawa keputusan anda untuk menyertai tidak akan mempengaruhi/berkaitan dengan rawatan perubatan anda. Anda tidak perlu menjawab semua soalan, tetapi sekali soal selidik anda telah diposkan/diserahkan kepada penyelidik, anda tidak boleh menarik balik penyertaan anda kerana penyertaan anda adalah secara tanpa nama.**

### Sulit

1. Informasi peribadi anda, contohnya alamat dan nombor kad pengenalan anda tidak diperlukan di mana-mana bahagian kajian ini.
2. Jawapan anda hanya akan digunakan untuk tujuan kajian sahaja dan tiada percubaan akan dijalankan untuk mengenal pasti anda dan informasi anda.
3. Untuk peserta temuduga: Nama samaran akan digunakkan dalam perbualan.

### Penyimpanan data

Data yang telah dikumpul akan disimpan selaras dengan peraturan Universiti Monash, disimpan dalam premis Universiti, dalam kabinet dikunci selama 5 tahun. Satu laporan kajian akan diserahkan untuk penerbitan, tetapi peserta individu tidak akan dikenal pasti dalam apa-apa laporan.

### Hasil kajian dan soalan

Jika anda mempunyai sebarang soalan berkaitan dengan kajian ini, atau anda mahu tahu akan hasil kajian ini, sila hubungi Grace Yap melalui [REDACTED] atau melalui telefon bimbit: 0182251428. Penemuan kajian dianggarkan muktamad menjelang April 2015.

<p>Jika anda ingin menghubungi penyelidik tentang sebarang aspek kajian ini, sila menghubungi penyelia utama:</p> <p>Dr Tam Cai Lian Pensyarah Universiti Monash [REDACTED]</p>	<p>Jika anda mempunyai sebarang aduan mengenai cara-cara di mana penyelidikan ini dijalankan, sila hubungi:</p> <p>Ms Joyce Tang Pengurusan Ketua, Perancangan &amp; Penyelidikan Monash University Sunway Campus Jalan Lagoon Selatan 46150 bandar Sunway Selangor Darul Ehsan, Malaysia [REDACTED]</p>
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Terima kasih.

Grace Yap

### B3 Explanatory Statement - Mandarin

MONASH University



2012年12月1日

#### 解释与声明

标题：影响糖尿病自我保健与生活品质的社会心理因素

这份资料是为您而准备。

我是叶珍珠(Grace Yap)，目前正与在Monash University的Jefferey Cheah School of Medicine & Health Sciences中担任博士研究班督导师的谭彩莲博士(Dr Tam Cai Lian)一起进行着一项研究项目。这表示研究成果将会被编写成一份相等于一本三百页书籍的论文。

您已被邀请参与这次的研究。请在做决定前仔细地阅读此声明。

#### 为何您会被挑选此次研究的参与者？

此研究的参与者需要符合以下的条件：

1. 患有二型糖尿病的患者
2. 马来西亚人
3. 二十岁或以上

#### 研究的宗旨

此次研究是为了增加对糖尿病患者们，和他们对自我保健的管理以及生活品质的认识。通过此次研究，能提供您在管理健康状况时对医疗保健有最新及更全面的认识。

#### 可能带来的好处

这次的经验将会提升对健康心理学与有关行业对现有糖尿病教育的见解，此外也协助开发能降低糖尿病并发症的新保健方法。

#### 此研究包含了什么？

这次的研究包含了一份调查问卷与一次简单的面谈（选择性）。您的自愿参与已表示您同意参与此次的研究。

1. 您将会得到一份调查小册子，里面包含一份个人资料问卷与 12 份有关糖尿病的调查问卷。

#### 选择 1：

2. 您可以于设在医院里的问卷分派处完成此问卷并在完成后交换给研究员。如有任何疑问，研究员将会从旁协助。
3. 选择性：在您完成了该调查问卷后，续而参与一个简短的面谈。该面谈是为了让您能更深入地与研究员讨论您个人保健的经验。

#### 选择2：

4. 您可以在家完成该调查问卷，并将此问卷放入所提供的信封内邮寄给研究员。

**完成此调查需时多久？**

此调查小册子需要您1小时至1小时30分钟来完成；而该面谈则需10至20分钟。

**可能发生的不便/不适**

此调查问卷包含204道问题。您可慢慢地完成它。若您感觉疲惫，请务必休息。

**回馈**

当您完成了此调查后，您将获得RM20的现金。若您选择在家完成，请于附在调查小册子后的小纸条上填上您的户口号码，以方便将款项存入您的户口。

您可以从此研究中退出。

**参与此研究完全是自愿性的行为，且您并没有义务参与。您也需要了解您的参与不会影响到您的医疗。您不需要回答全部的问题，但一旦您邮寄/提交了您的答案，您不可更改您的答案，因一切回应都是以匿名方式进行。**

**机密保证**

1. 此次研究并不需要您的个人资料，如：地址及身份证号码。
2. 您的回应只会被用于此次的研究中，且不会有任何要确定您或您资料的企图。
3. 对于受访者：在谈话中，将以一个假名来称呼您。

**资料存储**

所收集的数据将依据Monash University的条例，保存在大学校园里被上锁的文件柜里五年。此研究的报告可能被提交上并出版，但文献将不会提及任何个别参与者。

**咨询以及研究结果**

若您有任何相关的疑问或想要知道最后的研究结果，请通过电邮：ccyap2@student.monash.edu 或电话：0182251428联络Grace Yap。此项研究预计将在2015年4月完成。

若您想知道任何有关此研究的资料，请联络首席研究员：	若您对此研究<LR 2012001623>在过程中的进行方式有任何投诉，请联络：
Dr Tam Cai Lian Monash University Lecturer 电话: 603-551 44974 传真: 603-551 46129 电邮: tam.cai.lian@monash.edu	Ms Joyce Tang Head, Planning & Research Management Monash University Sunway Campus Jalan Lagoon Selatan 46150 Bandar Sunway Selangor Darul Ehsan, Malaysia Tel No: (+603) 5514 60000 Ext 46053 Direct Line: (+603) 5514 6053 Fax line: (+603) 5514 6176

谢谢！

叶珍珠 (Grace Yap) 启

## APPENDIX C

### C1 Consent Form - English

#### Consent Form

**Title:** Psychosocial variables in affecting diabetes self-management and life quality

**NOTE: This consent form will remain with the Monash University researcher for their records.**

I understand I have been asked to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I keep for my records.

I understand that:	YES	NO
- I will be asked to complete questionnaires asking me about <i>diabetes self-management</i>	<input type="checkbox"/>	<input type="checkbox"/>
- I will be asked to be interviewed by the researcher <i>(optional)</i>	<input type="checkbox"/>	<input type="checkbox"/>
- unless I otherwise inform the researcher before the interview I agree to allow the interview to be audio-taped	<input type="checkbox"/>	<input type="checkbox"/>

**and**

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

**and**

I understand that any data that the researcher extracts from the questionnaire / interview for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics without my signed consent below.

**and/or**

I understand that I will be given a transcript of data concerning me for my approval before it is included in the write up of the research.

**and/or**

I understand that I may ask at any time/prior to publication/ prior to (insert date) / prior to my giving final consent for my data to be withdrawn from the project

**and/or**

I understand that no information I have provided that could lead to the identification of any other individual will be disclosed in any reports on the project, or to any other party

**and**

I understand that data from the *questionnaire / interview* will be kept in secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5-year period unless I consent to it being used in future research.

**and**

I do/do not give permission to be identified by name/by a pseudonym/ understand I will remain anonymous at all times in any reports or publications from the project.

**Participant's name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## C2 Consent Form – Malay

### Borang Persetujuan

Tajuk: Faktor-faktor psikososial dalam mempengaruhi pengurusan dan kualiti hidup diabetes

**PERHATIAN:** Borang persetujuan ini akan disimpan oleh pengajian Monash Univesiti untuk rekod

Saya memahami saya telah diminta untuk mengambil bahagian dalam projek penyelidikan Universiti Monash yang dinyatakan di atas. Penyelidik sudah menjelaskan tujuan projek ini kepada saya, dan saya telah membaca Penyata Penjelasan, yang merangkumi penyimpanan rekod saya.

Saya memahami bahawa:	YA	TIDAK
- Saya akan diminta untuk melengkapkan soal selidik tentang <i>pengurusan diabetes diri</i> .	<input type="checkbox"/>	<input type="checkbox"/>
- Saya akan ditemuduga oleh penyelidik ( <i>tidak diwajibkan</i> )	<input type="checkbox"/>	<input type="checkbox"/>
- Saya bersetuju bahawa temuduga ini dirakamkan secara audio.	<input type="checkbox"/>	<input type="checkbox"/>

dan

Saya memahami bahawa penyertaan saya adalah secara sukarela, saya boleh memilih untuk tidak mengambil bahagian dalam sebahagian atau semua projek, dan saya boleh menarik diri pada mana-mana peringkat projek tanpa sebarang dendaan.

dan

Saya memahami bahawa dalam sebarang keadaan, apa-apa data yang penyelidik ekstrak daripada soal selidik/ temuduga untuk digunakan dalam laporan atau penemuan yang diterbitkan tidak akan mengandungi nama atau mengenal ciri-ciri tanpa persetujuan saya.

dan/atau

Saya memahami bahawa saya akan diberikan satu transkrip data yang berkaitan dengan saya untuk keizinan saya sebelum ia dimasukkan ke dalam penulisan kajian.

dan/atau

Saya memahami bahawa saya boleh meminta untuk menarik diri dari projek pada bila-bila masa/ sebelum penerbitan/ sebelum (menetapkan tarikh)/ sebelum persetujuan akhir saya memberi data.

dan/ atau

Saya memahami bahawa maklumat yang diperuntukkan oleh saya dalam sebarang laporan mengenai projek ini tidak akan dikenalpastikan kepada individu-individu atau pihak-pihak lain.

dan

Saya memahami bahawa data dari *soal selidik/ temu duga* akan disimpan secara selamat dan boleh diakses oleh pasukan penyelidik. Saya juga memahami bahawa data akan dimusnahkan selepas tempoh 5 tahun kecuali saya bersetuju ia untuk digunakan dalam penyelidikan masa depan.

dan

Saya membenarkan/ tidak membenarkan untuk dikenal pasti dengan nama/ nama samaran/ memahami saya tidak akan dikenalpastikan pada setiap masa dalam apa-apa laporan atau penerbitan daripada projek ini.

Nama peserta: \_\_\_\_\_

Tandatangan: \_\_\_\_\_ Tarikh: \_\_\_\_\_

### C3 Consent Form - Mandarin 同意表格

标题：糖尿病自我管理与生活品质的社会心理因素

注：这份同意表格将为 Monash University 的研究人员所保存，以做记录。

我明白我被邀请参与上述所指的研究项目。我已了解该研究内容也已阅读过解释与声明函，并将该函保存以做记录。

我了解：	是	否
- 我将被邀请完成有关糖尿病自我管理的调查问卷	<input type="checkbox"/>	<input type="checkbox"/>
- 我将被邀请参与由该研究人员所主导的面谈（可选的）	<input type="checkbox"/>	<input type="checkbox"/>
- 除非我事先通知该研究人员，否则表示我同意在面谈过程中被录音	<input type="checkbox"/>	<input type="checkbox"/>

且

我了解，我此次的参与完全是自愿性的；我可选择参与或不参与此次的研究。此外，我也可从研究的任何阶段中退出，并且不必负上任何的责任。

且

我了解，该研究人员从调查问卷/面谈中获得的任何资料，将不会在任何的报告发表里或任何的情况下，透露我的姓名或身份特征。

且/或

我了解，我将得到一份此次研究的个人数据报告，以在写入此次研究总报告前得到我的同意。

且/或

我了解，在任何时候/发表前/（输入日期）前/我确定提供我此次研究的个人结果前，我有权力从此次的研究中退出。

且/或

我了解，有关我身份的资料将不会在任何有关此次研究的报告中出现，或告知任何人。

且

我了解，从此次研究的调查问卷/面谈所获得的资料将被保存在安全的储存库中并只公开给有关的研究组。我也了解该资料将在五年后被销毁，除非我同意该资料在未来的研究中再次被使用。

且

我同意/不同意通过姓名/假名识别我的身份，并了解我的名字及身份将不会出现在任何有关的报告或发表中。

参与者姓名：\_\_\_\_\_

签名：\_\_\_\_\_

日期：\_\_\_\_\_

## APPENDIX D

## D1 Demographics Form and Questionnaire – English

## PART A – Demographic Information

**Instruction:** Please **circle or fill in** the appropriate information.

1.	Age	:	_____ years	Body weight: _____ kg
				Body height: _____ cm
2.	Gender	:	1. Male	2. Female
3.	Nationality	:	1. Malaysian	2. Others (please specify) :
4.	Ethnicity	:	1. Malay	2. Chinese
			3. Indian	4. Others (please specify) :
5.	Educational status	:	1. Primary school	
			2. Secondary school	
			3. Form Six / Pre-U / Diploma	
			4. Degree and higher	
			5. Others (please specify) :	
6.	Marital status	:	1. Single	2. Married
			3. Divorced	4. Widowed
			5. Others (please specify) :	
7.	Residential Area (State)	:	Please specify :	
8.	Occupational status	:	1. Homemaker	2. Student
			3. Business owner	4. Professional
			5. Administrator	6. Sales/Service
			7. Others (please specify):	
9.	How long have you been living with diabetes?	:	Approximately _____ year _____ month	
10.	The type of diabetes that you have.	:	1. Type 1	2. Type 2
			3. Gestational Diabetes	4. Not sure
11.	Do you have other medical complication besides diabetes?	:	1. No	2. Yes (please specify) :
12.	Does your family have a history of diabetes?	:	1. No	2. Yes



13.	How do you manage your diabetes?	:	<b>Circle as many</b> as it deemed appropriate: 1. Watch my diet 2. Physical exercise 3. I take prescriptive medicine recommended by my doctor 4. I received insulin injection on regular basis 5. I take traditional or alternative medicine recommended by friends, family, or other diabetics 6. Others (please specify) : _____	
14.	Clinic/Hospital for your diabetes care	:	1. Public	2. Private
15.	Your latest HbA1C result	:	_____ %	

## PART B – DSES

**Instructions:** We would like to know how confident you are in doing certain activities. For each of the following questions, **please circle** the number that corresponds to your confidence that you can do the tasks regularly at the present time.

	HOW CONFIDENT DO YOU FEEL THAT YOU...	Not at all confident	_____	Totally confident
1	can eat your meals every 4 to 5 hours every day, including breakfast every day?	1	2 3 4 5 6 7 8 9 10	
2	can follow your diet when you have to prepare or share food with other people who do not have diabetes?	1	2 3 4 5 6 7 8 9 10	
3	can choose the appropriate foods to eat when you are hungry (for example, snacks)?	1	2 3 4 5 6 7 8 9 10	
4	can exercise 15 to 30 minutes, 4 to 5 times a week?	1	2 3 4 5 6 7 8 9 10	
5	can do something to prevent your blood sugar level from dropping	1	2 3 4 5 6 7 8 9 10	



	when you exercise?	
6	know what to do when your blood sugar level goes higher or lower than it should be?	1 2 3 4 5 6 7 8 9 10
7	can judge when the changes in your illness mean you should visit the doctor?	1 2 3 4 5 6 7 8 9 10
8	can control your diabetes so that it does not interfere with the things you want to do?	1 2 3 4 5 6 7 8 9 10

### PART C – MHLIC

**Instruction:** Read each statement, and indicate the extent to which you agree or disagree with that statement by using the following options:

strong disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree
1	2	3	4	5	6

	1	If I get sick, it is my own behaviour which determines how soon I get well again.
	2	No matter what I do, if I am going to get sick, I will get sick.
	3	Having regular contact with my doctor is the best way for me to avoid illness.
	4	Most things that affect my health happen to me by accident.
	5	Whenever I don't feel well, I should consult a medically trained professional.
	6	I am in control of my health.
	7	My family has a lot to do with my becoming sick or staying healthy.

	8	When I get sick, I am to blame.
	9	Luck plays a big part in determining how soon I will recover from an illness.
	10	Health professionals control my health
	11	My good health is largely a matter of good fortune.
	12	The main thing which affects my health is what I myself do.
	13	If I take care of myself, I can avoid illness.
	14	When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.
	15	No matter what I do, I'm likely to get sick.
	16	If it's meant to be, I will stay healthy.
	17	If I take the right actions, I can stay healthy.
	18	Regarding my health, I can only do what my doctor tells me to do.

**PART D – PSI**

**Instruction:** Read each statement, and indicate the extent to which you agree or disagree with that statement by using the following options:

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree
1	2	3	4	5	6

	1	When a solution to a problem was unsuccessful, I did not examine why it didn't work.
	2	When I am confronted with a complex problem, I do not bother to develop a strategy to collect information so I can define exactly what the problem is.
	3	When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation.
	4	After I have solved a problem, I do not analyse what went right or what went wrong.
	5	I am usually able to think up creative and effective alternative to solve a problem.
	6	After I have tried to solve a problem with a certain course of action, I take time and compare the actual outcome to what I think should have happened.
	7	When I have a problem, I think up as many possible ways to handle it as I can until I can't come up with anymore ideas.
	8	When confronted with a problem, I consistently examine my feelings to find out what is going on in a problem situation.
	9	When I am confused with a problem, I do not try to define vague ideas or feelings into concrete or specific terms.

	10	I have the ability to solve most problems even though initially no solution is immediately apparent.
	11	Many problems I face are too complex for me to solve.
	12	I make decisions and am happy with them later.
	13	When confronted with a problem, I tend to do the first thing that I can think to solve it.
	14	Sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead.
	15	When deciding on an idea or possible solution to a problem, I do not take time to consider the chances of each alternative being successful.
	16	When confronted with a problem, I stop and think about it before deciding on a next step.
	17	I generally go with the first good idea that comes to my mind.
	18	When making a decision, I weight the consequences of each alternative and compare them against each other.
	19	When I make plans to solve a problem, I am almost certain that I can make them work.
	20	I try to predict the overall result of carrying out a particular course of action.
	21	When I try to think up possible solutions to a problem, I do not come up with very many alternatives.
	22	In trying to solving a problem, one strategy I often use is to think of past problems that have been similar.
	23	Given enough time and effort, I believe I can solve most problems that confront me.
	24	When face with a novel situation I have confidence that I can handle problems that may arise.

	25	Even though I work on a problem, sometimes I feel like I am groping or wandering, and am not getting down to the real issue.
	26	I make snap judgments and later regret them.
	27	I trust my ability to solve new and difficult problems.
	28	I have a systematic method for comparing alternatives and making decisions.
	29	When I try to think of ways of handling a problem, I do not try to combine different ideas together.
	30	When confronted with a problem, I don't usually examine what sort of external things in my environment may be contributing to my problem.
	31	When I am confronted by a problem, one of the first things I do is survey the situation and consider all the relevant pieces of information.
	32	Sometimes I get so charged up emotionally that I am unable to consider many ways of dealing with my problem.
	33	After making a decision, the outcome I expected usually matches the actual outcome.
	34	When confronted with a problem, I am unsure of whether I can handle the situation.
	35	When I become aware of a problem, one of the first things I do is to try to find out exactly what the problem is.

**PART E - LOT-R**

**Instruction:** Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

strongly disagree	disagree	neutral	agree	strongly agree
0	1	2	3	4

	1	In uncertain times, I usually expect the best.
	2	It's easy for me to relax.
	3	If something can go wrong for me, it will.
	4	I'm always optimistic about my future.
	5	I enjoy my friends a lot.
	6	It's important for me to keep busy.
	7	I hardly ever expect things to go my way.
	8	I don't get upset too easily.
	9	I rarely count on good things happening to me.
	10	Overall, I expect more good things to happen to me than bad.

**PART F - MDI**

**Instruction:** The following questions ask about how you have been feeling over the **past two weeks**. Please put a tick (“√”) in the box which is closest to how you have been feeling.

	<b>How much of the time ...</b>	All the time	Most of the time	Slightly more than half the time	Slightly less than half the time	Some of the time	At no time
1	Have you felt low in spirits or sad?						
2	Have you lost interest in your daily activities?						
3	Have you felt lacking in energy and strength?						
4	Have you felt less self-confident?						
5	Have you had a bad conscience or feelings of guilt?						
6	Have you felt that life wasn't worth living?						
7	Have you had difficulty in concentrating, e.g. when reading the newspaper or watching television?						
8a	Have you felt very restless?						
8b	Have you felt subdued or slowed down?						
9	Have you had trouble sleeping at night?						
10a	Have you suffered from reduced appetite?						
10b	Have you suffered from increased appetite?						

**PART G – CAS**

**Instruction:** Please answer each item carefully and as accurately as you can by placing a number beside each statement with the following options:

rarely or none of the time	a little of the time	some of the time	a good part of the time	most or all of the time
1	2	3	4	5

	1	I feel calm.
	2	I feel tense.
	3	I feel suddenly scared for no reason.
	4	I feel nervous.
	5	I use tranquilizers or antidepressants to cope with my anxiety.
	6	I feel confident about the future.
	7	I am free from senseless or unpleasant thoughts.
	8	I feel afraid to go out of my house alone.
	9	I feel relaxed and in control of myself.
	10	I have spells of terror or panic.
	11	I feel afraid in open spaces or in the streets.
	12	I feel afraid I will faint in public.
	13	I am comfortable traveling on buses, subways, or trains.
	14	I feel nervousness or shakiness inside.
	15	I feel comfortable in crowds, such as shopping or at a movie.
	16	I feel comfortable when I am left alone.



	17	I feel afraid without good reason.
	18	Due to my fears, I unreasonably avoid certain animals, objects, or situations.
	19	I get upset easily or feel panicky unexpectedly.
	20	My hands, arms, or legs shake or tremble.
	21	Due to my fears, I avoid social situations, whenever possible.
	22	I experience sudden attacks of panic which catch me by surprise.
	23	I feel generally anxious.
	24	I am bothered by dizzy spells.
	25	Due to my fears, I avoid being alone, whenever possible.

**PART H – DDS**

**Instructions:** Consider the degree to which each of the 17 items may have distressed or bothered you **DURING THE PAST MONTH** and **circle** the appropriate number.

Not A Problem	A Slight Problem	A Moderate Problem	Somewhat Serious Problem	A Serious Problem	A Very Serious Problem
1	2	3	4	5	6

1	Feeling that diabetes is taking up too much of my mental and physical energy every day.	1	2	3	4	5	6
2	Feeling that my doctor doesn't know enough about diabetes and diabetes care.	1	2	3	4	5	6
3	Feeling angry, scared, and/or depressed when I think about living with diabetes.	1	2	3	4	5	6

4	Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	1	2	3	4	5 6
5	Feeling that I am not testing my blood sugars frequently enough.	1	2	3	4	5 6
6	Feeling that I am often failing with my diabetes routine.	1	2	3	4	5 6
7	Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).	1	2	3	4	5 6
8	Feeling that diabetes controls my life.	1	2	3	4	5 6
9	Feeling that my doctor doesn't take my concerns seriously enough.	1	2	3	4	5 6
10	Not feeling confident in my day-to-day ability to manage diabetes.	1	2	3	4	5 6
11	Feeling that I will end up with serious long-term complications, no matter what I do.	1	2	3	4	5 6
12	Feeling that I am not sticking closely enough to a good meal plan.	1	2	3	4	5 6
13	Feeling that friends or family don't appreciate how difficult living with diabetes can be.	1	2	3	4	5 6
14	Feeling overwhelmed by the demands of living with diabetes.	1	2	3	4	5 6
15	Feeling that I don't have a doctor who I can see regularly enough about my diabetes.	1	2	3	4	5 6
16	Not feeling motivated to keep up my diabetes self management.	1	2	3	4	5 6
17	Feeling that friends or family don't give me the emotional support that I would like.	1	2	3	4	5 6

**PART I – MSPSS**

**Instructions:** Please answer each item carefully and as accurately as you can by placing a number beside each statement with the following options:

very strongly disagree	strongly disagree	mildly disagree	neutral	mildly agree	strongly agree	very strongly agree
1	2	3	4	5	6	7

	1	There is a special person who is around when I am in need.
	2	There is a special person with whom I can share joys and sorrows.
	3	My family really tries to help me.
	4	I get the emotional help and support I need from my family.
	5	I have a special person who is a real source of comfort to me.
	6	My friends really try to help me.
	7	I can count on my friends when things go wrong.
	8	I can talk about my problems with my family.
	9	I have friends with whom I can share my joys and sorrows.
	10	There is a special person in my life who cares about my feelings.
	11	My family is willing to help me make decisions.
	12	I can talk about my problems with my friends.

**PART J - HCCQ-6**

**Instructions:** This questionnaire contains items that are related to your visits with your doctor. Doctors have different styles in dealing with patients, and we would like to know more about how you have felt about your encounters with your doctor. Your responses are confidential. Please be honest and candid.

strongly disagree		neutral			strongly agree	
1	2	3	4	5	6	7

1	I feel that my doctor has provided me choices and options.	1	2	3	4	5	6	7
2	I feel understood by my doctor	1	2	3	4	5	6	7
3	My doctor conveys confidence in my ability to make changes.	1	2	3	4	5	6	7
4	My doctor encourages me to ask questions.	1	2	3	4	5	6	7
5	My doctor listens to how I would like to do things.	1	2	3	4	5	6	7
6	My doctor tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5	6	7

**PART K - DKT**

**Instructions:** Please circle an appropriate answer for the following questions by yourself.

1	The diabetes diet is: a. The way most Malaysian people eat b. A healthy diet for most people c. Too high in carbohydrate for most people d. Too high in protein for most people
2	Which of the following is highest in carbohydrate? a. Baked chicken b. Cheese c. Baked potato d. Peanut butter
3	Which of the following is highest in fat? a. Low fat milk b. Orange juice c. Corn d. Honey
4	Which of the following is a 'sugar free food'? a. Any unsweetened food b. Any dietetic food c. Any food that says 'sugar free' on the label d. Any food that has less than 20 calories per serving
5	Glycosylated haemoglobin (HbA1c) is a test that is a measure of your average blood glucose level for the past: a. Day b. Week c. 6 weeks d. 6 months
6	Which is the best method for testing blood glucose? a. Urine testing b. Blood testing c. Both are equally good
7	What effect does unsweetened fruit juice have on blood glucose? a. Lowers it b. Raises it c. Has no effect

8	Which should <b>NOT</b> be used to treat low blood glucose? a. 3 hard candies b. ½ cup orange juice c. 1 cup diet soft drink d. 1 cup skim milk
9	For a person in good control, what effect does exercise have on blood glucose? a. Lowers it b. Raises it c. Has no effect
10	Infection is likely to cause: a. An increase in blood glucose b. A decrease in blood glucose c. No change in blood glucose
11	The best way to take care of your feet is to : a. Look at and wash them each day b. Massage them with alcohol each day c. Soak them for one hour each day d. Buy shoes a size larger than usual
12	Eating foods lower in fat decreases your risk for: a. Nerve disease b. Kidney disease c. Heart disease d. Eye disease
13	Numbness and tingling may be symptoms of: a. Kidney disease b. Nerve disease c. Eye disease d. Liver disease
14	Which of the following is usually not associated with diabetes: a. Vision problems b. Kidney problems c. Nerve problems d. Lung problems

**PART L – PDSMS**

**Instructions:** Please answer each item carefully and as accurately as you can. **Place a number** beside each statement by the following options:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

	1	It is difficult for me to find effective solutions for problems that occur with managing my diabetes.
	2	I find efforts to change things I don't like about my diabetes are ineffective.
	3	I handle myself well with respect to my diabetes.
	4	I am able to manage things related to my diabetes as well as most other people.
	5	I succeed in the projects I undertake to manage my diabetes.
	6	Typically, my plan for managing my diabetes don't work out well.
	7	No matter how hard I try, managing my diabetes doesn't turn out the way I would like.
	8	I'm generally able to accomplish my goals with respect to managing my diabetes.

**PART M – SDSCA**

**Instructions:** The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the **last 7 days that you were not sick.**

<b>DIET</b>									
1	How many of the last SEVEN DAYS have you followed a healthful eating plan?	0	1	2	3	4	5	6	7
2	On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?	0	1	2	3	4	5	6	7
3	On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	0	1	2	3	4	5	6	7
4	On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?	0	1	2	3	4	5	6	7
<b>EXERCISE</b>									
5	On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking).	0	1	2	3	4	5	6	7
6	On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?	0	1	2	3	4	5	6	7
<b>BLOOD SUGAR TESTING</b>									
7	On how many of the last SEVEN DAYS did you test your blood sugar?	0	1	2	3	4	5	6	7
8	On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your healthcare provider?	0	1	2	3	4	5	6	7



FOOT CARE		
9	On how many of the last SEVEN DAYS did you check your feet?	0 1 2 3 4 5 6 7
10	On how many of the last SEVEN DAYS did you inspect the inside of your shoes?	0 1 2 3 4 5 6 7
SMOKING		
11	Have you smoked a cigarette – even one puff – during the past SEVEN DAYS? 0. No 1. Yes. <i>If yes, how many cigarettes did you smoke on average day?</i>  Number of cigarettes:_____	

## PART N – QoLS

**Instruction:** Please read each item and **circle the number** that best describes how satisfied you are at this time. Answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible
7	6	5	4	3	2	1

1	Material comforts home, food, conveniences, financial security	7	6	5	4	3	2	1
2	Health - being physically fit and rigorous	7	6	5	4	3	2	1
3	Relationships with parents, siblings & other relatives - communicating, visiting, helping	7	6	5	4	3	2	1
4	Having and rearing children	7	6	5	4	3	2	1

5	Close relationships with spouse or significant other	7	6	5	4	3	2	1
6	Close friends	7	6	5	4	3	2	1
7	Helping and encouraging others, volunteering, giving advice	7	6	5	4	3	2	1
8	Participating in organizations and public affairs	7	6	5	4	3	2	1
9	Learning- attending school, improving understanding, getting additional knowledge	7	6	5	4	3	2	1
10	Understanding yourself - knowing your assets and limitations - knowing what life is about	7	6	5	4	3	2	1
11	Work - job or in home	7	6	5	4	3	2	1
12	Expressing yourself creatively	7	6	5	4	3	2	1
13	Socializing - meeting other people, doing things, parties, etc	7	6	5	4	3	2	1
14	Reading, listening to music, or observing entertainment	7	6	5	4	3	2	1
15	Participating in active recreation	7	6	5	4	3	2	1
16	Independence, doing for yourself	7	6	5	4	3	2	1

**Thank you for your participation.**

## D2 Demographics Form and Questionnaire – Malay

**Bahagian A – Maklumat Demografik**     **Arahan:** Sila **bulatkan atau isikan** maklumat yang sesuai.

1.	Umur	:	_____ tahun	Berat badan:	_____ kg
				Ketinggian:	_____ cm
2.	Jantina	:	2. Lelaki    2. Perempuan		
3.	Kewarganegaraan	:	2. Malaysia    2. Lain-lain ( <i>nyatakan</i> ) :		
4.	Bangsa	:	2. Melayu    2. Cina    3. India 4. Lain-lain ( <i>nyatakan</i> ) :		
5.	Status pendidikan	:	6. Sekolah rendah 7. Sekolah menengah 8. Tingkatan 6/ Pra-universiti/ Diploma 9. Sarjana dan lebih tinggi 10. Lain-lain ( <i>nyatakan</i> ) :		
6.	Status perkahwinan	:	1. Bujang                      2. Berkahwin 3. Janda/Duda              4. Balu 5. Lain-lain ( <i>nyatakan</i> ):		
7.	Kawasan Kediaman (Negeri)	:	Sila nyatakan:		
8.	Status pekerjaan	:	1. Suri rumah              2. Pelajar 3. Pemilik peniagaan      4. Profesional 5. Pentadbir                6. Jurujual/Perkhidmatan 7. Lain-lain ( <i>nyatakan</i> ):		
9.	Berapa lama anda telah menghadapi penyakit kencing manis?	:	Lebih kurang _____ tahun _____ bulan		
10.	Jenis penyakit kencing manis anda?	:	1. Jenis 1                      2. Jenis 2 3. Kencing manis ketika hamil    4. Tidak pasti		
11.	Adakah anda mengalami komplikasi perubatan yang lain selain daripada kencing manis?	:	1. Tidak    2. Ya ( <i>sila nyatakan</i> ):		
12.	Adakah keluarga anda mempunyai sejarah kencing manis?	:	3. Tidak 4. Ya		

13.	<p>Bagaimana anda mengurus penyakit kencing manis anda? :</p> <p>Bulatkan sebanyak yang dianggap sesuai:</p> <p>7. Jaga pemakanan saya</p> <p>8. Senaman fizikal</p> <p>9. Saya ambil ubat preskriptif yang dicadangkan oleh doktor saya</p> <p>10. Saya menerima suntikan insulin mengikut jadual yang ditetapkan</p> <p>11. Saya ambil ubat tradisional atau ubat lain yang dicadangkan oleh kawan-kawan, keluarga, atau pesakit kencing manis yang lain</p> <p>12. Lain-lain (<i>sila nyatakan</i>):</p>
14.	<p>Klinik / Hospital untuk penjagaan diabetes anda : 2. Kerajaan 2. Swasta</p>
15.	<p>Keputusan HbA1C terkini : %</p>

### Bahagian B – DSES

**Arahan:** Kami ingin tahu tahap keyakinan anda dalam melakukan sesetengah aktiviti tertentu. Untuk setiap soalan yang berikut, sila **pilih nombor** yang sesuai dengan keyakinan anda di mana anda boleh melakukan tugas ini pada masa sekarang.

	BERAPAKAH KEYAKINAN YANG ANDA RASA ANDA...	Langsung tidak beryakin	-----	Betul-betul beryakini
1	boleh makan dalam setiap 4 hingga 5 jam, termasuk sarapan pagi tiap-tiap hari?	1	2 3 4 5 6 7 8 9 10	
2	boleh mengikut diet anda apabila anda menyediakan ataupun berkongsi makanan dengan orang lain yang tidak mempunyai penyakit kencing manis?	1	2 3 4 5 6 7 8 9 10	
3	boleh memilih makanan yang sesuai untuk dimakan apabila anda berasa lapar (contohnya, makanan ringan/snek)?	1	2 3 4 5 6 7 8 9 10	
4	boleh bersenam selama 15 hingga 30 minit untuk 4 hingga 5 kali	1	2 3 4 5 6 7 8 9 10	

	setiap minggu?	
5	boleh melakukan sesuatu untuk mengelakkan paras gula darah anda jatuh semasa anda bersenam?	1 2 3 4 5 6 7 8 9 10
6	tahu apa yang perlu dilakukan apabila paras gula darah anda lebih tinggi ataupun lebih rendah daripada tahap yang sepatutnya?	1 2 3 4 5 6 7 8 9 10
7	boleh membuat keputusan apabila terdapat perubahan penyakit anda bermaksud anda perlu berjumpa dengan doktor?	1 2 3 4 5 6 7 8 9 10
8	boleh mengawal penyakit kencing manis supaya ia tidak mengganggu aktiviti-aktiviti yang anda ingin lakukan?	1 2 3 4 5 6 7 8 9 10

### Bahagian C – MHLC

**Arahan:** Baca setiap kenyataan dan nyatakan sejauh manakah anda setuju atau tidak setuju dengan pernyataan tersebut berdasarkan pilihan yang berikut:

amat tidak bersetuju	sederhana tidak bersetuju	kurang tidak bersetuju	sedikit bersetuju	sederhana bersetuju	amat bersetuju
1	2	3	4	5	6

1	Sekiranya saya tidak sihat, ia adalah kelakuan saya yang menentukan bila saya akan sembuh lagi.
2	Tidak kira apa yang saya lakukan, sekiranya saya akan menjatuh sakit, saya tetap akan menjadi sakit.
3	Cara yang terbaik untuk mengelakkan penyakit saya ialah berjumpa dengan doktor mengikut jadual yang ditetapkan.
4	Kebanyakan perkara yang menjejaskan kesihatan saya belaku secara kebetulan.
5	Apabila saya berasa tidak sihat, saya harus meminta nasihat daripada

		pegawai perubatan profesional.
	6	Saya yang mengawal kesihatan saya.
	7	Keluarga saya yang bertanggungjawab terhadap kesihatan saya.
	8	Apabila saya berjatuh sakit, saya yang patut disalahkan.
	9	Nasib memainkan peranan yang terutama untuk menentukan bila saya akan sembuh daripada penyakit.
	10	Pegawai-pegawai perubatan profesional yang mengawal kesihatan saya.
	11	Kesihatan baik saya adalah suatu perkara yang bernasib baik.
	12	Punca utama yang mempengaruhi kesihatan saya ialah segala apa yang saya lakukan.
	13	Sekiranya saya menjaga diri sendiri, saya boleh mencegah daripada jatuh sakit.
	14	Apabila saya sembuh daripada penyakit, ia selalunya disebabkan orang lain (contohnya, doktor, jururawat, keluarga, kawan) yang telah menjaga saya dengan baik.
	15	Tidak kira apa yang saya lakukan, saya mungkin akan sakit.
	16	Sekiranya itu adalah ketentuanNya, saya akan kekal sihat.
	17	Asalkan saya mengambil tindakan yang betul, saya boleh kekal sihat.
	18	Mengenai kesihatan saya, saya hanya boleh lakukan apa yang diminta oleh doktor untuk dilakukan.

**Bahagian D – PSI**

**Arahan:** Baca setiap kenyataan dan nyatakan sejauh mana anda setuju atau tidak setuju dengan pernyataan tersebut berdasarkan pilihan yang berikut:

amat bersetuju	sederhana bersetuju	sedikit bersetuju	Sedikit tidak setuju	sederhana tidak setuju	amat tidak setuju
1	2	3	4	5	6

	1	Apabila satu penyelesaian kepada satu masalah tidak berjaya, saya tidak memeriksa kenapa ia tidak berjaya.
	2	Apabila saya menghadapi suatu perkara yang rumit/kompleks, saya tidak ambil peduli mencari satu strategi untuk mengumpul maklumat yang membolehkan saya menentukan apakah masalahnya.
	3	Apabila usaha pertama saya untuk menyelesaikan masalah telah gagal, saya berasa tidak selesa dengan kebolehan saya untuk menangani situasi itu.
	4	Selepas saya menyelesaikan suatu masalah, saya tidak membuat analisis tentang apa yang telah berlaku samada betul ataupun salah.
	5	Biasanya saya boleh memikirkan alternatif yang kreatif dan efektif untuk menyelesaikan sesuatu masalah.
	6	Setelah saya cuba menyelesaikan sesuatu masalah dengan tindakan yang tertentu, saya akan ambil masa dan bandingkan hasil sebenar untuk apa yang saya rasa sepatutnya terjadi.
	7	Apabila saya mempunyai masalah, saya fikirkan cara-cara penyelesaian yang bermungkinan dengan sedaya-upaya.
	8	Apabila berhadapan dengan sesuatu masalah, saya meneliti perasaan saya dengan konsisten untuk mengetahui apa yang berlaku dalam satu situasi masalah.
	9	Apabila saya keliru dengan sesuatu masalah, saya tidak akan cuba menentukan idea-idea ataupun perasaan yang kurang jelas ke dalam segi konkrit dan tertentu.
	10	Saya mempunyai kebolehan untuk menyelesaikan kebanyakan masalah walaupun pada asalnya tiada penyelesaian segera yang ketara.
	11	Banyak masalah yang saya hadapi adalah terlalu kompleks untuk saya selesaikan.
	12	Saya membuat keputusan-keputusan dan berasa gembira dengan keputusan-keputusan tersebut.

	13	Apabila berhadapan dengan masalah, saya ter cenderung kepada mengikuti perkara pertama yang saya dapat fikirkan untuk menyelesaikan masalah itu.
	14	Kadang-kala saya tidak berhenti dan mengambil masa untuk menguruskan masalah saya, tetapi saya hanya bingung.
	15	Apabila membuat keputusan tentang suatu idea yang berkemungkinan menjadi penyelesaian kepada satu masalah, saya tidak mengambil masa untuk mempertimbangkan peluang alternatif lain yang akan berjaya.
	16	Apabila berhadapan dengan masalah, saya berhenti dan memikir tentang masalah itu sebelum membuat keputusan untuk langkah seterusnya.
	17	Biasanya saya mengikut idea pertama yang bagus terlintas dalam fikiran saya.
	18	Apabila membuat keputusan, saya mempertimbangkan akibat-akibat setiap alternatif dan bandingkannya antara satu sama lain.
	19	Apabila saya membuat rancangan untuk menyelesaikan sesuatu masalah, saya agak pasti ia akan berjaya.
	20	Saya cuba meramalkan keputusan keseluruhannya semasa mengambil sesetengah tindakan.
	21	Apabila saya cuba memikirkan cara-cara yang mungkin menjadi penyelesaian pada suatu masalah, saya tidak mengemukakan banyak alternatif.
	22	Dalam usaha untuk menyelesaikan suatu masalah, satu strategi yang sering digunakan oleh saya ialah mengimbas balik masalah-masalah dahulu yang serupa.
	23	Saya percaya bahawa saya boleh menyelesaikan kebanyakan masalah jikalau saya mempunyai masa dan usaha yang mencukupi.
	24	Apabila berdepan dengan keadaan/situasi baru, saya yakin bahawa saya boleh menangani masalah yang mungkin dihadapi.
	25	Walaupun saya berusaha dalam suatu masalah, kadang-kala saya rasa seperti fikiran saya merayau-rayau dan tidak dapat menumpu perhatian kepada isu yang sebenar.
	26	Saya membuat keputusan yang pantas tetapi menyesal kemudian.
	27	Saya percaya pada kebolehan saya untuk menyelesaikan masalah baru dan sukar.
	28	Saya mempunyai suatu kaedah sistematik untuk membandingkan alternatif-alternatif dan membuat keputusan.
	29	Apabila saya cuba memikirkan cara untuk menguruskan suatu masalah, saya tidak menggabungkan idea-idea lain.
	30	Apabila berhadapan dengan masalah, saya selalunya tidak mengkaji apa pengaruh luar dari persekitaran yang mungkin menyumbang kepada masalah saya.



	31	Apabila saya berhadapan dengan masalah, salah satu perkara pertama yang saya lakukan adalah meninjau situasi tersebut dan mempertimbangkan semua maklumat yang penting.
	32	Kadang-kala saya terlalu mementingkan emosi saya dan tidak boleh mempertimbangkan cara-cara untuk mengurus masalah saya.
	33	Selepas membuat keputusan, hasil keseluruhan yang saya ramalkan selalunya sepadan dengan hasil sebenar.
	34	Apabila berhadapan dengan masalah, saya tidak pasti sama ada saya boleh menangani situasi itu.
	35	Apabila saya berwaspada terhadap sesuatu masalah, salah satu perkara yang pertama saya lakukan adalah cuba untuk mengetahui betul-betul apa masalahnya.

### Bahagian E – LOT-R

**Arahan:** Sila jawab soalan-soalan yang berikut mengenai diri sendiri dan menyatakan setakat manakah penyetujuan anda dengan menggunakan skala yang berikut:

amat tidak bersetuju	tidak bersetuju	berkecuali	bersetuju	amat bersetuju
0	1	2	3	4

	1	Dalam waktu-waktu tidak pasti, saya selalunya mengharapkan yang terbaik.
	2	Ia adalah mudah bagi saya untuk rileks.
	3	Sekiranya sesuatu boleh jadi salah, ia akan menjadi salah untuk saya.
	4	Saya selalunya berfikiran positif tentang masa depan saya.
	5	Saya amat suka bergaul dengan kawan-kawan saya.
	6	Ia adalah penting supaya saya sentiasa sibuk.
	7	Saya jarang mengharapkan perkara-perkara berlaku seperti saya harapkan.
	8	Saya tidak mudah susah hati.
	9	Saya jarang mengharapkan perkara-perkara baik akan berlaku pada saya.
	10	Keseluruhannya, saya mengharapkan lebih banyak perkara-perkara baik berlaku pada diri saya daripada perkara-perkara tidak baik.

**Bahagian F - MDI**

**Arahan:** Soalan-soalan yang berikut adalah berkenaan dengan perasaan anda sejak dua minggu yang lalu. Sila tandakan “√” pada kotak yang paling bersesuaian dengan perasaan anda.

	<b>Berapa kerap-kali...</b>	Sepanjang masa	Kebanyakkan masa	Sedikit lebih daripada sepenuh masa	Sedikit kurang daripada sepenuh masa	Kadang-kala	Tidak pernah
1	Pernakah anda berasa hilang semangat ataupun sedih?						
2	Pernakah anda hilang minat dalam aktiviti harian anda?						
3	Pernakah anda berasa kurang bertenaga dan lemah?						
4	Pernakah anda berasa kurang keyakinan diri?						
5	Pernakah anda mempunyai perasaan seperti naluri hati yang tidak baik ataupun rasa bersalah?						
6	Pernakah anda rasa kehidupan anda tidak berbaloi untuk hidup?						
	Pernakah						

7	anda mengalami kesukaran untuk menumpukan perhatian, contohnya ketika membaca surat khabar atau menonton televisyen?						
8 a	Pernahkah anda berasa amat khuatir/ gelisah?						
8 b	Pernahkah anda berasa terkawal atau lemah?						
9	Pernahkah anda mempunyai kesukaran untuk tidur di waktu malam?						
10 a	Pernahkah anda mengalami kurang berselera untuk makan?						
10 b	Pernahkan anda bertambah selera untuk makan?						

**Bahagian G - CAS**

**Arahan:** Sila jawab setiap soalan dengan teliti dan setepat mungkin. Kemudian tuliskan nombor di sebelah setiap pernyataan berikut:

	jarang atau tidak pernah	sedikit masa	kadang-kala	sebahagian masa	kebanyakkan masa atau setiap masa
	1	2	3	4	5
	1	Saya rasa tenang.			
	2	Saya rasa tegang.			
	3	Saya tiba-tiba berasa takut tanpa sebab.			
	4	Saya rasa cemas.			
	5	Saya menggunakan ubat penenang atau antidepresan untuk mengatasi kebingungan saya.			
	6	Saya yakin tentang masa depan.			
	7	Saya bebas daripada pemikiran yang tidak munasabah atau yang tidak menyenangkan.			
	8	Saya berasa takut untuk keluar dari rumah saya berseorangan.			
	9	Saya berasa rileks dan mempunyai kawalan pada diri sendiri.			
	10	Saya berasa ngeri atau cemas.			
	11	Saya berasa takut semasa berada di ruang terbuka atau berjalan-jalan di luar.			
	12	Saya takut saya akan pengsan di tempat awam.			
	13	Saya berasa selesa menaiki bas, LRT/monorail, atau keretapi.			
	14	Saya berasa cemas atau gementar dalam hati saya.			
	15	Saya berasa selesa di tempat orang ramai, contohnya di tempat membeli-belah atau di pawagam.			
	16	Saya berasa selesa apabila saya berseorangan.			
	17	Saya berasa takut tanpa sebab yang wajar.			
	18	Oleh sebab ketakutan, saya mengelakkan diri daripada sesetengah binatang, benda, atau situasi tanpa sebab yang wajar.			
	19	Saya mudah berasa susah hati atau cemas yang tidak disangka.			
	20	Tangan, lengan atau kaki saya goyah atau gementar.			

	21	Oleh sebab ketakutan, saya mengelakkan diri daripada situasi sosial seboleh mungkin.
	22	Saya mengalami serangan panik yang tidak disangkakan.
	23	Saya berasa cemas sepanjang masa.
	24	Saya diganggu oleh rasa pening .
	25	Oleh sebab ketakutan, saya mengelakkan diri daripada berseorangan seboleh mungkin.

### Bahagian H – DDS

**Arahan:** Sila mempertimbangkan yang manakah di antara 17 perkara yang berikut telah mengganggu anda **PADA BULAN YANG LALU** dan bulatkan nombor yang sesuai.

Bukan masalah	Sedikit masalah	Masalah sederhana	Masalah agak serius	Masalah yang serius	Masalah yang sangat serius
1	2	3	4	5	6

1	Berperasaan bahawa tiap-tiap hari diabetes amat menghabiskan tenaga mental dan fizikal saya.	1	2	3	4	5	6
2	Berperasaan bahawa doktor saya kurang berpengetahuan tentang penyakit dan penjagaan diabetes.	1	2	3	4	5	6
3	Berperasaan marah, ketakutan dan/atau tertekan ketika saya berfikir tentang kehidupan pesakit diabetes.	1	2	3	4	5	6
4	Berperasaan bahawa doktor saya tidak memberi arahan yang jelas tentang pengurusan diabetes saya.	1	2	3	4	5	6
5	Berperasaan bahawa saya tidak menguji gula darah dengan secukup kerap.	1	2	3	4	5	6
6	Berperasaan bahawa saya kerap gagal dengan diabetes rutin/jadual penjagaan diabetes saya.	1	2	3	4	5	6
7	Berperasaan bahawa kawan atau keluarga kurang menyokong usaha penjagaan diri, contohnya, perancangan aktiviti yang bercanggah dengan jadual saya, menggalakkan saya makan makanan yang "salah".	1	2	3	4	5	6

8	Saya berasa penyakit diabetes telah mengawal kehidupan saya.	1	2	3	4	5	6
9	Berasa bahawa doktor saya tidak mengambil berat terhadap kebimbangan saya.	1	2	3	4	5	6
10	Berasa kurang yakin terhadap keupayaan saya sehari-hari untuk menguruskan diabetes.	1	2	3	4	5	6
11	Berperasaan bahawa saya akan berakhir dengan komplikasi jangka panjang yang serius, tidak kira apa yang saya lakukan.	1	2	3	4	5	6
12	Berperasaan bahawa saya tidak mematuhi pelan makan (an) yang baik.	1	2	3	4	5	6
13	Berperasaan bahawa kawan atau keluarga saya tidak memahami bahawa kesukaran hidup dengan diabetes.	1	2	3	4	5	6
14	Berasa tertewas oleh kehidupan dengan penyakit diabetes.	1	2	3	4	5	6
15	Berperasaan bahawa saya tidak mempunyai seorang doktor yang saya boleh kerap berjumpa mengenai diabetes saya.	1	2	3	4	5	6
16	Berasa tidak bermotivasi untuk mengikuti arahan-arahan pengurusan diabetes saya.	1	2	3	4	5	6
17	Berperasaan bahawa rakan-rakan atau keluarga tidak memberi sokongan emosi yang saya inginkan.	1	2	3	4	5	6

**Bahagian I - MSPSS**

**Arahan:** Sila jawab setiap pernyataan dengan teliti dan setepat mungkin dengan mencatatkan satu nombor di sebelah setiap penyata mengikut pilihan yang berikut:

tidak bersetuju sama sekali	amat tidak bersetuju	tidak bersetuju	berkecuali/ neutral	bersetuju	amat bersetuju	bersetuju sama sekali
1	2	3	4	5	6	7

	1	Apabila saya perlu, terdapat seseorang yang istimewa berada di sisi saya.
	2	Saya mempunyai seseorang istimewa yang boleh berkongsi kegembiraan dan kesedihan saya.
	3	Keluarga saya benar-benar cuba untuk membantu saya.
	4	Saya mendapat sokongan dan bantuan emosi yang saya perlukan daripada keluarga saya.
	5	Saya mempunyai seseorang istimewa yang merupakan punca sebenar keselesaan kepada saya.
	6	Kawan-kawan saya benar-benar cuba untuk membantu saya.
	7	Apabila sesuatu yang tidak diingini berlaku, saya boleh bergantung kepada kawan-kawan saya.
	8	Saya boleh bercakap tentang masalah saya dengan keluarga saya.
	9	Saya mempunyai kawan-kawan yang boleh berkongsi kegembiraan dan kesusahan saya.
	10	Saya mempunyai seseorang istimewa yang megambil berat tentang perasaan saya.
	11	Keluarga saya sanggup membantu saya untuk membuat keputusan-keputusan.
	12	Saya boleh bercakap tentang masalah saya dengan kawan-kawan saya.

**Bahagian J - HCCQ-6**

**Arahan:** Soal selidik ini mengandungi pernyataan yang berkenaan dengan janji temu anda dengan doktor anda. Doktor mempunyai pelbagai jenis gaya dalam berurusan dengan pesakit, dan kami ingin lebih mengetahui perasaan anda akan pertemuan anda dengan doktor anda. Jawapan anda adalah sulit. Sila jawab dengan jujur dan terus-terang.

Amat tidak bersetuju		berkecuali			Amat bersetuju	
1	2	3	4	5	6	7

1	Doktor saya mengemukakan pilihan-pilihan untuk saya.	1	2	3	4	5	6	7
2	Doktor saya memahami saya.	1	2	3	4	5	6	7
3	Doktor saya menyampaikan keyakinan dalam keupayaan saya untuk membuat perubahan.	1	2	3	4	5	6	7
4	Doktor saya menggalakkan saya bertanya.	1	2	3	4	5	6	7
5	Doktor saya mendengar bagaimana saya ingin melakukan sesuatu perkara.	1	2	3	4	5	6	7
6	Doktor saya cuba memahami pandangan saya sebelum mencadangkan sesuatu.	1	2	3	4	5	6	7



**Bahagian K - DKT**

**Arahan:** Sila jawab soalan-soalan yang berikut tanpa meminta tolong daripada orang lain.

1	Diet diabetes ialah: a. Cara makanan kebanyakan orang Malaysia. b. Cara makanan yang sihat bagi kebanyakan orang. c. Mengandungi karbohidrat yang terlalu tinggi bagi kebanyakan orang. d. Mengandungi protein yang terlalu tinggi bagi kebanyakan orang.
2	Mana satu makanan yang berikut mengandungi karbohidrat yang paling tinggi? a. Ayam panggang b. Keju c. Kentang bakar d. Mentega kacang
3	Mana satu makanan yang berikut mengandungi lemak yang paling tinggi? a. Susu rendah lemak b. Jus oren c. Jagung d. Madu
4	Makanan manakah antara berikut adalah “makanan tanpa gula”? a. Mana-mana makanan tanpa gula b. Mana-mana makanan dietetic c. Mana-mana makanan yang dilabelkan “tanpa gula” d. Mana-mana makanan yang mengandungi kurang daripada 20 kalori dalam setiap hidangan.
5	Hemoglobin terglikosilat (HbA1c) adalah ujian yang mengukur glukosa darah tahap purata anda untuk; a. Sehari lalu b. Seminggu lalu c. 6 minggu lalu d. 6 bulan lalu
6	Yang manakah kaedah terbaik untuk menguji glukosa darah? a. Ujian air kencing b. Ujian darah c. Kedua-duanya adalah sama baik
7	Apakah kesan jus buah-buahan tanpa gula terhadap glukosa darah? a. Merendahkan glukosa darah b. Meningkatkan glukosa darah c. Tidak mempunyai apa-apa kesan

8	<p>Mana satu yang berikut <b>TIDAK</b> boleh digunakan untuk merawat glukosa darah rendah?</p> <ul style="list-style-type: none"> <li>a. 3 biji gula-gula keras</li> <li>b. ½ cawan jus oren</li> <li>c. 1 cawan minuman ringan diet</li> <li>d. 1 cawan susu skim</li> </ul>
9	<p>Bagi pesakit yang di dalam kawalan yang baik, apakah kesan senaman ke atas glukosa darah?</p> <ul style="list-style-type: none"> <li>a. Merendahkan ia</li> <li>b. Meningkatkan ia</li> <li>c. Tidak mempunyai apa-apa kesan.</li> </ul>
10	<p>Jangkitan berkemungkinan besar menyebabkan:</p> <ul style="list-style-type: none"> <li>a. Glukosa darah meningkat</li> <li>b. Glukosa darah menurun</li> <li>c. Tidak mempunyai kesan terhadap glukosa darah</li> </ul>
11	<p>Cara yang terbaik untuk menjaga kaki anda ialah:</p> <ul style="list-style-type: none"> <li>a. Menjaga dan membasuh kaki setiap hari</li> <li>b. Mengurut dengan alkohol setiap hari</li> <li>c. Merendam kaki selama sejam setiap hari</li> <li>d. Membeli kasut saiz yang lebih besar daripada biasa</li> </ul>
12	<p>Makan makanan rendah lemak mengurangkan risiko anda daripada menghadapi:</p> <ul style="list-style-type: none"> <li>a. Penyakit saraf</li> <li>b. Penyakit ginjal</li> <li>c. Penyakit jantung</li> <li>d. Penyakit mata</li> </ul>
13	<p>Kekebasan dan perasaan menyengat mungkin adalah gejala-gejala:</p> <ul style="list-style-type: none"> <li>a. Penyakit ginjal</li> <li>b. Penyakit saraf</li> <li>c. Penyakit mata</li> <li>d. Penyakit hati</li> </ul>
14	<p>Yang manakah berikut biasanya tidak berkaitan dengan penyakit kencing manis:</p> <ul style="list-style-type: none"> <li>a. Masalah penglihatan</li> <li>b. Masalah buah pinggang</li> <li>c. Masalah saraf</li> <li>d. Masalah paru-paru</li> </ul>

**Bahagian L – PDSMS**

**Arahan:** Sila jawab setiap kenyataan dengan berhati-hati dan setepat mungkin.

**Tuliskan satu nombor** yang sesuai di sebelah setiap kenyataan berikut berdasarkan pilihan di bawah:

Amat tidak bersetuju	Tidak bersetuju	Berkecuali	Bersetuju	Amat bersetuju
1	2	3	4	5

	1	Saya berasa sukar untuk mencari penyelesaian yang berkesan terhadap masalah-masalah yang berkenaan dengan pengurusan diabetes saya.
	2	Saya berasa usaha-usaha untuk mengubah perkara-pekerja yang saya tidak suka tentang diabetes saya tidak berkesan.
	3	Saya menguruskan diri saya dengan baik terhadap diabetes.
	4	Saya mampu menguruskan perkara-perkara berkaitan dengan diabetes saya seperti kebanyakan orang lain.
	5	Saya berjaya dalam projek-projek yang saya jalankan untuk mengurus diabetes saya.
	6	Selalunya, rancangan saya untuk mengurus diabetes saya kurang memuaskan.
	7	Tidak kira betapa susah saya mencuba, pengurusan diabetes saya tidak berjalan seperti yang saya ingini.
	8	Biasanya, saya mampu mencapai matlamat-matlamat saya terhadap pengurusan diabetes saya.

**Bahagian M - SDSCA**

**Arahan:** Soalan-soalan berikutnya adalah berkaitan dengan aktiviti-aktiviti penjagaan diri diabetes (kencing manis) anda pada tujuh (7) hari yang lepas. Jika anda sakit pada 7 hari yang lepas, sila imbas kembali **7 hari terakhir yang anda tidak bersakit**.

<b>DIET</b>									
1	Dalam 7 HARI yang lepas, berapa hari anda mengikuti rancangan makanan yang sihat?	0	1	2	3	4	5	6	7
2	Berapa HARI DALAM SATU MINGGU telah anda ikuti rancangan makanan yang sihat secara purata pada bulan lalu?	0	1	2	3	4	5	6	7
3	Dalam 7 HARI yang lepas, berapa hari anda telah makan lima atau lebih hidangan buah-buahan dan sayur-sayuran?	0	1	2	3	4	5	6	7
4	Dalam 7 HARI yang lepas, berapa hari anda pernah makan makanan yang berlemak tinggi seperti daging merah ataupun produk tenus penuh-lemak?	0	1	2	3	4	5	6	7
<b>SENAMAN</b>									
5	Dalam 7 HARI yang lepas, berapakah hari anda menjalankan aktiviti fizikal untuk sekurang-kurangnya 30 minit (Jumlah minit untuk aktiviti berterusan, termasuk berjalan kaki).	0	1	2	3	4	5	6	7
6	Dalam 7 HARI yang lepas, berapakah hari anda bersenam (seperti berjalan, berjoging, berbasikal, berenang) selain daripada apa yang anda jalankan sekitar rumah atau sebagai sebahagian daripada tugas anda?	0	1	2	3	4	5	6	7
<b>UJIAN GULA DARAH</b>									
7	Dalam 7 HARI yang lepas, berapakah hari anda telah menguji gula darah anda?	0	1	2	3	4	5	6	7
8	Dalam 7 HARI yang lepas, berapakah hari telah anda menguji gula darah anda seperti yang dicadangkan oleh doktor atau jururawat anda?	0	1	2	3	4	5	6	7

PENJAGAAN KAKI	
9	Dalam 7 HARI yang lepas, berapakah hari telah anda periksa kaki anda? 0   1   2   3   4   5   6   7
10	Dalam 7 HARI yang lepas, berapakah hari telah anda memeriksa bahagian dalam kasut anda? 0   1   2   3   4   5   6   7
MEROKOK	
11	<p>Pernahkan anda merokok– walaupun satu hembusan – dalam 7 HARI yang lepas?</p> <p>0. Tidak</p> <p>1. Ya. Jika anda pernah merokok dalam TUJUH HARI yang lepas, berapa batang rokok telah anda hisap sehari secara purata?</p> <p>Bilangan rokok: _____</p>

### Bahagian N – QoLS

**Arahan:** Baca setiap kenyataan dan **bulatkan nombor yang paling sesuai** untuk menggambarkan kepuasan anda sekarang. Sila menjawab setiap soalan/ kenyataan walaupun anda tidak menyertai aktiviti atau mempunyai kaitan dengan aktiviti tersebut. Anda boleh pilih sama ada anda berpuas hati atau tidak dengan melakukan aktiviti tersebut, atau mempunyai kaitan dengan aktiviti tersebut.

Sangat gembira & amat berpuas hati	Gembira & berpuas hati	Kebanyakan nya berpuas hati	Bercampuran	Kebanyakannya tidak berpuas hati	Sedih & tidak berpuas hati	Dahsyat & amat tidak berpuas hati
7	6	5	4	3	2	1

1	Kebendaan - Keselesaan rumah, makanan, kemudahan, jaminan kewangan.	7	6	5	4	3	2	1
2	Kesihatan - menjadi sihat dan cergas dari segi fizikal	7	6	5	4	3	2	1

3	Hubungan dengan ibu bapa, adik-beradik, dan saudara-mara - komunikasi, ziarah-menziarahi dan bantuan.	7	6	5	4	3	2	1
4	Mempunyai dan membesarkan anak-anak.	7	6	5	4	3	2	1
5	Perhubungan rapat dengan pasangan atau orang lain yang istimewa untuk anda.	7	6	5	4	3	2	1
6	Rakan-rakan yang rapat	7	6	5	4	3	2	1
7	Membantu dan menggalakkan orang lain, menawarkan diri untuk aktiviti sukarela atau memberi nasihat kepada orang lain.	7	6	5	4	3	2	1
8	Menyertai pertubuhan-pertubuhan dan hal ehwal awam.	7	6	5	4	3	2	1
9	Pelajaran – bersekolah, meningkatkan pemahaman, mendapat pengetahuan selanjutnya	7	6	5	4	3	2	1
10	Kefahaman diri – mengetahui kelebihan dan had anda – mengetahui tentang makna hidup.	7	6	5	4	3	2	1
11	Kerja – Berkerjaan atau di rumah.	7	6	5	4	3	2	1
12	Menyatakan diri anda secara kreatif/bebas	7	6	5	4	3	2	1
13	Bergaul – bertemu dengan orang lain, menjalankan aktiviti, jamuan dan lain-lain.	7	6	5	4	3	2	1

14	Membaca, mendengar muzik, atau menikmati hiburan.	7	6	5	4	3	2	1
15	Menyertai aktiviti rekreasi	7	6	5	4	3	2	1
16	Berdikari, melakukan sesuatu aktiviti untuk diri sendiri.	7	6	5	4	3	2	1

- **Terima kasih diatas penyertaan anda** -

## D3 Demographics Form and Questionnaire – Mandarin

## A 项 - 个人资料

指示：请在以下的问题中“圈起”或“填入”适合的答案。

1. 年龄	:	_____ 岁	体重: _____ 公斤
			体高: _____ 厘米
2. 性别	:	1. 男	2. 女
3. 国籍	:	1. 马来西亚人	2. 其他 (请注明):
4. 种族	:	1. 马来族	2. 华族
		3. 印族	4. 其他 (请注明):
5. 最高学历		1. 小学	2. 中学
		3. 大学先修班/文凭班	4. 学士 或以上
		5. 其他 (请注明):	
6. 婚姻状况	:	1. 未婚	2. 已婚
		3. 离婚	4. 丧偶
		5. 其他 (请注明):	
7. 居住地区(州属)	:	请注明:	
8. 职业	:	1. 家庭主妇	2. 学生
		3. 经商/商人	4. 专业人士
		5. 行政人员	6. 销售/服务业
		7. 其他 (请注明):	
9. 请问您患上糖尿病有多久了?	:	大约 _____ 年	_____ 月
10. 请问您患上的糖尿病种类是?	:	1. 第 1 型糖尿病	2. 第 2 型糖尿病
		3. 妊娠糖尿病	4. 不确定
11. 除了糖尿病, 请问您还有其他并发症吗?	:	1. 没有	2. 有 (请注明):
12. 请问您的家人有糖尿病的病历吗?	:	1. 没有	2. 有



13. 请问您是如何控制您的糖尿病？		只要以下的选项符合您的情况, 您可 <b>选择多于一项</b> ：	
		1. 控制我的饮食 2. 运动 3. 我服用医生为我开的药方 4. 我定期接受胰岛素的注射 5. 我服用经朋友，家人或其他糖尿病患者所介绍的传统或其他药物/偏方 6. 其他 (请注明)：	
14. 您看病的医院/诊所是		1. 政府医院/诊所	2. 私人医院/诊所
15. 您最近一次的 HbA1c 成绩		:	_____ %

### B 项 – DSES

**指示：**我们想知道您在进行一些活动时的自信程度。请为以下每一道问题**圈**起一个适度的数字来代表您对完成以下活动的自信程度。

		完全 没信心	_____	完全 有信心
1	请问您有信心能做到每天每4-5小时用一餐吗（包括早餐）？	1	2 3 4 5 6 7 8 9 10	
2	请问您有信心在您为非糖尿病患者准备或与其共餐时维持您应有的饮食习惯吗？	1	2 3 4 5 6 7 8 9 10	
3	请问您有信心在您饥饿时为自己选择适当的食物（如：小吃/零食）吗？	1	2 3 4 5 6 7 8 9 10	
4	请问您有信心可以每个星期运动4至5次，每次为时15至30分钟吗？	1	2 3 4 5 6 7 8 9 10	
5	请问您有信心在运动时防止您的血糖水平下降吗？	1	2 3 4 5 6 7 8 9 10	
6	当您的血糖水平比平时高或低时，请问您有信心应对吗？	1	2 3 4 5 6 7 8 9 10	

7	请问您有信心能根据您的病情的变化来判断什么时候该去看医生吗?	1	2	3	4	5	6	7	8	9	10
8	请问您有信心能控制您的糖尿病病情以便它不会干扰到您想进行的活动吗?	1	2	3	4	5	6	7	8	9	10

### C 项 - MHLIC

**指示：**请仔细地阅读以下每一个项目，并在空格内用以下的五项选择来表明您同意或不同意：

非常不同意	大致上不同意	稍微不同意	稍微同意	大致上同意	非常同意
1	2	3	4	5	6

	1	若我生病了，我自己的行为将决定我何时会痊愈。
	2	不管我做些什么，若我注定会生病，我就一定会生病。
	3	防止我生病最有效的方法就是定期去看医生。
	4	大多数影响我健康的事情通常都发生在我的意料之外。
	5	每当我感觉到不舒服，我都应该征询一位受过专业训练的医生。
	6	我能够掌控我自己的健康。
	7	我家人对我是否会生病或能否维持健康有着重大的影响。
	8	我若生病，都是由我自己造成的。
	9	我的疾病是否会痊愈，完全取决于我的运气。
	10	我的健康由医务人员控制。
	11	我能拥有良好的健康主要是因为我的运气好。

	12	我的行为是影响我的健康的主要因素。
	13	若我有照顾我自己，我是可以避免生病的。
	14	若我能从生病中痊愈，通常都是其他人（如医生、护士、家人、朋友）的功劳。
	15	不管我做什么，我都有可能会染上疾病。
	16	我可否保持健康，是天注定的。
	17	若我采取正确的行动，我是可以保持健康的。
	18	关于我的健康方面，我只能依照我医生的指示来做。

## D 项 - PSI

**指示：**请仔细地阅读以下每一项，并在空格内用以下五项选项来表明您同意或不同意。

非常同意	大致上同意	稍微同意	稍微不同意	大致上不同意	非常不同意
1	2	3	4	5	6

	1	当一个问题的解决方案失效时，我没有检讨其中原因。
	2	当我面对一个复杂的问题时，我不会为了要准确地厘清其问题的主因而去收集资料。
	3	若我在第一次尝试解决问题时失败了，我会对自己处理事情的能力感到不安。
	4	当我解决了一问题后，我不会再去分析我什么做得对或什么做错。
	5	我通常能想出有创意又有效的各种方案来解决问题。
	6	当我尝试采取一些行动来解决问题后，我会花时间来比较其所带来的后果是否与我预期中的一样。

	7	当我面对一问题时，我会尽力想出各种各样的解决方案直到我再也想不出别的方法为止。
	8	当面对一问题时，我会持续地检视我的感觉以便找出其困境的前因后果。
	9	当我对一问题感到困惑时，我不会尝试将那些模糊的想法或感受具体化。
	10	即使一开始并没有立刻想到解决方案，我仍然具有解决大部分问题的能力。
	11	我所面对的许多问题都太复杂，是我能力所不能解决的。
	12	我自己做决定并在事后为这些决定而感到开心。
	13	当我遇见一问题时，我倾向于采用我第一个想到的方法去解决。
	14	有时候我不会停下脚步来花时间去解决我的许多问题而只会蒙混过关。
	15	当己为一问题决定了某一个想法或解决方案时，我不会再花费时间去考虑其他选择的成功机率。
	16	当面对一问题时，我会在决定下一步之前停下脚步并仔细地考虑清楚。
	17	我通常都会采用我第一个想到的好办法。
	18	当要做决定时，我会斟酌各个选择所带来的后果并相互比较。
	19	当我在为一问题计划着解决方案时，我几乎可以肯定我的方案会成功。
	20	我会尝试去预测一特定行动所会带来整体结果。
	21	当我尝试去为一问题想出可能的解决方案时，我不会想出太多不同的解决方案。
	22	在尝试解决一问题时，我最常用的策略是参考过去类似的问题。
	23	只要给与足够的时间和努力，我相信我可以解决自己大多数面对的问题。

	24	当处身于一个新的状况时，我有信心自己可以处理所有可能出现的问题。
	25	即使我正在着手处理着一问题，有时我仍然会觉得自己在摸索或感觉很飘零，也觉得自己似乎并没有对准真正的问题。
	26	我草率地作出判断并且在事后感到后悔。
	27	我相信自己有能力处理新的和有难度的问题。
	28	我拥有一套有系统的方法来比较各种解决方案并做出选择。
	29	当我尝试为一问题寻求解决方案时，我不会尝试将不同的想法结合在一起。
	30	当面对一问题时，我通常不会考核何种外来因素将影响此问题。
	31	当我正面对一问题时，我第一件会做的事就是调查该情况及考虑所有有关的资料。
	32	有时候我会因为情绪激动而无法去思考各种方案来解决自己的问题。
	33	当我做了一个决定后，我所得到的结果往往都会与我所期望的相符。
	34	当我面对一问题时，我不确定自己是否能处理它。
	35	当我意识到一问题的存在时，我会先做的其中一件事就是找出问题症结的所在。

## E 项 - LOT-R

**指示：**请于空格内按照您对您自己的认知用以下的五项选项表示您同意或不同意。

非常不同意	不同意	中立	同意	非常同意
0	1	2	3	4

	1	当处身于不明朗的情况时，我通常都会带着正面的期望。
	2	放松对我来说是一件容易的事。
	3	若一件负面的事情注定要发生在我身上，它定会发生。
	4	我总是对我的未来抱以乐观的态度。
	5	我很享受与我朋友们在一起的时光。
	6	保持生活的忙碌对我来说很重要。
	7	我鲜少期望事情总会依照我的意愿发展。
	8	我不容易感到沮丧。
	9	我很少期望好事发生在我身上。
	10	整体而言，我倾向于期望发生在我身上的好事多于坏事。

## F 项 - MDI

**指示：** 以下的问题是有关您在过去两个星期里所经历的感受。请于以下六项中选择最符合您感受的答案，并在空格内画勾（“√”）。

	有多少时候。。。	每时每刻	大部分时间	略超过一半的时间	略少过一半的时间	有时/偶尔	从来没有
1	请问您有感觉心情低迷或悲伤吗？						
2	请问您有对您的日常活动失去兴趣吗？						
3	请问您有感觉缺乏精力和体力吗？						
4	请问您有感觉缺乏自信心吗？						
5	请问您有感觉自己心存愧疚或自责吗？						
6	请问您有感觉人生是不值得活下去的吗？						
7	请问您有感觉精神很难集中吗？（如：阅读报章或观看电视节目时。）						
8a	请问您有感觉焦虑不安吗？						
8b	请问您有感觉被抑制或慢了下来吗？						
9	请问您晚上有失眠的问题吗？						
10a	请问您有食欲减少的问题吗？						
10b	请问您有食欲增加的问题吗？						

**G 项 - CAS**

**指示：**请仔细地回答以下每一项，并在空格内从以下五项选项中选出最符合您情况的答案：

很少或从来没有	偶尔	某些时候	蛮多时候	绝大部分时候或每时每刻
1	2	3	4	5

	1	我感觉平静。
	2	我感觉紧绷。
	3	我会突然间没有理由的感到害怕。
	4	我感觉紧张。
	5	为了控制我的焦虑，我会服用镇静剂或抗抑郁药。
	6	我对未来充满信心。
	7	我没有不愉快或毫无意义的想法。
	8	我害怕一个人独自出门。
	9	我觉得轻松自在及自我掌控。
	10	我容易感觉到恐怖或恐慌。
	11	身处在开放的空间或在街上让我感觉害怕。
	12	我害怕自己会在公共场合晕倒。
	13	我能轻松自在地乘搭巴士、地铁或火车。
	14	在我内心深处，我感觉神经紧张或颤抖。
	15	当身处人群中我感觉自在，如逛街或看电影。
	16	当独自一人时，我感觉自在。
	17	我会无理由地感到害怕。
	18	由于我的恐惧，我会无理由地避免与一些动物，物品接触或避免某些场合/环境。
	19	我很容易感觉沮丧或突然感觉惊慌。
	20	我感觉我的手，手臂或脚在颤抖。



	21	由于我的恐惧，我尽量避免投身社交场合。
	22	我经历突如其来的恐慌并感到措手不及。
	23	一般来说，我感觉忧虑。
	24	我常感觉头晕/ 晕眩。
	25	由于我的恐惧，我尽可能不独处。

## H 项 - DDS

**指示:** 请仔细阅读以下 17 项，在**过去一个月**内哪项问题曾经使您觉得苦恼或困扰，并**圈出**适当的数字：

不是个困扰	轻微的困扰	中等的困扰	有些严重的困扰	严重的困扰	非常严重的困扰
1	2	3	4	5	6

1	觉得糖尿病已过多的占用了我每一天的精神和身体精力。	1	2	3	4	5	6
2	觉得我的医生对糖尿病的知识和护理没有足够的了解	1	2	3	4	5	6
3	当我想到患有糖尿病时，我感到愤怒，害怕，和/或消沉。	1	2	3	4	5	6
4	觉得我的医生没有给予我十分清楚的指示来管理我的糖尿病。	1	2	3	4	5	6
5	觉得我的血糖测试次数不足够。	1	2	3	4	5	6
6	觉得我经常没有遵照我糖尿病的常规/例行活动。	1	2	3	4	5	6
7	觉得朋友或家人在自我保健工作上没有给予足够的支持（例如，计划与我的日程安排有冲突的活动，鼓励我吃“错”的食物）。	1	2	3	4	5	6
8	觉得糖尿病控制了我的生活。	1	2	3	4	5	6
9	觉得我的医生没有把我的顾虑/疑问给予足够的重视。	1	2	3	4	5	6

10	对于我日常管理糖尿病的能力没有自信。	1	2	3	4	5	6
11	觉得无论我做什么，我最后还是会患上严重的长期并发症。	1	2	3	4	5	6
12	觉得我不够紧密地遵照一个好的饮食计划。	1	2	3	4	5	6
13	觉得朋友或家人不明白患有糖尿病的生活是有多么的困难。	1	2	3	4	5	6
14	觉得糖尿病患者的生活需求有不堪重负之感。	1	2	3	4	5	6
15	觉得我没有一个可以经常咨询关于我糖尿病的医生。	1	2	3	4	5	6
16	觉得没有动力来维持我糖尿病的自我照料。	1	2	3	4	5	6
17	觉得朋友或家人没有给予我想要的精神支持。	1	2	3	4	5	6

## I 项 - MSPSS

**指示：**请仔细与准确地回答每一个项目，您可以通过下列选项在每个句子旁边写下合适的数字：

极度不同 意 1	非常不同 意 2	有些不 同意 3	中立 4	有些同意 5	非常同意 6	极度同意 7
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	1	当我有需要的时候, 总会有特定的一个人陪在我身边。
	2	我拥有一个特定的人来分享我的快乐与悲伤。
	3	我的家人真切地扶持我。
	4	我从我的家人那里得到了所需要的精神帮助与支持。
	5	我拥有一个特定的人, 他/她是我真正的安慰来源。
	6	我的朋友们真切地扶持我。
	7	当事情不如意时, 我可以依靠我的朋友。
	8	我可以和我的家人谈论我的问题。
	9	我拥有可以分享我的快乐与悲伤的朋友。
	10	在我的生活中, 有一个特定人会在乎我的感受。
	11	我的家人愿意在我做决定时给予帮助。
	12	我可以与我的朋友们谈论我的问题。

## J 项 - HCCQ-6

**指示：**本问卷所包含的项目是涉及到您咨询您医生的经验。每位医生处理病人的风格都不同，我们想更多地了解您对您与医生的相处有什么感受。您的回答是被保密的。请诚实和坦率地回答：

非常不同意		中立			非常同意	
1	2	3	4	5	6	7

1	我觉得我的医生为我提供各选择和做选择的空间。	1	2	3	4	5	6	7
2	我觉得我的医生理解我。	1	2	3	4	5	6	7
3	我的医生让我相信自己能改变	1	2	3	4	5	6	7
4	我的医生鼓励我发问。	1	2	3	4	5	6	7
5	我的医生会听取我喜欢的处事方式。	1	2	3	4	5	6	7
6	在提出做事情的新方式之前，我的医生会先试图理解我看待事情的方式。	1	2	3	4	5	6	7

## K 项 - DKT

指示：请在以下问题中圈出一个合适的答案。请您务必亲自作答。

1	糖尿病患者的饮食是： a. 大多数大马人的饮食 b. 对大多数人来说是健康的饮食 c. 对于大多数人来说含有过高的碳水化合物 d. 对于大多数人来说含有过高的蛋白质
2	下列哪一项含有最高的碳水化合物？ a. 烤鸡 b. 奶酪 c. 烤马铃薯 d. 花生酱
3	下列哪一项含有最高的脂肪？ a. 低脂牛奶 b. 橙汁 c. 玉米/玉蜀黍 d. 蜂蜜
4	下列哪一项是“无糖食品”？ a. 任何不加糖的食物 b. 任何营养食品 c. 任何在标签上写着“无糖”的食物 d. 任何每份热量少过 20 卡路里的食物
5	糖化血红蛋白（HbA1c）是一项测量您在过去多长时间的平均血糖水平测试？ a. 一天 b. 一个星期 c. 6 个星期 d. 6 个月
6	哪一项是最好的检测血糖方法？ a. 尿液测试 b. 血液测试 c. 两者都一样好
7	不加糖的果汁（无糖分）对血糖有怎样的影响？ a. 降低血糖 b. 提高血糖 c. 没有影响

8	以下哪一项 <b>不应该</b> 用来克服/应对低血糖？ a. 3 颗硬糖果 b. 半杯橙汁 c. 1 杯无糖/含人造糖的汽水 d. 1 杯脱脂牛奶
9	对于一个自律的人，运动对血糖有什么样的影响？ a. 降低血糖 b. 提高血糖 c. 没有影响
10	伤口/细菌感染可能会导致： d. 血糖增加 e. 血糖减少 f. 血糖没有变化
11	照顾您双脚最好的方式是： e. 每天察看并把它们洗干净 f. 每天用酒精按摩它们 g. 每天浸泡双脚一小时 h. 买比以往大一号的鞋子
12	吃低脂肪的食物能降低您的哪一项风险？ e. 神经疾病 f. 肾脏疾病 g. 心脏疾病 h. 眼科疾病
13	麻木和刺痛可能是以下哪一项疾病的症状？ e. 肾脏疾病 f. 神经疾病 g. 眼科疾病 h. 肝脏疾病
14	下列哪项通常与糖尿病没有关系？ e. 视力问题 f. 肾脏问题 g. 神经问题 h. 肺部问题

## L 项 - PDSMS

指示：请仔细与准确地回答每一个项目，并通过下列选项在每个句子旁边写下一个数字：

非常不同意	不同意	中立	同意	非常同意
1	2	3	4	5

	1	对我而言，要找到有效的解决方案来治理糖尿病所出现的问题是一件很困难的事。
	2	我发现自己无法改变有关糖尿病中不喜欢的事情。
	3	我把自己的（糖尿）病情照料得很好。
	4	我可以像其他大多数人那样，很好地管理我的（糖尿）病情。
	5	在管理我的糖尿病的事项中，我相当成功。
	6	通常，我糖尿病管理的计划并没有实行得很好。
	7	无论我怎么努力，我糖尿病的管理没有如我所期望般地发生。
	8	一般上，我有能力达成管理我糖尿病情的目标。

## M 项 - SDSCA

**指示：** 以下的问题是关于您在过去的 7 天的糖尿病自我保健活动。如果您在最近的 7 天内生病了，请回想过去您**没有生病的 7 天**。

饮食 DIET		(天)							
1	过去七天中，有多少天您遵循了健康的饮食计划？	0	1	2	3	4	5	6	7
2	平均而言，在过去的一个月中，您 <b>每周有多少天</b> 遵循您的饮食计划？	0	1	2	3	4	5	6	7
3	过去七天中，有多少天您吃了五份或以上的水果和蔬菜？	0	1	2	3	4	5	6	7
4	过去七天中，有多少天您摄取了高脂肪的食物，如红肉或全脂乳制品？	0	1	2	3	4	5	6	7
运动 EXERCISE									
5	在过去七天中，有几天您进行了至少 30 分钟的体力活动？（持续性的活动总数，包括步行）。	0	1	2	3	4	5	6	7
6	除了做家务以及工作，在过去七天中，有几天您进行了一个特定的运动（如：游泳，散步，骑脚踏车）？	0	1	2	3	4	5	6	7
血糖测试 BLOOD SUGAR TESTING									
7	在过去七天中您有几天测试了您的血糖？	0	1	2	3	4	5	6	7
8	在过去七天中有几天遵循了您的医务人员所推荐的次数来测试你的血糖？	0	1	2	3	4	5	6	7



足部护理 FOOT CARE									
9	在过去七天中，有几天您检查了你的双脚？	0	1	2	3	4	5	6	7
10	在过去七天中，有几天您检查了您鞋子的内部状况？	0	1	2	3	4	5	6	7
抽烟 SMOKING									
11	在过去七天中您有抽过一根烟，甚至是一口烟吗？ 2. 没有 3. 有。如果有的话，您平均每天吸多少根香烟？ 香烟的数量：_____								

## N 项 - QoLS

**指示：**请仔细阅读每一个项目并圈出最能反映出您对现状是否满意的数字。请回答每一个项目，即您目前没有参与相关的活动或拥有相关的关系；您仍然可以对以下的项目表示满意或不满意：

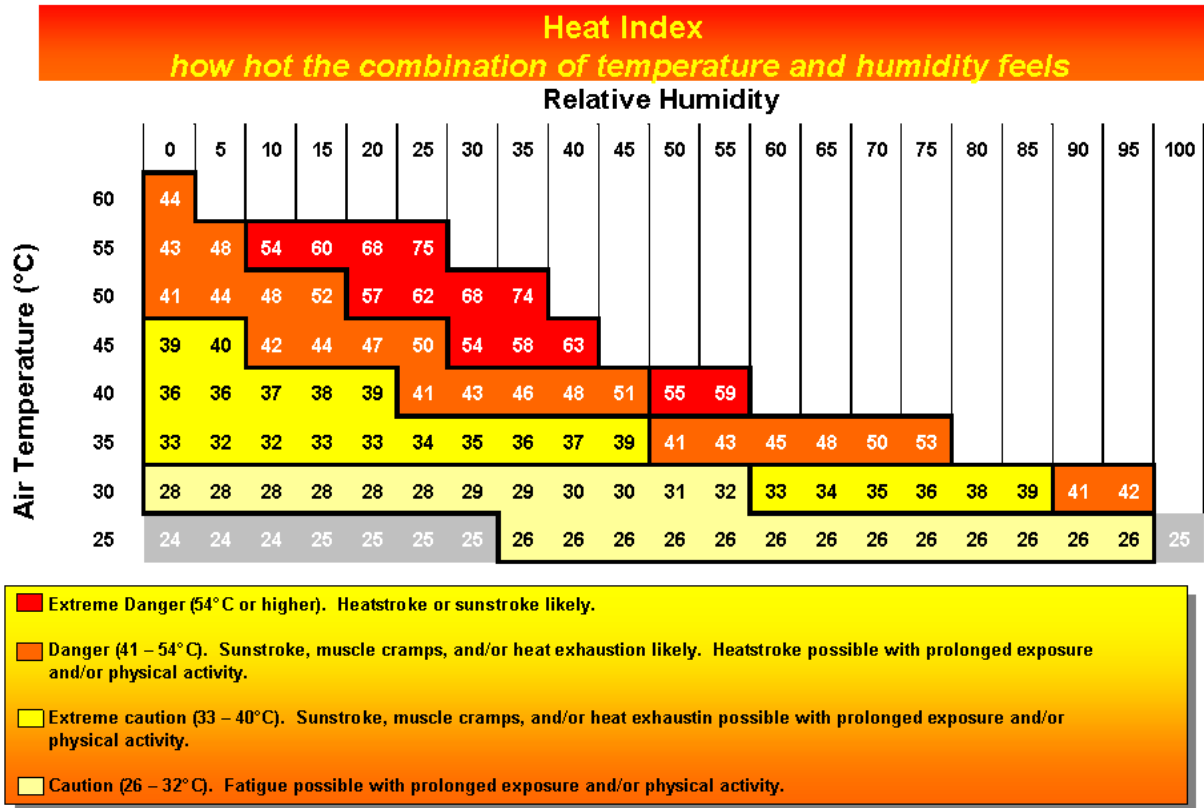
		欣喜	高兴	大多满意	混合	大多不满	不愉快	糟糕
1	家居物质的享受，食物，便利，财物安全感。	7	6	5	4	3	2	1
2	健康方面 - 拥有强健和精练的体魄。	7	6	5	4	3	2	1
3	与父母，兄弟姐妹和其他亲属的关系 - 有互相沟通，探望，帮助。	7	6	5	4	3	2	1
4	拥有和抚养着孩子。	7	6	5	4	3	2	1
5	与配偶或重要的人拥有密切的关系。	7	6	5	4	3	2	1
6	知心的朋友	7	6	5	4	3	2	1

7	帮助和鼓励他人，志愿服务（做义工），提供意见。	7	6	5	4	3	2	1
8	参与社会团体和公共/社区的事务。	7	6	5	4	3	2	1
9	学习方面 - 上学，提高认知，获得更多的知识	7	6	5	4	3	2	1
10	自我了解 - 了解你的优点和缺点 - 知道生活是什么	7	6	5	4	3	2	1
11	工作 - 事业或家庭方面	7	6	5	4	3	2	1
12	有创意地表达自己	7	6	5	4	3	2	1
13	社交方面 - 与其他人交流，一起活动，聚会等等	7	6	5	4	3	2	1
14	阅读，听音乐，或观赏娱乐活动/节目。	7	6	5	4	3	2	1
15	参与休闲活动	7	6	5	4	3	2	1
16	独立，自己能照顾/满足自己。	7	6	5	4	3	2	1

感谢您的参与 -

## APPENDIX E

## Heat Index Chart



## APPENDIX F

## SPSS Outputs for Main Study

## F1 Demographics

## Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Original order	85	47.0	47.0	47.0
	Alternative order	96	53.0	53.0	100.0
	Total	181	100.0	100.0	

## Language-Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	48	26.5	26.5	26.5
	Malay	92	50.8	50.8	77.3
	Chinese	41	22.7	22.7	100.0
	Total	181	100.0	100.0	

## Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	87	48.1	48.1	48.1
	Female	94	51.9	51.9	100.0
	Total	181	100.0	100.0	

## Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	82	45.3	45.3	45.3
	Chinese	68	37.6	37.6	82.9
	Indian	31	17.1	17.1	100.0
	Total	181	100.0	100.0	

**Residential Area**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selangor	58	32.0	32.0	32.0
	Kuala Lumpur	14	7.7	7.7	39.8
	N Sembilan	5	2.8	2.8	42.5
	Perak	4	2.2	2.2	44.8
	Malacca	6	3.3	3.3	48.1
	Johore	8	4.4	4.4	52.5
	Penang	6	3.3	3.3	55.8
	Kedah	4	2.2	2.2	58.0
	Kelantan	20	11.0	11.0	69.1
	Terengganu	54	29.8	29.8	98.9
	Pahang	2	1.1	1.1	100.0
	Total	181	100.0	100.0	

**Age (in years)**

	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	181	23.00	73.00	52.2928	11.72355
Valid N (listwise)	181				

**Age Groups**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 30 years	7	3.9	3.9	3.9
	30-60 years	128	70.7	70.7	74.6
	Above 60 years	46	25.4	25.4	100.0
	Total	181	100.0	100.0	

**Education**

		Frequency	Percent	Valid Percent
Valid	Primary School	38	21.0	21.0
	Secondary School	73	40.3	40.3
	Form 6/Pre-U/Diploma	28	15.5	15.5
	Degree & higher	27	14.9	14.9
	No Formal Education	15	8.3	8.3
	Total	181	100.0	100.0

**Marital status**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	29	16.0	16.0	16.0
	Married	132	72.9	72.9	89.0
	Divorced	11	6.1	6.1	95.0
	Widowed	9	5.0	5.0	100.0
	Total	181	100.0	100.0	

**Occupational status**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Homemaker	47	26.0	26.0	26.0
	Eco-Cultural	13	7.2	7.2	33.1
	Business owner	30	16.6	16.6	49.7
	Professional	18	9.9	9.9	59.7
	Administrator	22	12.2	12.2	71.8
	Sales/Service	25	13.8	13.8	85.6
	Others	10	5.5	5.5	91.2
	Retireess	16	8.8	8.8	100.0
	Total	181	100.0	100.0	

**Healthcare Provider**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public Hospital	128	70.7	70.7	70.7
	Privite Hospital	53	29.3	29.3	100.0
	Total	181	100.0	100.0	

**Body Mass Index**

	N	Minimum	Maximum	Mean	Std. Deviation
BMI	181	16.90	51.90	27.7091	4.74776
Valid N (listwise)	181				

**BMI Big Group**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal and below	49	27.1	27.1	27.1
	Overweight and above	132	72.9	72.9	100.0
	Total	181	100.0	100.0	

**Other complication**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	92	50.8	50.8	50.8
	Yes	89	49.2	49.2	100.0
	Total	181	100.0	100.0	

**Family History of Diabetes**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	52	28.7	28.7	28.7
	Yes	129	71.3	71.3	100.0
	Total	181	100.0	100.0	

**Manage by Lifestyle**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	164	90.6	90.6	90.6
	Yes	17	9.4	9.4	100.0
	Total	181	100.0	100.0	

**Oral Medication Only**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	58	32.0	32.0	32.0
	Yes	123	68.0	68.0	100.0
	Total	181	100.0	100.0	

**Manage D-Insulin**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	140	77.3	77.3	77.3
	Yes	41	22.7	22.7	100.0
	Total	181	100.0	100.0	

**Home Remedy/Alt Medicine**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	105	58.0	58.0	58.0
	Yes	76	42.0	42.0	100.0
	Total	181	100.0	100.0	

**Smoker/NonSmoker**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	143	79.0	79.0	79.0
	Yes	38	21.0	21.0	100.0
	Total	181	100.0	100.0	

**Diabetes Duration Groups**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3 years	54	29.8	29.8	29.8
	3-10 years	81	44.8	44.8	74.6
	More than 10 years	46	25.4	25.4	100.0
	Total	181	100.0	100.0	

**F2 HbA1c vs. Demographics****HbA1c in Overall Sample**

	N	Minimum	Maximum	Mean	Std. Deviation
GlycoHemoglobin	181	5.00	14.00	8.5646	1.95473
Valid N (listwise)	181				

**Report**

GlycoHemoglobin

Age Groups	Mean	N	Std. Deviation
Below 30 years	8.6286	7	2.08304
30-60 years	8.4922	128	1.90638
Above 60 years	8.7565	46	2.09652
Total	8.5646	181	1.95473

**Report**

GlycoHemoglobin

Gender	Mean	N	Std. Deviation
Male	8.5632	87	1.88403
Female	8.5660	94	2.02806
Total	8.5646	181	1.95473



**Report**

## GlycoHemoglobin

Ethnicity	Mean	N	Std. Deviation
Malay	9.5817	82	1.79403
Chinese	7.5897	68	1.66358
Indian	8.0129	31	1.66087
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Residential Coast	Mean	N	Std. Deviation
West Coast	7.6629	105	1.57335
East Coast	9.8105	76	1.73962
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Education	Mean	N	Std. Deviation
Primary School	9.1921	38	2.09457
Secondary School	8.3466	73	1.57039
Form 6/Pre-U/Diploma	8.0643	28	2.01038
Degree & higher	7.5889	27	1.21222
No Formal Education	10.7267	15	2.37982
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Family history	Mean	N	Std. Deviation
No	8.4038	52	1.75889
Yes	8.6295	129	2.03122
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Other complication	Mean	N	Std. Deviation
No	8.4076	92	1.60393
Yes	8.7270	89	2.25896
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Healthcare Provider	Mean	N	Std. Deviation
Public Hospital	8.9016	128	1.96047
Private Hospital	7.7509	53	1.69860
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

BMI Big Group	Mean	N	Std. Deviation
Normal and below	8.0955	44	1.94422
Overweight and above	8.7209	129	1.92092
Total	8.5618	173	1.94052

**Report**

## GlycoHemoglobin

Manage by Lifestyle	Mean	N	Std. Deviation
No	8.6726	164	1.97289
Yes	7.5235	17	1.43594
Total	8.5646	181	1.95473

**Report**

## GlycoHemoglobin

Oral Medication Only	Mean	N	Std. Deviation
No	9.0259	58	2.32179
Yes	8.3472	123	1.72338
Total	8.5646	181	1.95473

**Report**

GlycoHemoglobin

Manage D-Insulin	Mean	N	Std. Deviation
No	8.2471	140	1.70794
Yes	9.6488	41	2.34522
Total	8.5646	181	1.95473

**Report**

GlycoHemoglobin

Home Remedy/Alt Medicine	Mean	N	Std. Deviation
No	8.2895	105	1.88491
Yes	8.9447	76	1.99783
Total	8.5646	181	1.95473

**Report**

GlycoHemoglobin

Diabetes Duration Groups	Mean	N	Std. Deviation
Less than 3 years	8.0259	54	1.50686
3-10 years	8.6926	81	1.87535
More than 10 years	8.9717	46	2.41041
Total	8.5646	181	1.95473

**Report**

GlycoHemoglobin

Smoker/NonSmoker	Mean	N	Std. Deviation
No	8.3168	143	1.88758
Yes	9.4974	38	1.94512
Total	8.5646	181	1.95473

**F3a Multiple Regression Analysis on PDSMS****Descriptive Statistics**

	Mean	Std. Deviation	N
PDSMS	26.8066	5.25792	181
DSES	6.1077	1.83517	181
IHLC	25.2320	5.13066	181
PSI	103.0110	19.95188	181
LOTR	15.1713	4.07001	181
MDI	14.1934	10.39130	181
CAS	27.1326	17.20511	181
DDS	2.3494	.91382	181
MSPSS	4.9217	1.06546	181
HCCQ	4.9098	1.17582	181
DKT	7.7624	3.01918	181

**Correlations**

		PDSMS	DSES	IHLC	PSI
Pearson Correlation	PDSMS	1.000	.521	.429	-.560
	DSES	.521	1.000	.535	-.516
	IHLC	.429	.535	1.000	-.546
	PSI	-.560	-.516	-.546	1.000
	LOTR	.532	.474	.499	-.590
	MDI	-.493	-.581	-.395	.476
	CAS	-.545	-.621	-.436	.578
	DDS	-.583	-.546	-.414	.475
	MSPSS	.391	.466	.384	-.457
	HCCQ	.291	.339	.195	-.267
	DKT	.445	.638	.501	-.490
Sig. (1-tailed)	PDSMS	.	.000	.000	.000
	DSES	.000	.	.000	.000
	IHLC	.000	.000	.	.000
	PSI	.000	.000	.000	.

	LOTR	.000	.000	.000	.000
	MDI	.000	.000	.000	.000
	CAS	.000	.000	.000	.000
	DDS	.000	.000	.000	.000
	MSPSS	.000	.000	.000	.000
	HCCQ	.000	.000	.004	.000
	DKT	.000	.000	.000	.000
N	PDSMS	181	181	181	181
	DSES	181	181	181	181
	IHLC	181	181	181	181
	PSI	181	181	181	181
	LOTR	181	181	181	181
	MDI	181	181	181	181
	CAS	181	181	181	181
	DDS	181	181	181	181
	MSPSS	181	181	181	181
	HCCQ	181	181	181	181
	DKT	181	181	181	181

## Correlations

		LOTR	MDI	CAS	DDS
Pearson Correlation	PDSMS	.532	-.493	-.545	-.583
	DSES	.474	-.581	-.621	-.546
	IHLC	.499	-.395	-.436	-.414
	PSI	-.590	.476	.578	.475
	LOTR	1.000	-.473	-.572	-.440
	MDI	-.473	1.000	.717	.613
	CAS	-.572	.717	1.000	.628
	DDS	-.440	.613	.628	1.000
	MSPSS	.492	-.512	-.473	-.437
	HCCQ	.286	-.265	-.179	-.210
	DKT	.378	-.549	-.584	-.525
Sig. (1-tailed)	PDSMS	.000	.000	.000	.000
	DSES	.000	.000	.000	.000

	IHLC	.000	.000	.000	.000
	PSI	.000	.000	.000	.000
	LOTR	.	.000	.000	.000
	MDI	.000	.	.000	.000
	CAS	.000	.000	.	.000
	DDS	.000	.000	.000	.
	MSPSS	.000	.000	.000	.000
	HCCQ	.000	.000	.008	.002
	DKT	.000	.000	.000	.000
N	PDSMS	181	181	181	181
	DSES	181	181	181	181
	IHLC	181	181	181	181
	PSI	181	181	181	181
	LOTR	181	181	181	181
	MDI	181	181	181	181
	CAS	181	181	181	181
	DDS	181	181	181	181
	MSPSS	181	181	181	181
	HCCQ	181	181	181	181
	DKT	181	181	181	181

## Correlations

		MSPSS	HCCQ	DKT
Pearson Correlation	PDSMS	.391	.291	.445
	DSES	.466	.339	.638
	IHLC	.384	.195	.501
	PSI	-.457	-.267	-.490
	LOTR	.492	.286	.378
	MDI	-.512	-.265	-.549
	CAS	-.473	-.179	-.584
	DDS	-.437	-.210	-.525
	MSPSS	1.000	.323	.462
	HCCQ	.323	1.000	.145
	DKT	.462	.145	1.000

Sig. (1-tailed)	PDSMS	.000	.000	.000
	DSES	.000	.000	.000
	IHLC	.000	.004	.000
	PSI	.000	.000	.000
	LOTR	.000	.000	.000
	MDI	.000	.000	.000
	CAS	.000	.008	.000
	DDS	.000	.002	.000
	MSPSS	.	.000	.000
	HCCQ	.000	.	.026
	DKT	.000	.026	.
N	PDSMS	181	181	181
	DSES	181	181	181
	IHLC	181	181	181
	PSI	181	181	181
	LOTR	181	181	181
	MDI	181	181	181
	CAS	181	181	181
	DDS	181	181	181
	MSPSS	181	181	181
	HCCQ	181	181	181
	DKT	181	181	181

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS <sup>b</sup>	.	Enter

a. Dependent Variable: PDSMS

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.702 <sup>a</sup>	.493	.463	3.85247

a. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

b. Dependent Variable: PDSMS

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F
1	Regression	2453.169	10	245.317	16.529
	Residual	2523.063	170	14.842	
	Total	4976.232	180		

**ANOVA<sup>a</sup>**

Model		Sig.
1	Regression	.000 <sup>b</sup>
	Residual	
	Total	

a. Dependent Variable: PDSMS

b. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	30.265	4.375		6.918
	DSES	.279	.243	.097	1.151
	IHLC	.013	.074	.013	.176
	PSI	-.054	.021	-.205	-2.630
	LOTR	.230	.099	.178	2.318
	MDI	-.010	.044	-.019	-.220
	CAS	-.016	.029	-.054	-.569
	DDS	-1.690	.439	-.294	-3.850
	MSPSS	-.196	.348	-.040	-.564
	HCCQ	.376	.273	.084	1.376
	DKT	.032	.139	.019	.233



**Coefficients<sup>a</sup>**

Model		Sig.	95.0% Confidence Interval for B		Correlations	
			Lower Bound	Upper Bound	Zero-order	Partial
1	(Constant)	.000	21.629	38.901		
	DSES	.251	-.200	.758	.521	.088
	IHLC	.860	-.134	.160	.429	.014
	PSI	.009	-.095	-.013	-.560	-.198
	LOTR	.022	.034	.426	.532	.175
	MDI	.826	-.096	.076	-.493	-.017
	CAS	.570	-.074	.041	-.545	-.044
	DDS	.000	-2.556	-.823	-.583	-.283
	MSPSS	.573	-.884	.491	.391	-.043
	HCCQ	.171	-.163	.916	.291	.105
	DKT	.816	-.242	.306	.445	.018

**Coefficients<sup>a</sup>**

Model		Correlations	Collinearity Statistics	
		Part	Tolerance	VIF
1	(Constant)			
	DSES	.063	.416	2.404
	IHLC	.010	.567	1.764
	PSI	-.144	.491	2.035
	LOTR	.127	.505	1.978
	MDI	-.012	.402	2.487
	CAS	-.031	.333	3.000
	DDS	-.210	.513	1.951
	MSPSS	-.031	.599	1.670
	HCCQ	.075	.799	1.252
	DKT	.013	.470	2.128

a. Dependent Variable: PDSMS

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	DSES
1	1	9.846	1.000	.00	.00
	2	.768	3.580	.00	.00
	3	.098	10.001	.00	.00
	4	.072	11.683	.00	.01
	5	.064	12.429	.00	.00
	6	.040	15.692	.00	.10
	7	.035	16.880	.01	.01
	8	.031	17.945	.00	.54
	9	.022	20.932	.00	.14
	10	.020	22.162	.00	.18
	11	.004	52.585	.99	.02

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions				
		IHLC	PSI	LOTR	MDI	CAS
1	1	.00	.00	.00	.00	.00
	2	.00	.00	.00	.06	.03
	3	.00	.01	.00	.80	.25
	4	.00	.00	.06	.00	.31
	5	.00	.01	.04	.04	.08
	6	.04	.02	.27	.03	.13
	7	.01	.31	.00	.00	.09
	8	.08	.00	.00	.02	.03
	9	.02	.06	.14	.02	.00
	10	.70	.00	.36	.00	.08
	11	.15	.60	.12	.03	.00

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions			
		DDS	MSPSS	HCCQ	DKT
1	1	.00	.00	.00	.00
	2	.01	.00	.00	.01
	3	.03	.00	.01	.03
	4	.21	.00	.02	.30
	5	.46	.01	.12	.19
	6	.00	.02	.38	.00
	7	.22	.03	.13	.06
	8	.00	.14	.16	.24
	9	.02	.72	.11	.10
	10	.00	.01	.02	.04
	11	.05	.08	.04	.03

a. Dependent Variable: PDSMS

**Casewise Diagnostics<sup>a</sup>**

Case Number	Std. Residual	PDSMS	Predicted Value	Residual
4	-3.057	18.00	29.7785	-11.77850

a. Dependent Variable: PDSMS

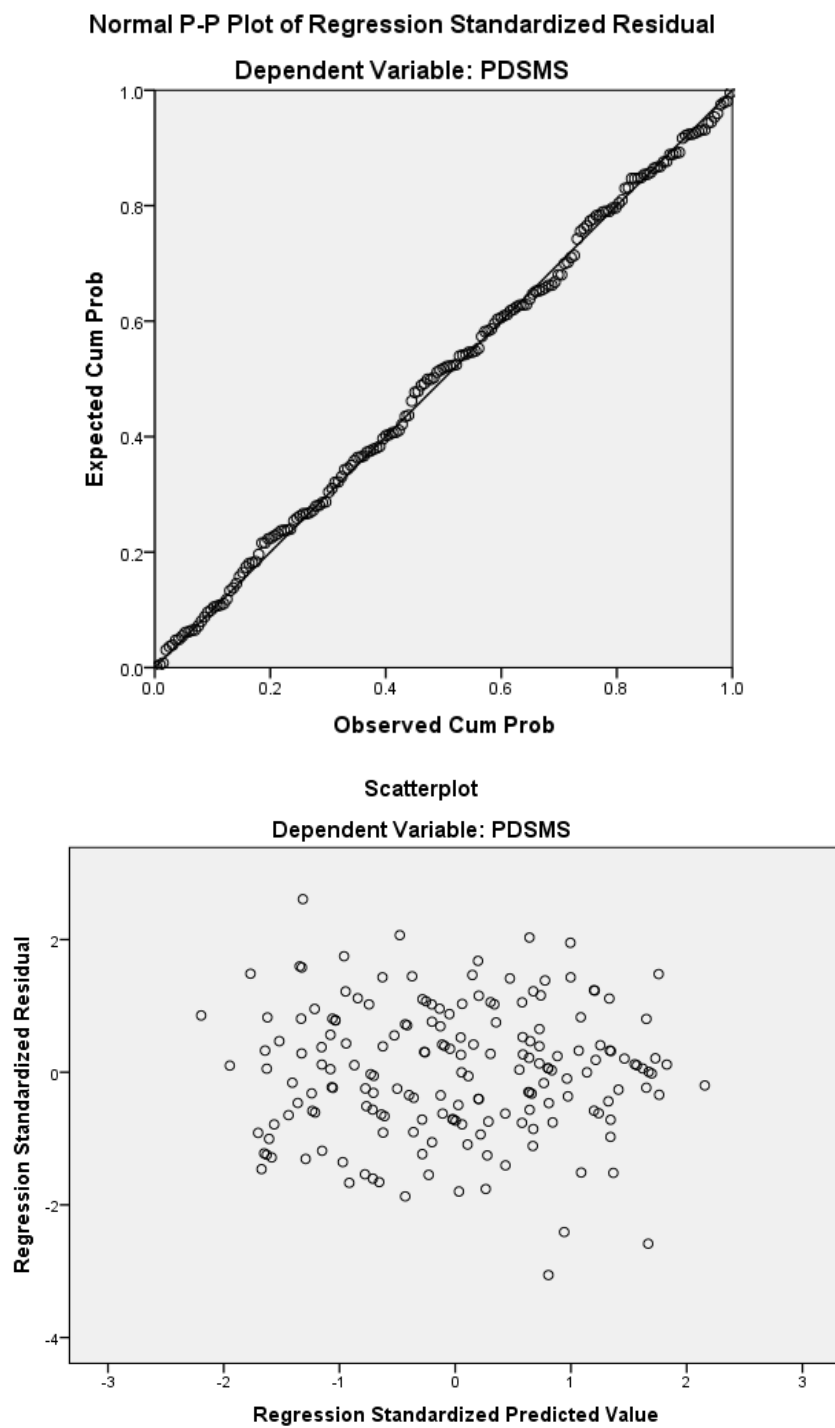
**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	18.7021	34.7661	26.8066	3.69171
Std. Predicted Value	-2.195	2.156	.000	1.000
Standard Error of Predicted Value	.471	1.590	.923	.224
Adjusted Predicted Value	18.4407	34.8159	26.7915	3.71480
Residual	-11.77850	10.05369	.00000	3.74393
Std. Residual	-3.057	2.610	.000	.972
Stud. Residual	-3.158	2.865	.002	1.011
Deleted Residual	-12.56400	12.11819	.01509	4.05419
Stud. Deleted Residual	-3.245	2.928	.001	1.017
Mahal. Distance	1.699	29.671	9.945	5.440
Cook's Distance	.000	.153	.008	.016
Centered Leverage Value	.009	.165	.055	.030

**Residuals Statistics<sup>a</sup>**

	N
Predicted Value	181
Std. Predicted Value	181
Standard Error of Predicted Value	181
Adjusted Predicted Value	181
Residual	181
Std. Residual	181
Stud. Residual	181
Deleted Residual	181
Stud. Deleted Residual	181
Mahal. Distance	181
Cook's Distance	181
Centered Leverage Value	181

a. Dependent Variable: PDSMS



**F3b Multiple Regression Analysis on SDSCA****Descriptive Statistics**

	Mean	Std. Deviation	N
SDSCA	32.6243	11.08965	181
DSES	6.1077	1.83517	181
IHLC	25.2320	5.13066	181
PSI	103.0110	19.95188	181
LOTR	15.1713	4.07001	181
MDI	14.1934	10.39130	181
CAS	27.1326	17.20511	181
DDS	2.3494	.91382	181
MSPSS	4.9217	1.06546	181
HCCQ	4.9098	1.17582	181
DKT	7.7624	3.01918	181

**Correlations**

		SDSCA	DSES	IHLC	PSI
Pearson Correlation	SDSCA	1.000	.528	.354	-.354
	DSES	.528	1.000	.535	-.516
	IHLC	.354	.535	1.000	-.546
	PSI	-.354	-.516	-.546	1.000
	LOTR	.400	.474	.499	-.590
	MDI	-.337	-.581	-.395	.476
	CAS	-.267	-.621	-.436	.578
	DDS	-.274	-.546	-.414	.475
	MSPSS	.258	.466	.384	-.457
	HCCQ	.248	.339	.195	-.267
	DKT	.322	.638	.501	-.490
Sig. (1-tailed)	SDSCA	.	.000	.000	.000
	DSES	.000	.	.000	.000
	IHLC	.000	.000	.	.000
	PSI	.000	.000	.000	.
	LOTR	.000	.000	.000	.000

	MDI	.000	.000	.000	.000
	CAS	.000	.000	.000	.000
	DDS	.000	.000	.000	.000
	MSPSS	.000	.000	.000	.000
	HCCQ	.000	.000	.004	.000
	DKT	.000	.000	.000	.000
N	SDSCA	181	181	181	181
	DSES	181	181	181	181
	IHLC	181	181	181	181
	PSI	181	181	181	181
	LOTR	181	181	181	181
	MDI	181	181	181	181
	CAS	181	181	181	181
	DDS	181	181	181	181
	MSPSS	181	181	181	181
	HCCQ	181	181	181	181
	DKT	181	181	181	181

## Correlations

		LOTR	MDI	CAS	DDS
Pearson Correlation	SDSCA	.400	-.337	-.267	-.274
	DSES	.474	-.581	-.621	-.546
	IHLC	.499	-.395	-.436	-.414
	PSI	-.590	.476	.578	.475
	LOTR	1.000	-.473	-.572	-.440
	MDI	-.473	1.000	.717	.613
	CAS	-.572	.717	1.000	.628
	DDS	-.440	.613	.628	1.000
	MSPSS	.492	-.512	-.473	-.437
	HCCQ	.286	-.265	-.179	-.210
	DKT	.378	-.549	-.584	-.525
Sig. (1-tailed)	SDSCA	.000	.000	.000	.000
	DSES	.000	.000	.000	.000
	IHLC	.000	.000	.000	.000

N	PSI	.000	.000	.000	.000
	LOTR	.	.000	.000	.000
	MDI	.000	.	.000	.000
	CAS	.000	.000	.	.000
	DDS	.000	.000	.000	.
	MSPSS	.000	.000	.000	.000
	HCCQ	.000	.000	.008	.002
	DKT	.000	.000	.000	.000
	SDSCA	181	181	181	181
	DSES	181	181	181	181
	IHLC	181	181	181	181
	PSI	181	181	181	181
	LOTR	181	181	181	181
	MDI	181	181	181	181
	CAS	181	181	181	181
	DDS	181	181	181	181
	MSPSS	181	181	181	181
	HCCQ	181	181	181	181
	DKT	181	181	181	181

## Correlations

		MSPSS	HCCQ	DKT
Pearson Correlation	SDSCA	.258	.248	.322
	DSES	.466	.339	.638
	IHLC	.384	.195	.501
	PSI	-.457	-.267	-.490
	LOTR	.492	.286	.378
	MDI	-.512	-.265	-.549
	CAS	-.473	-.179	-.584
	DDS	-.437	-.210	-.525
	MSPSS	1.000	.323	.462
	HCCQ	.323	1.000	.145
	DKT	.462	.145	1.000
Sig. (1-tailed)	SDSCA	.000	.000	.000



	DSES	.000	.000	.000
	IHLC	.000	.004	.000
	PSI	.000	.000	.000
	LOTR	.000	.000	.000
	MDI	.000	.000	.000
	CAS	.000	.008	.000
	DDS	.000	.002	.000
	MSPSS	.	.000	.000
	HCCQ	.000	.	.026
	DKT	.000	.026	.
N	SDSCA	181	181	181
	DSES	181	181	181
	IHLC	181	181	181
	PSI	181	181	181
	LOTR	181	181	181
	MDI	181	181	181
	CAS	181	181	181
	DDS	181	181	181
	MSPSS	181	181	181
	HCCQ	181	181	181
	DKT	181	181	181

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS <sup>b</sup>	.	Enter

a. Dependent Variable: SDSCA

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.590 <sup>a</sup>	.348	.309	9.21686

a. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

b. Dependent Variable: SDSCA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F
1	Regression	7694.871	10	769.487	9.058
	Residual	14441.582	170	84.950	
	Total	22136.453	180		

**ANOVA<sup>a</sup>**

Model		Sig.
1	Regression	.000 <sup>b</sup>
	Residual	
	Total	

a. Dependent Variable: SDSCA

b. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	5.530	10.467		.528
	DSES	2.997	.580	.496	5.163
	IHLC	.068	.178	.032	.385
	PSI	-.044	.049	-.079	-.896
	LOTR	.665	.237	.244	2.802
	MDI	-.151	.104	-.141	-1.448
	CAS	.188	.069	.291	2.712
	DDS	.395	1.050	.033	.376
	MSPSS	-.720	.833	-.069	-.865
	HCCQ	.261	.654	.028	.399
	DKT	-.013	.332	-.004	-.040

**Coefficients<sup>a</sup>**

Model		Sig.	95.0% Confidence Interval for B		Correlations	
			Lower Bound	Upper Bound	Zero-order	Partial
1	(Constant)	.598	-15.132	26.191		
	DSES	.000	1.851	4.142	.528	.368
	IHLC	.701	-.283	.420	.354	.030
	PSI	.371	-.141	.053	-.354	-.069
	LOTR	.006	.197	1.134	.400	.210
	MDI	.150	-.357	.055	-.337	-.110
	CAS	.007	.051	.324	-.267	.204
	DDS	.708	-1.678	2.467	-.274	.029
	MSPSS	.388	-2.365	.924	.258	-.066
	HCCQ	.691	-1.030	1.551	.248	.031
	DKT	.968	-.669	.642	.322	-.003

**Coefficients<sup>a</sup>**

Model		Correlations	Collinearity Statistics	
		Part	Tolerance	VIF
1	(Constant)			
	DSES	.320	.416	2.404
	IHLC	.024	.567	1.764
	PSI	-.056	.491	2.035
	LOTR	.174	.505	1.978
	MDI	-.090	.402	2.487
	CAS	.168	.333	3.000
	DDS	.023	.513	1.951
	MSPSS	-.054	.599	1.670
	HCCQ	.025	.799	1.252
	DKT	-.002	.470	2.128

a. Dependent Variable: SDSCA

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	DSES
1	1	9.846	1.000	.00	.00
	2	.768	3.580	.00	.00
	3	.098	10.001	.00	.00
	4	.072	11.683	.00	.01
	5	.064	12.429	.00	.00
	6	.040	15.692	.00	.10
	7	.035	16.880	.01	.01
	8	.031	17.945	.00	.54
	9	.022	20.932	.00	.14
	10	.020	22.162	.00	.18
	11	.004	52.585	.99	.02

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions				
		IHLC	PSI	LOTR	MDI	CAS
1	1	.00	.00	.00	.00	.00
	2	.00	.00	.00	.06	.03
	3	.00	.01	.00	.80	.25
	4	.00	.00	.06	.00	.31
	5	.00	.01	.04	.04	.08
	6	.04	.02	.27	.03	.13
	7	.01	.31	.00	.00	.09
	8	.08	.00	.00	.02	.03
	9	.02	.06	.14	.02	.00
	10	.70	.00	.36	.00	.08
	11	.15	.60	.12	.03	.00

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions			
		DDS	MSPSS	HCCQ	DKT
1	1	.00	.00	.00	.00
	2	.01	.00	.00	.01
	3	.03	.00	.01	.03
	4	.21	.00	.02	.30
	5	.46	.01	.12	.19
	6	.00	.02	.38	.00
	7	.22	.03	.13	.06
	8	.00	.14	.16	.24
	9	.02	.72	.11	.10
	10	.00	.01	.02	.04
	11	.05	.08	.04	.03

a. Dependent Variable: SDSCA

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	13.5694	44.5435	32.6243	6.53829
Std. Predicted Value	-2.914	1.823	.000	1.000
Standard Error of Predicted Value	1.127	3.804	2.209	.536
Adjusted Predicted Value	13.2076	44.5819	32.5667	6.61882
Residual	-26.96645	25.37796	.00000	8.95718
Std. Residual	-2.926	2.753	.000	.972
Stud. Residual	-2.979	2.984	.003	1.006
Deleted Residual	-27.94808	29.81301	.05766	9.61366
Stud. Deleted Residual	-3.050	3.057	.003	1.013
Mahal. Distance	1.699	29.671	9.945	5.440
Cook's Distance	.000	.141	.007	.014
Centered Leverage Value	.009	.165	.055	.030

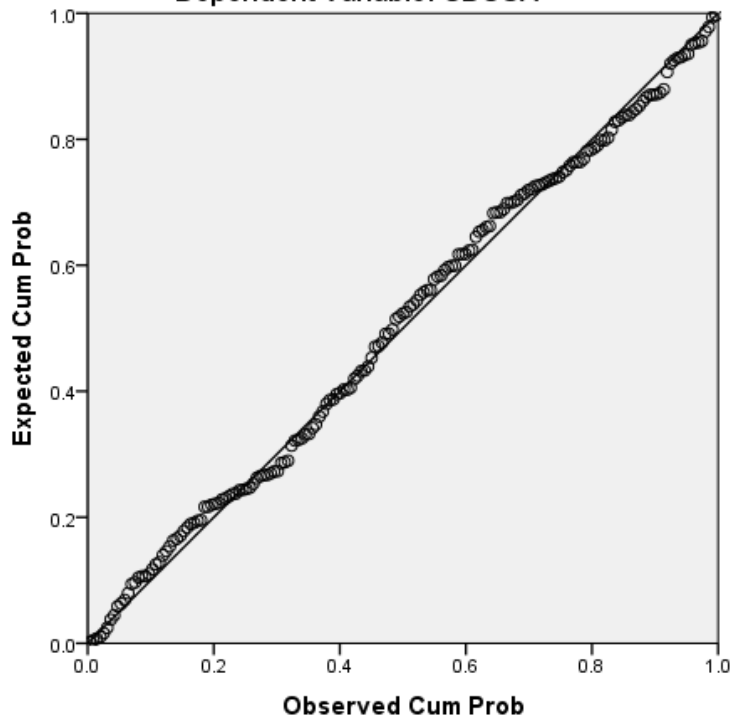
**Residuals Statistics<sup>a</sup>**

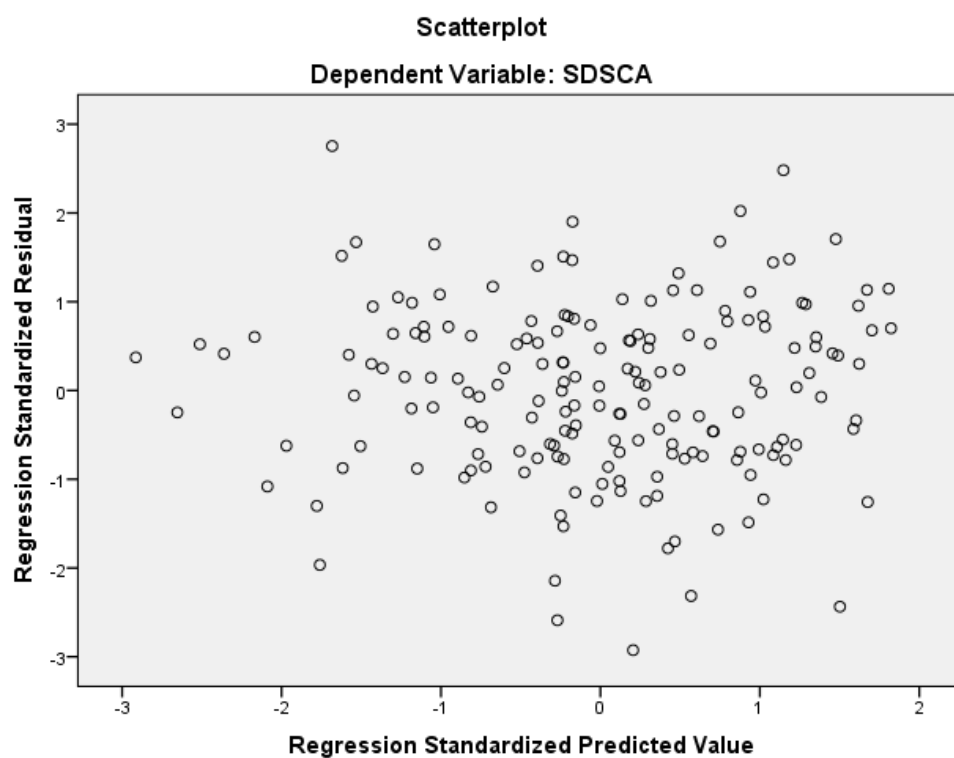
	N
Predicted Value	181
Std. Predicted Value	181
Standard Error of Predicted Value	181
Adjusted Predicted Value	181
Residual	181
Std. Residual	181
Stud. Residual	181
Deleted Residual	181
Stud. Deleted Residual	181
Mahal. Distance	181
Cook's Distance	181
Centered Leverage Value	181

a. Dependent Variable: SDSCA

**Normal P-P Plot of Regression Standardized Residual**

Dependent Variable: SDSCA





### F3c Multiple Regression Analysis on HbA1c

**Descriptive Statistics**

	Mean	Std. Deviation	N
GlycoHemoglobin	8.5646	1.95473	181
DSES	6.1077	1.83517	181
IHLC	25.2320	5.13066	181
PSI	103.0110	19.95188	181
LOTR	15.1713	4.07001	181
MDI	14.1934	10.39130	181
CAS	27.1326	17.20511	181
DDS	2.3494	.91382	181
MSPSS	4.9217	1.06546	181
HCCQ	4.9098	1.17582	181
DKT	7.7624	3.01918	181

		GlycoHemoglobin	DSES	IHLC	PSI
Pearson Correlation	GlycoHemoglobin	1.000	-.590	-.426	.462
	DSES	-.590	1.000	.535	-.516
	IHLC	-.426	.535	1.000	-.546
	PSI	.462	-.516	-.546	1.000
	LOTR	-.439	.474	.499	-.590
	MDI	.597	-.581	-.395	.476
	CAS	.579	-.621	-.436	.578
	DDS	.541	-.546	-.414	.475
	MSPSS	-.414	.466	.384	-.457
	HCCQ	-.148	.339	.195	-.267
	DKT	-.494	.638	.501	-.490
Sig. (1-tailed)	GlycoHemoglobin	.	.000	.000	.000
	DSES	.000	.	.000	.000
	IHLC	.000	.000	.	.000
	PSI	.000	.000	.000	.
	LOTR	.000	.000	.000	.000
	MDI	.000	.000	.000	.000
	CAS	.000	.000	.000	.000
	DDS	.000	.000	.000	.000
	MSPSS	.000	.000	.000	.000
	HCCQ	.023	.000	.004	.000
	DKT	.000	.000	.000	.000
N	GlycoHemoglobin	181	181	181	181
	DSES	181	181	181	181
	IHLC	181	181	181	181
	PSI	181	181	181	181
	LOTR	181	181	181	181
	MDI	181	181	181	181
	CAS	181	181	181	181
	DDS	181	181	181	181
	MSPSS	181	181	181	181
	HCCQ	181	181	181	181
	DKT	181	181	181	181



		LOTR	MDI	CAS	DDS	MSPSS
Pearson Correlation	GlycoHemoglobin	-.439	.597	.579	.541	-.414
	DSES	.474	-.581	-.621	-.546	.466
	IHLC	.499	-.395	-.436	-.414	.384
	PSI	-.590	.476	.578	.475	-.457
	LOTR	1.000	-.473	-.572	-.440	.492
	MDI	-.473	1.000	.717	.613	-.512
	CAS	-.572	.717	1.000	.628	-.473
	DDS	-.440	.613	.628	1.000	-.437
	MSPSS	.492	-.512	-.473	-.437	1.000
	HCCQ	.286	-.265	-.179	-.210	.323
	DKT	.378	-.549	-.584	-.525	.462
Sig. (1-tailed)	GlycoHemoglobin	.000	.000	.000	.000	.000
	DSES	.000	.000	.000	.000	.000
	IHLC	.000	.000	.000	.000	.000
	PSI	.000	.000	.000	.000	.000
	LOTR	.	.000	.000	.000	.000
	MDI	.000	.	.000	.000	.000
	CAS	.000	.000	.	.000	.000
	DDS	.000	.000	.000	.	.000
	MSPSS	.000	.000	.000	.000	.
	HCCQ	.000	.000	.008	.002	.000
	DKT	.000	.000	.000	.000	.000
N	GlycoHemoglobin	181	181	181	181	181
	DSES	181	181	181	181	181
	IHLC	181	181	181	181	181
	PSI	181	181	181	181	181
	LOTR	181	181	181	181	181
	MDI	181	181	181	181	181
	CAS	181	181	181	181	181
	DDS	181	181	181	181	181
	MSPSS	181	181	181	181	181
	HCCQ	181	181	181	181	181
	DKT	181	181	181	181	181

		HCCQ	DKT
Pearson Correlation	GlycoHemoglobin	-.148	-.494
	DSES	.339	.638
	IHLC	.195	.501
	PSI	-.267	-.490
	LOTR	.286	.378
	MDI	-.265	-.549
	CAS	-.179	-.584
	DDS	-.210	-.525
	MSPSS	.323	.462
	HCCQ	1.000	.145
	DKT	.145	1.000
Sig. (1-tailed)	GlycoHemoglobin	.023	.000
	DSES	.000	.000
	IHLC	.004	.000
	PSI	.000	.000
	LOTR	.000	.000
	MDI	.000	.000
	CAS	.008	.000
	DDS	.002	.000
	MSPSS	.000	.000
	HCCQ	.	.026
	DKT	.026	.
N	GlycoHemoglobin	181	181
	DSES	181	181
	IHLC	181	181
	PSI	181	181
	LOTR	181	181
	MDI	181	181
	CAS	181	181
	DDS	181	181
	MSPSS	181	181
	HCCQ	181	181
	DKT	181	181

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS <sup>b</sup>	.	Enter

a. Dependent Variable: GlycoHemoglobin

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.698 <sup>a</sup>	.488	.458	1.43968	1.807

a. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

b. Dependent Variable: GlycoHemoglobin

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	335.419	10	33.542	16.183	.000 <sup>b</sup>
	Residual	352.355	170	2.073		
	Total	687.774	180			

a. Dependent Variable: GlycoHemoglobin

b. Predictors: (Constant), DKT, HCCQ, LOTR, DDS, IHLC, MSPSS, PSI, MDI, DSES, CAS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.530	1.635		5.218	.000
	DSES	-.282	.091	-.265	-3.112	.002
	IHLC	-.019	.028	-.049	-.668	.505
	PSI	.005	.008	.055	.703	.483
	LOTR	-.024	.037	-.050	-.650	.516

MDI	.047	.016	.247	2.856	.005
CAS	.008	.011	.068	.711	.478
DDS	.294	.164	.137	1.793	.075
MSPSS	-.058	.130	-.032	-.446	.656
HCCQ	.162	.102	.098	1.590	.114
DKT	-.004	.052	-.007	-.086	.931

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	5.303	11.758			
	DSES	-.461	-.103	-.590	-.232	-.171
	IHLC	-.073	.036	-.426	-.051	-.037
	PSI	-.010	.021	.462	.054	.039
	LOTR	-.097	.049	-.439	-.050	-.036
	MDI	.014	.079	.597	.214	.157
	CAS	-.014	.029	.579	.054	.039
	DDS	-.030	.618	.541	.136	.098
	MSPSS	-.315	.199	-.414	-.034	-.025
	HCCQ	-.039	.364	-.148	.121	.087
	DKT	-.107	.098	-.494	-.007	-.005

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	DSES	.416	2.404
	IHLC	.567	1.764
	PSI	.491	2.035
	LOTR	.505	1.978
	MDI	.402	2.487
	CAS	.333	3.000
	DDS	.513	1.951
	MSPSS	.599	1.670
	HCCQ	.799	1.252
	DKT	.470	2.128

a. Dependent Variable: GlycoHemoglobin

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	DSES	IHLC	PSI
1	1	9.846	1.000	.00	.00	.00	.00
	2	.768	3.580	.00	.00	.00	.00
	3	.098	10.001	.00	.00	.00	.01
	4	.072	11.683	.00	.01	.00	.00
	5	.064	12.429	.00	.00	.00	.01
	6	.040	15.692	.00	.10	.04	.02
	7	.035	16.880	.01	.01	.01	.31
	8	.031	17.945	.00	.54	.08	.00
	9	.022	20.932	.00	.14	.02	.06
	10	.020	22.162	.00	.18	.70	.00
	11	.004	52.585	.99	.02	.15	.60

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions						
		LOTR	MDI	CAS	DDS	MSPSS	HCCQ	DKT
1	1	.00	.00	.00	.00	.00	.00	.00
	2	.00	.06	.03	.01	.00	.00	.01
	3	.00	.80	.25	.03	.00	.01	.03
	4	.06	.00	.31	.21	.00	.02	.30
	5	.04	.04	.08	.46	.01	.12	.19
	6	.27	.03	.13	.00	.02	.38	.00
	7	.00	.00	.09	.22	.03	.13	.06
	8	.00	.02	.03	.00	.14	.16	.24
	9	.14	.02	.00	.02	.72	.11	.10
	10	.36	.00	.08	.00	.01	.02	.04
	11	.12	.03	.00	.05	.08	.04	.03

a. Dependent Variable: GlycoHemoglobin

**Casewise Diagnostics<sup>a</sup>**

Case Number	Std. Residual	GlycoHemoglobin	Predicted Value	Residual
7	3.502	12.80	7.7579	5.04208
157	3.339	14.00	9.1927	4.80735

a. Dependent Variable: GlycoHemoglobin

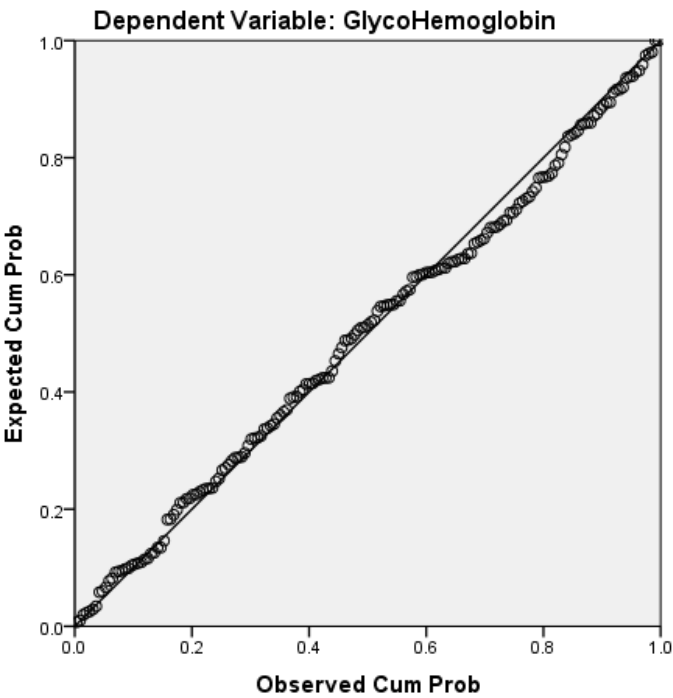
**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.0179	11.8303	8.5646	1.36508	181
Std. Predicted Value	-1.866	2.392	.000	1.000	181
Standard Error of Predicted Value	.176	.594	.345	.084	181
Adjusted Predicted Value	5.9868	11.8370	8.5679	1.36887	181
Residual	-3.53786	5.04208	.00000	1.39912	181
Std. Residual	-2.457	3.502	.000	.972	181
Stud. Residual	-2.519	3.545	-.001	1.005	181
Deleted Residual	-3.71856	5.21189	-.00323	1.49657	181
Stud. Deleted Residual	-2.560	3.673	.000	1.014	181
Mahal. Distance	1.699	29.671	9.945	5.440	181
Cook's Distance	.000	.092	.006	.012	181
Centered Leverage Value	.009	.165	.055	.030	181

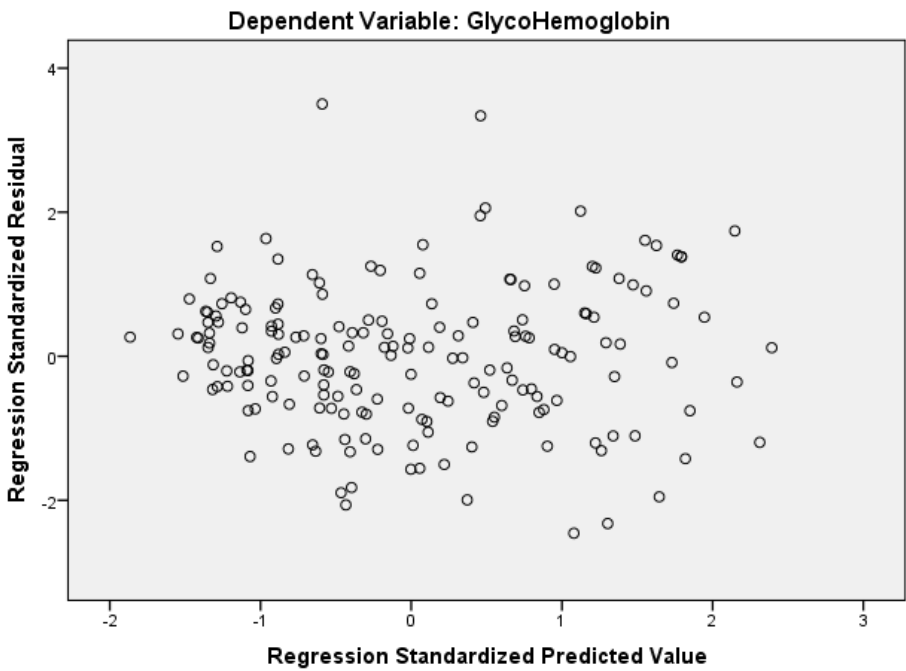
a. Dependent Variable: GlycoHemoglobin

Charts

Normal P-P Plot of Regression Standardized Residual



Scatterplot



**F4a Pearson's Correlation between in Self-Management and QoLS**

		<b>Correlations</b>			
		PDSMS	SDSCA	GlycoHemoglobi n	QoLS
PDSMS	Pearson Correlation	1	.433**	-.504**	.555**
	Sig. (2-tailed)		.000	.000	.000
	N	181	181	181	181
SDSCA	Pearson Correlation	.433**	1	-.372**	.483**
	Sig. (2-tailed)	.000		.000	.000
	N	181	181	181	181
GlycoHemoglobin	Pearson Correlation	-.504**	-.372**	1	-.465**
	Sig. (2-tailed)	.000	.000		.000
	N	181	181	181	181
QoLS	Pearson Correlation	.555**	.483**	-.465**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	181	181	181	181

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**F4b Multiple Regression Analysis on QoLS**

<b>Descriptive Statistics</b>			
	Mean	Std. Deviation	N
QoLS	76.9669	15.56809	181
GlycoHemoglobin	8.5646	1.95473	181
PDSMS	26.8066	5.25792	181
SDSCA	32.6243	11.08965	181



**Correlations**

		QoLS	GlycoHemoglobin	PDSMS
Pearson Correlation	QoLS	1.000	-.465	.555
	GlycoHemoglobin	-.465	1.000	-.504
	PDSMS	.555	-.504	1.000
	SDSCA	.483	-.372	.433
Sig. (1-tailed)	QoLS	.	.000	.000
	GlycoHemoglobin	.000	.	.000
	PDSMS	.000	.000	.
	SDSCA	.000	.000	.000
N	QoLS	181	181	181
	GlycoHemoglobin	181	181	181
	PDSMS	181	181	181
	SDSCA	181	181	181

		SDSCA
Pearson Correlation	QoLS	.483
	GlycoHemoglobin	-.372
	PDSMS	.433
	SDSCA	1.000
Sig. (1-tailed)	QoLS	.000
	GlycoHemoglobin	.000
	PDSMS	.000
	SDSCA	.
N	QoLS	181
	GlycoHemoglobin	181
	PDSMS	181
	SDSCA	181

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	SDSCA, GlycoHemoglobin, PDSMS <sup>b</sup>	.	Enter

a. Dependent Variable: QoLS

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639 <sup>a</sup>	.408	.398	12.07913

a. Predictors: (Constant), SDSCA, GlycoHemoglobin, PDSMS

b. Dependent Variable: QoLS

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F
1	Regression	17800.550	3	5933.517	40.667
	Residual	25825.251	177	145.905	
	Total	43625.801	180		

**ANOVA<sup>a</sup>**

Model		Sig.
1	Regression	.000 <sup>b</sup>
	Residual	
	Total	

a. Dependent Variable: QoLS

b. Predictors: (Constant), SDSCA, GlycoHemoglobin, PDSMS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	50.834	8.901		5.711
	GlycoHemoglobin	-1.543	.544	-.194	-2.837
	PDSMS	1.020	.208	.345	4.900
	SDSCA	.368	.092	.262	4.005

**Coefficients<sup>a</sup>**

Model		Sig.	95.0% Confidence Interval for B		Correlations
			Lower Bound	Upper Bound	Zero-order
1	(Constant)	.000	33.269	68.399	
	GlycoHemoglobin	.005	-2.616	-.470	-.465
	PDSMS	.000	.609	1.431	.555
	SDSCA	.000	.187	.549	.483

**Coefficients<sup>a</sup>**

Model		Correlations			
		Partial	Part	Tolerance	VIF
1	(Constant)				
	GlycoHemoglobin	-.209	-.164	.717	1.395
	PDSMS	.346	.283	.677	1.478
	SDSCA	.288	.232	.781	1.280

a. Dependent Variable: QoLS

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	GlycoHemoglobin
1	1	3.847	1.000	.00	.00
	2	.110	5.925	.00	.15
	3	.037	10.209	.01	.14
	4	.007	23.423	.99	.71

**Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Variance Proportions	
		PDSMS	SDSCA
1	1	.00	.01
	2	.01	.34
	3	.36	.63
	4	.63	.02

a. Dependent Variable: QoLS

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	53.1842	99.8863	76.9669	9.94444
Std. Predicted Value	-2.392	2.305	.000	1.000
Standard Error of Predicted Value	.930	3.446	1.722	.510
Adjusted Predicted Value	52.6168	100.7807	76.9837	9.94657

Residual	-31.03187	34.08358	.00000	11.97805
Std. Residual	-2.569	2.822	.000	.992
Stud. Residual	-2.596	2.864	-.001	1.004
Deleted Residual	-31.67534	35.11671	-.01689	12.28483
Stud. Deleted Residual	-2.639	2.925	.000	1.010
Mahal. Distance	.072	13.653	2.983	2.473
Cook's Distance	.000	.062	.006	.011
Centered Leverage Value	.000	.076	.017	.014

Residuals Statistics<sup>a</sup>

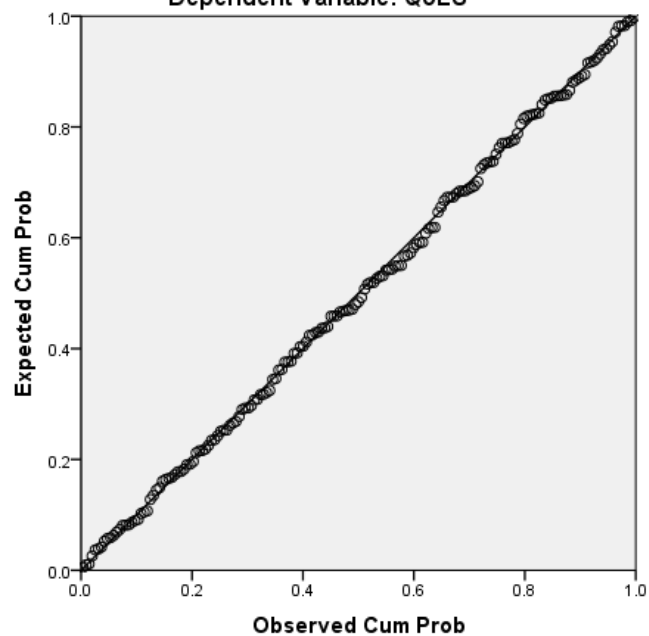
	N
Predicted Value	181
Std. Predicted Value	181
Standard Error of Predicted Value	181
Adjusted Predicted Value	181
Residual	181
Std. Residual	181
Stud. Residual	181
Deleted Residual	181
Stud. Deleted Residual	181
Mahal. Distance	181
Cook's Distance	181
Centered Leverage Value	181

a. Dependent Variable: QoLS

## Charts

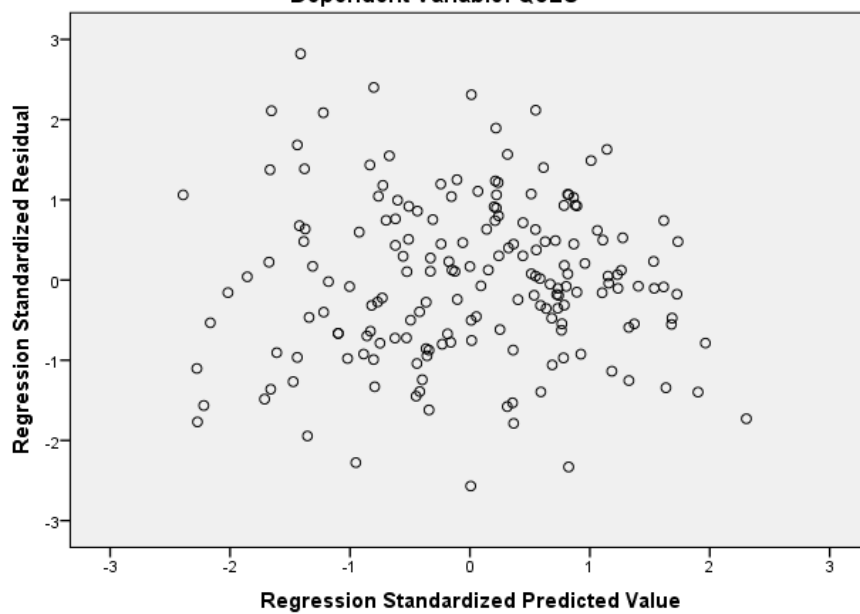
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: QoLS



Scatterplot

Dependent Variable: QoLS



**F5 Independent-samples t-test on Residential Area****T-Test****Group Statistics**

	Residential Coast	N	Mean	Std. Deviation
GlycoHemoglobin	West Coast	105	7.6629	1.57335
	East Coast	76	9.8105	1.73962

	Residential Coast	Std. Error Mean
GlycoHemoglobin	West Coast	.15354
	East Coast	.19955

**Independent Samples Test**

		Levene's Test for Equality of Variances	
		F	Sig.
GlycoHemoglobin	Equal variances assumed	3.623	.059
	Equal variances not assumed		

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
GlycoHemoglobin	Equal variances assumed	-8.669	179	.000
	Equal variances not assumed	-8.530	151.741	.000

		t-test for Equality of Means	
		Mean Difference	Std. Error Difference
GlycoHemoglobin	Equal variances assumed	-2.14767	.24775
	Equal variances not assumed	-2.14767	.25178

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
GlycoHemoglobin	Equal variances assumed	-2.63656	-1.65877
	Equal variances not assumed	-2.64512	-1.65021

**F6 One-Way ANOVA on Ethnic Groups****Oneway****Descriptives**

GlycoHemoglobin

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
					Lower Bound
Malay	82	9.5817	1.79403	.19812	9.1875
Chinese	68	7.5897	1.66358	.20174	7.1870
Indian	31	8.0129	1.66087	.29830	7.4037
Total	181	8.5646	1.95473	.14529	8.2779

GlycoHemoglobin

	95% Confidence Interval for Mean	Minimum	Maximum
	Upper Bound		
Malay	9.9759	6.10	14.00
Chinese	7.9924	5.10	13.00
Indian	8.6221	5.00	14.00
Total	8.8513	5.00	14.00

**Test of Homogeneity of Variances**

GlycoHemoglobin

Levene Statistic	df1	df2	Sig.
1.912	2	178	.151

**ANOVA**

GlycoHemoglobin

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	158.894	2	79.447	26.739	.000
Within Groups	528.880	178	2.971		
Total	687.774	180			

**Robust Tests of Equality of Means**

GlycoHemoglobin

	Statistic <sup>a</sup>	df1	df2	Sig.
Welch	26.210	2	83.855	.000
Brown-Forsythe	27.518	2	129.727	.000

a. Asymptotically F distributed.

**Post Hoc Tests****Multiple Comparisons**

Dependent Variable: GlycoHemoglobin

Tukey HSD

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
					Lower Bound
Malay	Chinese	1.99200 <sup>*</sup>	.28272	.000	1.3238
	Indian	1.56880 <sup>*</sup>	.36343	.000	.7098
Chinese	Malay	-1.99200 <sup>*</sup>	.28272	.000	-2.6602
	Indian	-.42320	.37355	.495	-1.3061
Indian	Malay	-1.56880 <sup>*</sup>	.36343	.000	-2.4278
	Chinese	.42320	.37355	.495	-.4597

**Multiple Comparisons**

Dependent Variable: GlycoHemoglobin

Tukey HSD

(I) Ethnicity	(J) Ethnicity	95% Confidence Interval
		Upper Bound
Malay	Chinese	2.6602
	Indian	2.4278
Chinese	Malay	-1.3238
	Indian	.4597
Indian	Malay	-.7098
	Chinese	1.3061

\*. The mean difference is significant at the 0.05 level.



## Homogeneous Subsets

### GlycoHemoglobin

Tukey HSD<sup>a,b</sup>

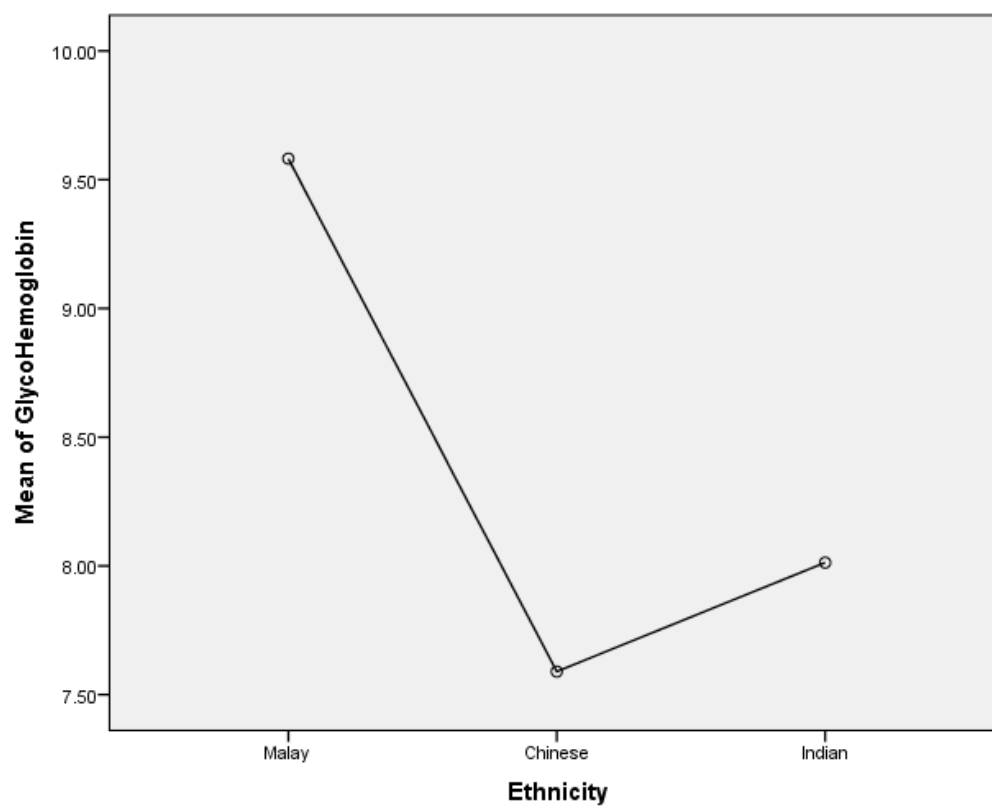
Ethnicity	N	Subset for alpha = 0.05	
		1	2
Chinese	68	7.5897	
Indian	31	8.0129	
Malay	82		9.5817
Sig.		.433	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 50.711.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

## Means Plots



### F7 Additional Analyses

#### F7a Pearson's chi-square test on Residential Area and Education Levels

##### Residential Coast \* Education

Crosstab

			Education	
			Primary School	Secondary School
Residential Coast	West Coast	Count	17	43
		% within Residential Coast	16.2%	41.0%
		% within Education	44.7%	58.9%
		% of Total	9.4%	23.8%
	East Coast	Count	21	30
		% within Residential Coast	27.6%	39.5%
		% within Education	55.3%	41.1%
		% of Total	11.6%	16.6%
Total	Count	38	73	
	% within Residential Coast	21.0%	40.3%	
	% within Education	100.0%	100.0%	
	% of Total	21.0%	40.3%	

			Education	
			Form 6/Pre-U/Diploma	Degree & higher
Residential Coast	West Coast	Count	19	23
		% within Residential Coast	18.1%	21.9%
		% within Education	67.9%	85.2%
		% of Total	10.5%	12.7%
	East Coast	Count	9	4
		% within Residential Coast	11.8%	5.3%
		% within Education	32.1%	14.8%
		% of Total	5.0%	2.2%
Total	Count	28	27	
	% within Residential Coast	15.5%	14.9%	
	% within Education	100.0%	100.0%	
	% of Total	15.5%	14.9%	

**Crosstab**

			Education	Total
			No Formal Education	
Residential Coast	West Coast	Count	3	105
		% within Residential Coast	2.9%	100.0%
		% within Education	20.0%	58.0%
		% of Total	1.7%	58.0%
	East Coast	Count	12	76
		% within Residential Coast	15.8%	100.0%
		% within Education	80.0%	42.0%
		% of Total	6.6%	42.0%
Total	Count		15	181
	% within Residential Coast		8.3%	100.0%
	% within Education		100.0%	100.0%
	% of Total		8.3%	100.0%

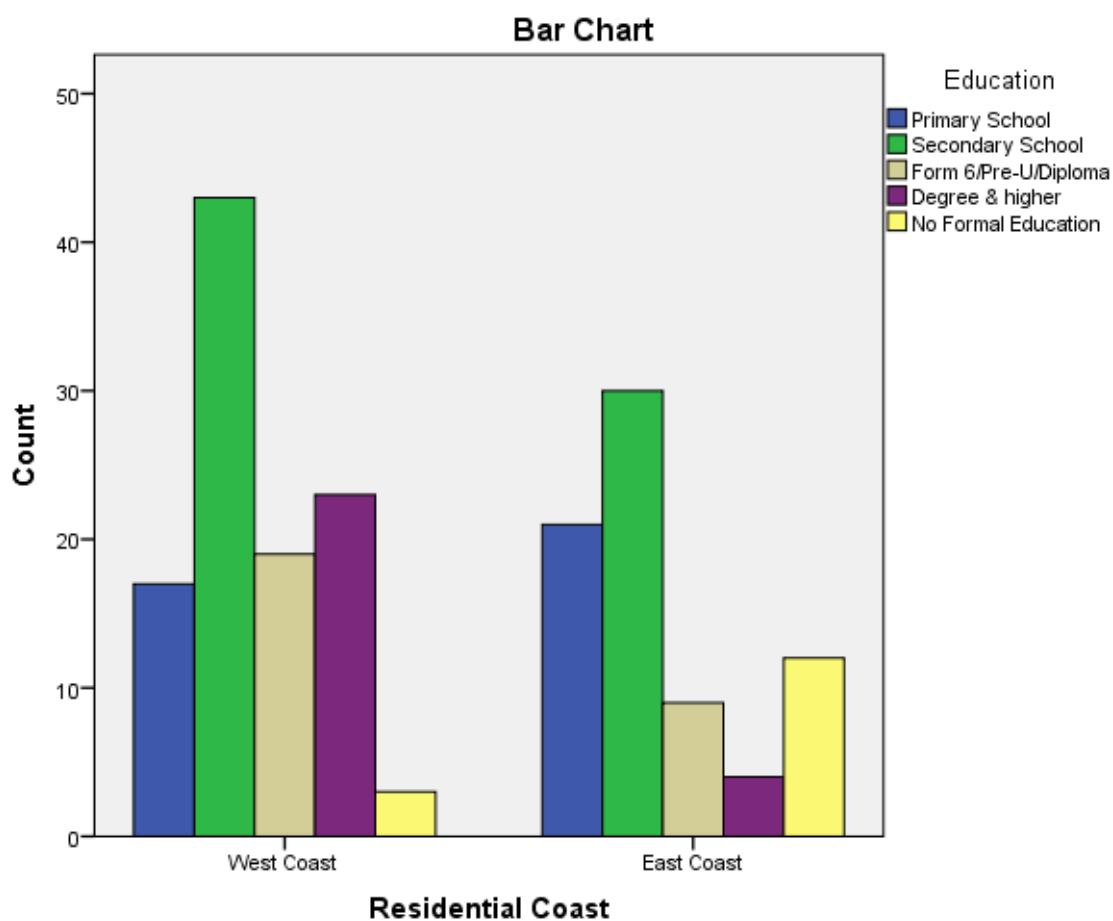
**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.970 <sup>a</sup>	4	.000
Likelihood Ratio	22.295	4	.000
Linear-by-Linear Association	.444	1	.505
N of Valid Cases	181		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.30.

**Symmetric Measures**

		Value	Approx. Sig.
Nominal by Nominal	Phi	.340	.000
	Cramer's V	.340	.000
N of Valid Cases		181	



## Crosstabs

**Case Processing Summary**

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Residential Coast * Smoker/NonSmoker	181	100.0%	0	0.0%	181	100.0%
Residential Coast * Education	181	100.0%	0	0.0%	181	100.0%

**F7b Pearson's chi-square test on Residential Area and Smoking Status****Residential Coast \* Smoker/NonSmoker****Crosstab**

			Smoker/NonSmoker		Total
			No	Yes	
Residential Coast	West Coast	Count	93	12	105
		% within Residential Coast	88.6%	11.4%	100.0%
		% within Smoker/NonSmoker	65.0%	31.6%	58.0%
		% of Total	51.4%	6.6%	58.0%
	East Coast	Count	50	26	76
		% within Residential Coast	65.8%	34.2%	100.0%
		% within Smoker/NonSmoker	35.0%	68.4%	42.0%
		% of Total	27.6%	14.4%	42.0%
	Total	Count	143	38	181
		% within Residential Coast	79.0%	21.0%	100.0%
		% within Smoker/NonSmoker	100.0%	100.0%	100.0%
		% of Total	79.0%	21.0%	100.0%

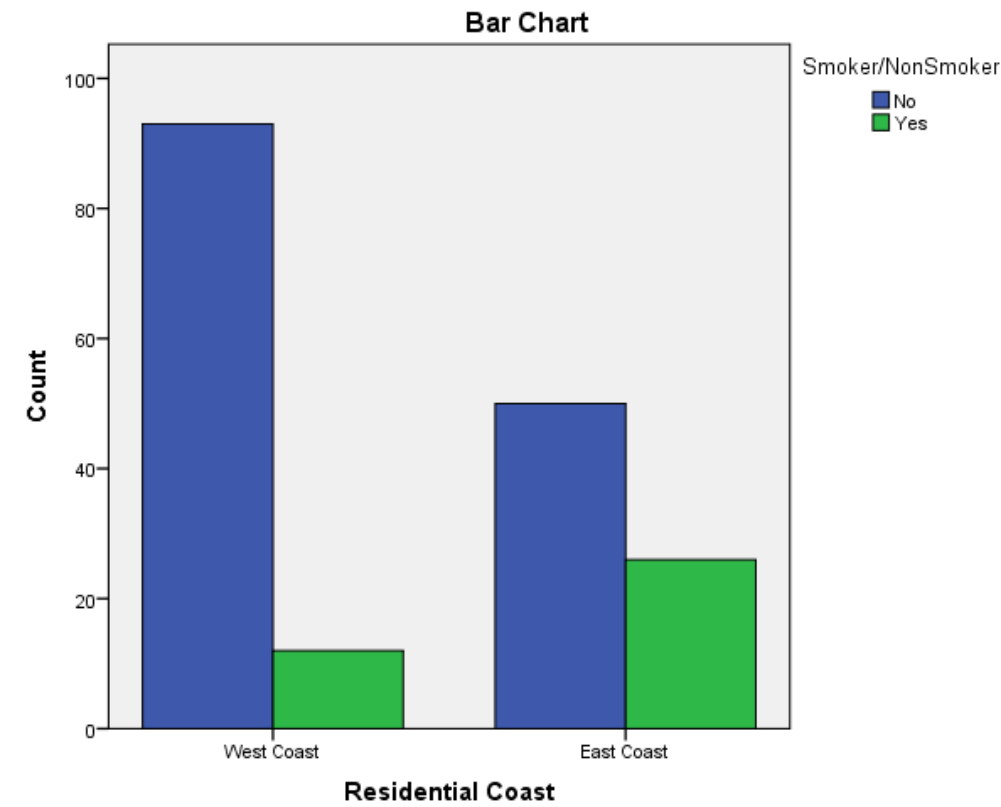
**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13.796 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	12.456	1	.000		
Likelihood Ratio	13.747	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	13.719	1	.000		
N of Valid Cases	181				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.96.

b. Computed only for a 2x2 table

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.276	.000
	Cramer's V	.276	.000
N of Valid Cases		181	



**F7c Independent-samples t-test on Residential Area and SDSCA**

Group Statistics					
	Residential Coast	N	Mean	Std. Deviation	Std. Error Mean
Diet	West Coast	105	4.5024	1.13854	.11111
	East Coast	76	3.6908	1.13275	.12993
Exercise	West Coast	105	3.1381	1.93835	.18916
	East Coast	76	2.6908	1.99327	.22864
Glucose Test	West Coast	105	2.3952	2.18462	.21320
	East Coast	76	2.6447	2.09414	.24021
Foot Care	West Coast	105	2.6905	2.09553	.20450
	East Coast	76	2.3289	2.12376	.24361

Independent Samples Test					
		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Diet	Equal variances assumed	.724	.396	4.743	179
	Equal variances not assumed			4.747	162.231
Exercise	Equal variances assumed	.013	.908	1.514	179
	Equal variances not assumed			1.507	159.066
Glucose Test	Equal variances assumed	.036	.850	-.772	179
	Equal variances not assumed			-.777	165.595
Foot Care	Equal variances assumed	.125	.724	1.139	179
	Equal variances not assumed			1.137	160.478

**Independent Samples Test**

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Diet	Equal variances assumed	.000	.81159	.17110
	Equal variances not assumed	.000	.81159	.17096
Exercise	Equal variances assumed	.132	.44731	.29542
	Equal variances not assumed	.134	.44731	.29675
Glucose Test	Equal variances assumed	.441	-.24950	.32337
	Equal variances not assumed	.438	-.24950	.32118
Foot Care	Equal variances assumed	.256	.36153	.31738
	Equal variances not assumed	.257	.36153	.31807

**Independent Samples Test**

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
Diet	Equal variances assumed	.47395	1.14923
	Equal variances not assumed	.47399	1.14919
Exercise	Equal variances assumed	-.13564	1.03025
	Equal variances not assumed	-.13877	1.03338
Glucose Test	Equal variances assumed	-.88762	.38862
	Equal variances not assumed	-.88363	.38464
Foot Care	Equal variances assumed	-.26477	.98783
	Equal variances not assumed	-.26661	.98967



**F7d Kruskal-Wallis test on Ethnic Groups vs Psychosocial Predictors****Kruskal-Wallis Test**

Ranks			
	Ethnicity	N	Mean Rank
DSES	Malay	82	70.05
	Chinese	68	107.79
	Indian	31	109.60
	Total	181	
PSI	Malay	82	101.34
	Chinese	68	81.07
	Indian	31	85.44
	Total	181	
LOTR	Malay	82	83.01
	Chinese	68	95.98
	Indian	31	101.23
	Total	181	
MDI	Malay	82	113.91
	Chinese	68	70.99
	Indian	31	74.27
	Total	181	
CAS	Malay	82	115.19
	Chinese	68	70.83
	Indian	31	71.26
	Total	181	
DDS	Malay	82	114.84
	Chinese	68	66.35
	Indian	31	82.02
	Total	181	

**Test Statistics<sup>a,b</sup>**

	DSES	PSI	LOTR	MDI	CAS	DDS
Chi-Square	24.014	5.992	3.727	28.818	31.980	32.959
df	2	2	2	2	2	2
Asymp. Sig.	.000	.050	.155	.000	.000	.000

- a. Kruskal Wallis Test
- b. Grouping Variable: Ethnicity

## NPar Tests

Notes		
Output Created		18-NOV-2015 15:23:11
Comments		
Input	Data	C:\Users\ccyap\Dropbox\Diabetes Analysis [20March13]\THESIS DATA N181 8 Feb 2015.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	181
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
Syntax		NPAR TESTS /M-W= DSES PSI MDI CAS DDS BY A4(1 2) /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01
	Number of Cases Allowed <sup>a</sup>	71493

- a. Based on availability of workspace memory.

## Mann-Whitney Test

Ranks				
	Ethnicity	N	Mean Rank	Sum of Ranks
DSES	Malay	82	61.44	5038.00
	Chinese	68	92.46	6287.00
	Total	150		
PSI	Malay	82	83.40	6839.00
	Chinese	68	65.97	4486.00
	Total	150		
MDI	Malay	82	91.57	7508.50
	Chinese	68	56.13	3816.50
	Total	150		
CAS	Malay	82	92.01	7545.00
	Chinese	68	55.59	3780.00
	Total	150		
DDS	Malay	82	93.47	7664.50
	Chinese	68	53.83	3660.50
	Total	150		

Test Statistics <sup>a</sup>					
	DSES	PSI	MDI	CAS	DDS
Mann-Whitney U	1635.000	2140.000	1470.500	1434.000	1314.500
Wilcoxon W	5038.000	4486.000	3816.500	3780.000	3660.500
Z	-4.354	-2.447	-4.979	-5.113	-5.566
Asymp. Sig. (2-tailed)	.000	.014	.000	.000	.000

a. Grouping Variable: Ethnicity

**NPar Tests****Mann-Whitney Test**

Ranks				
	Ethnicity	N	Mean Rank	Sum of Ranks
DSES	Malay	82	50.11	4109.00
	Indian	31	75.23	2332.00
	Total	113		
PSI	Malay	82	59.44	4874.00
	Indian	31	50.55	1567.00
	Total	113		
MDI	Malay	82	63.85	5235.50
	Indian	31	38.89	1205.50
	Total	113		
CAS	Malay	82	64.68	5303.50
	Indian	31	36.69	1137.50
	Total	113		
DDS	Malay	82	62.87	5155.00
	Indian	31	41.48	1286.00
	Total	113		

Test Statistics <sup>a</sup>					
	DSES	PSI	MDI	CAS	DDS
Mann-Whitney U	706.000	1071.000	709.500	641.500	790.000
Wilcoxon W	4109.000	1567.000	1205.500	1137.500	1286.000
Z	-3.637	-1.288	-3.616	-4.053	-3.097
Asymp. Sig. (2-tailed)	.000	.198	.000	.000	.002

a. Grouping Variable: Ethnicity

## Mann-Whitney Test

Ranks				
	Ethnicity	N	Mean Rank	Sum of Ranks
DSES	Chinese	68	49.83	3388.50
	Indian	31	50.37	1561.50
	Total	99		
PSI	Chinese	68	49.60	3372.50
	Indian	31	50.89	1577.50
	Total	99		
MDI	Chinese	68	49.37	3357.00
	Indian	31	51.39	1593.00
	Total	99		
CAS	Chinese	68	49.74	3382.50
	Indian	31	50.56	1567.50
	Total	99		
DDS	Chinese	68	47.02	3197.50
	Indian	31	56.53	1752.50
	Total	99		

Test Statistics <sup>a</sup>					
	DSES	PSI	MDI	CAS	DDS
Mann-Whitney U	1042.500	1026.500	1011.000	1036.500	851.500
Wilcoxon W	3388.500	3372.500	3357.000	3382.500	3197.500
Z	-.087	-.208	-.325	-.132	-1.529
Asymp. Sig. (2-tailed)	.931	.836	.745	.895	.126

a. Grouping Variable: Ethnicity

**Case Processing Summary**

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
DSES * Ethnicity	181	100.0%	0	0.0%	181	100.0%
PSI * Ethnicity	181	100.0%	0	0.0%	181	100.0%
MDI * Ethnicity	181	100.0%	0	0.0%	181	100.0%
CAS * Ethnicity	181	100.0%	0	0.0%	181	100.0%
DDS * Ethnicity	181	100.0%	0	0.0%	181	100.0%

**Report**

Ethnicity		DSES	PSI	MDI	CAS	DDS
Malay	N	82	82	82	82	82
	Median	5.3750	110.5000	19.0000	39.5000	2.7353
Chinese	N	68	68	68	68	68
	Median	6.8750	99.0000	8.0000	16.5000	1.8235
Indian	N	31	31	31	31	31
	Median	6.7500	100.0000	9.0000	16.0000	2.1176
Total	N	181	181	181	181	181
	Median	6.2500	103.0000	11.0000	23.0000	2.2353

**F7e One-Way ANOVA on Ethnic Groups vs SDSCA****Oneway**

Descriptives						
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
						Lower Bound
Diet	Malay	82	3.8506	1.08998	.12037	3.6111
	Chinese	68	4.4301	1.30645	.15843	4.1139
	Indian	31	4.3952	1.07969	.19392	3.9991
	Total	181	4.1616	1.20205	.08935	3.9853
Exercise	Malay	82	2.7683	2.01720	.22276	2.3251
	Chinese	68	3.0956	2.02274	.24529	2.6060
	Indian	31	3.1129	1.72100	.30910	2.4816
	Total	181	2.9503	1.96858	.14632	2.6615
Glucose Test	Malay	82	2.9451	2.19709	.24263	2.4624
	Chinese	68	2.1691	2.20686	.26762	1.6349
	Indian	31	2.0484	1.63989	.29453	1.4469
	Total	181	2.5000	2.14476	.15942	2.1854
Foot Care	Malay	82	2.7378	2.25835	.24939	2.2416
	Chinese	68	2.1176	1.89090	.22931	1.6600
	Indian	31	2.9355	2.06455	.37080	2.1782
	Total	181	2.5387	2.10915	.15677	2.2293

Descriptives				
		95% Confidence Interval for Mean	Minimum	Maximum
		Upper Bound		
Diet	Malay	4.0901	.50	6.25
	Chinese	4.7464	.50	7.00
	Indian	4.7912	2.50	6.75
	Total	4.3379	.50	7.00
Exercise	Malay	3.2115	.00	7.00
	Chinese	3.5852	.00	6.50
	Indian	3.7442	.00	6.00
	Total	3.2390	.00	7.00
Glucose Test	Malay	3.4279	.00	7.00
	Chinese	2.7033	.00	7.00
	Indian	2.6499	.00	7.00
	Total	2.8146	.00	7.00
Foot Care	Malay	3.2340	.00	7.00
	Chinese	2.5753	.00	7.00
	Indian	3.6928	.00	7.00
	Total	2.8480	.00	7.00

#### Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Diet	1.939	2	178	.147
Exercise	1.234	2	178	.294
Glucose Test	3.645	2	178	.028
Foot Care	1.267	2	178	.284



**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Diet	Between Groups	14.526	2	7.263	5.265	.006
	Within Groups	245.560	178	1.380		
	Total	260.086	180			
Exercise	Between Groups	4.971	2	2.486	.639	.529
	Within Groups	692.581	178	3.891		
	Total	697.552	180			
Glucose Test	Between Groups	30.014	2	15.007	3.348	.037
	Within Groups	797.986	178	4.483		
	Total	828.000	180			
Foot Care	Between Groups	20.187	2	10.093	2.302	.103
	Within Groups	780.543	178	4.385		
	Total	800.729	180			

**Robust Tests of Equality of Means**

		Statistic <sup>a</sup>	df1	df2	Sig.
Diet	Welch	5.380	2	83.500	.006
	Brown-Forsythe	5.417	2	134.978	.005
Exercise	Welch	.641	2	87.351	.529
	Brown-Forsythe	.687	2	145.642	.505
Glucose Test	Welch	3.537	2	92.375	.033
	Brown-Forsythe	3.795	2	160.571	.025
Foot Care	Welch	2.513	2	82.921	.087
	Brown-Forsythe	2.360	2	124.793	.099

a. Asymptotically F distributed.

## Post Hoc Tests

### Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.
Diet	Malay	Chinese	-.57954*	.19264	.008
		Indian	-.54455	.24764	.074
	Chinese	Malay	.57954*	.19264	.008
		Indian	.03499	.25454	.990
	Indian	Malay	.54455	.24764	.074
		Chinese	-.03499	.25454	.990
Exercise	Malay	Chinese	-.32730	.32353	.570
		Indian	-.34461	.41589	.686
	Chinese	Malay	.32730	.32353	.570
		Indian	-.01731	.42747	.999
	Indian	Malay	.34461	.41589	.686
		Chinese	.01731	.42747	.999
Glucose Test	Malay	Chinese	.77600	.34727	.068
		Indian	.89673	.44642	.113
	Chinese	Malay	-.77600	.34727	.068
		Indian	.12073	.45885	.963
	Indian	Malay	-.89673	.44642	.113
		Chinese	-.12073	.45885	.963
Foot Care	Malay	Chinese	.62016	.34346	.171
		Indian	-.19768	.44151	.895
	Chinese	Malay	-.62016	.34346	.171
		Indian	-.81784	.45381	.172
	Indian	Malay	.19768	.44151	.895
		Chinese	.81784	.45381	.172

**Multiple Comparisons**

Tukey HSD

Dependent Variable	(I) Ethnicity	(J) Ethnicity	95% Confidence Interval	
			Lower Bound	Upper Bound
Diet	Malay	Chinese	-1.0348	-.1242
		Indian	-1.1298	.0407
	Chinese	Malay	.1242	1.0348
		Indian	-.5666	.6366
	Indian	Malay	-.0407	1.1298
		Chinese	-.6366	.5666
Exercise	Malay	Chinese	-1.0919	.4374
		Indian	-1.3276	.6383
	Chinese	Malay	-.4374	1.0919
		Indian	-1.0276	.9930
	Indian	Malay	-.6383	1.3276
		Chinese	-.9930	1.0276
Glucose Test	Malay	Chinese	-.0448	1.5968
		Indian	-.1584	1.9518
	Chinese	Malay	-1.5968	.0448
		Indian	-.9638	1.2052
	Indian	Malay	-1.9518	.1584
		Chinese	-1.2052	.9638
Foot Care	Malay	Chinese	-.1916	1.4319
		Indian	-1.2412	.8458
	Chinese	Malay	-1.4319	.1916
		Indian	-1.8904	.2547
	Indian	Malay	-.8458	1.2412
		Chinese	-.2547	1.8904

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

### Diet

Tukey HSD<sup>a,b</sup>

Ethnicity	N	Subset for alpha = 0.05	
		1	2
Malay	82	3.8506	
Indian	31	4.3952	4.3952
Chinese	68		4.4301
Sig.		.054	.988

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 50.711.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

### Exercise

Tukey HSD<sup>a,b</sup>

Ethnicity	N	Subset for alpha = 0.05
		1
Malay	82	2.7683
Chinese	68	3.0956
Indian	31	3.1129
Sig.		.654

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 50.711.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

**Glucose Test**Tukey HSD<sup>a,b</sup>

Ethnicity	N	Subset for alpha = 0.05
		1
Indian	31	2.0484
Chinese	68	2.1691
Malay	82	2.9451
Sig.		.086

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 50.711.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

**Foot Care**Tukey HSD<sup>a,b</sup>

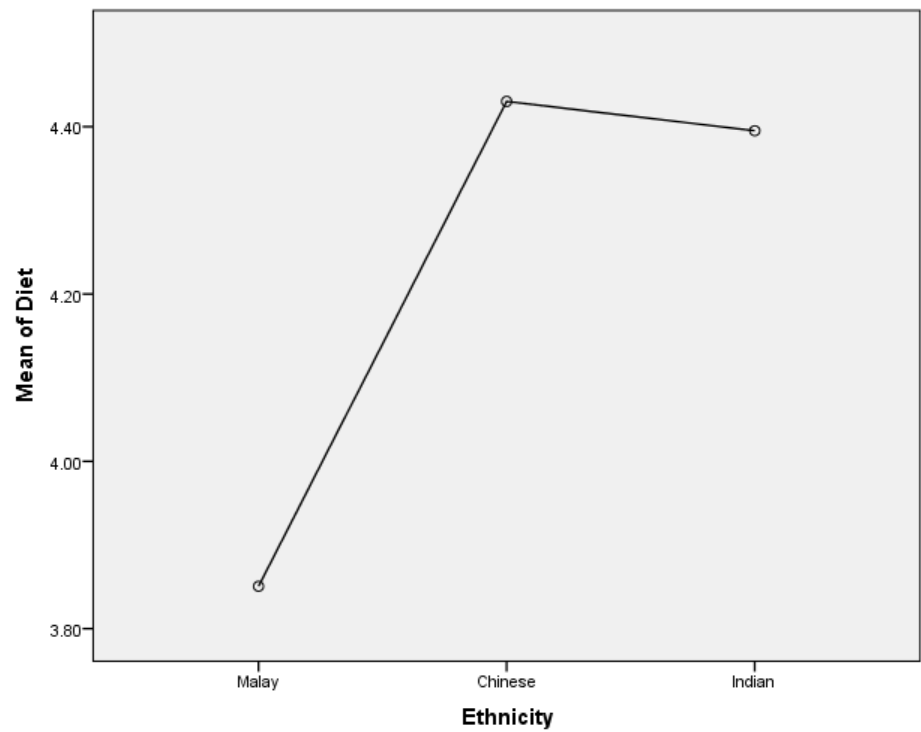
Ethnicity	N	Subset for alpha = 0.05
		1
Chinese	68	2.1176
Malay	82	2.7378
Indian	31	2.9355
Sig.		.124

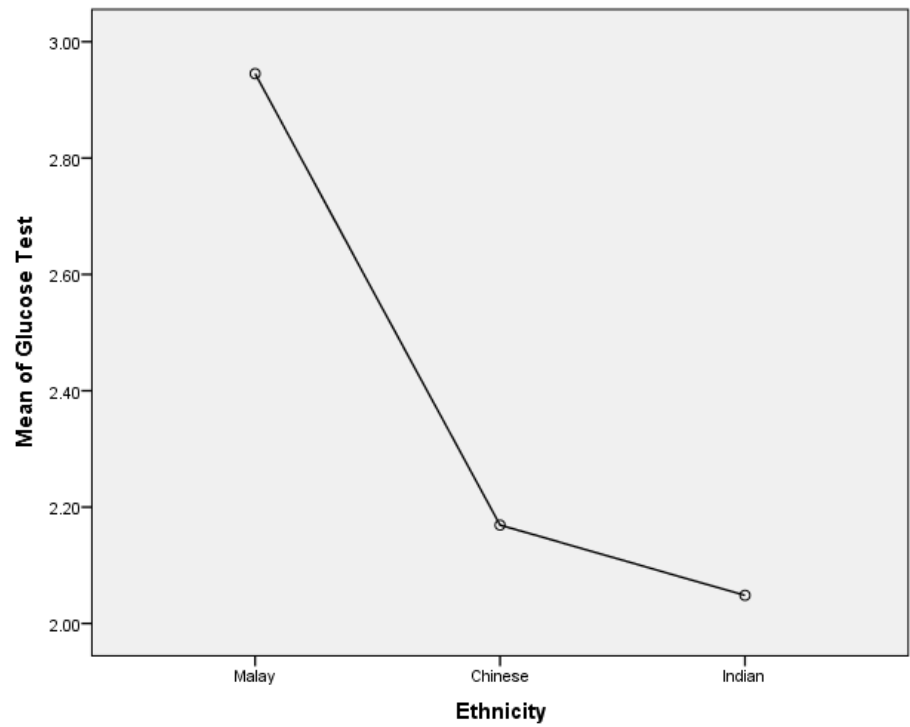
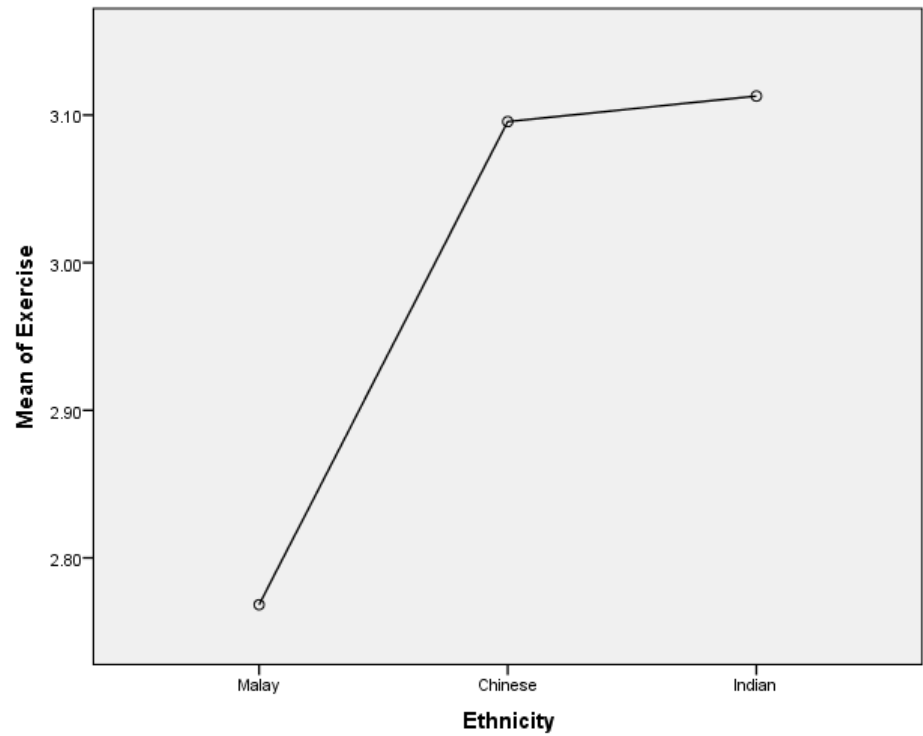
Means for groups in homogeneous subsets are displayed.

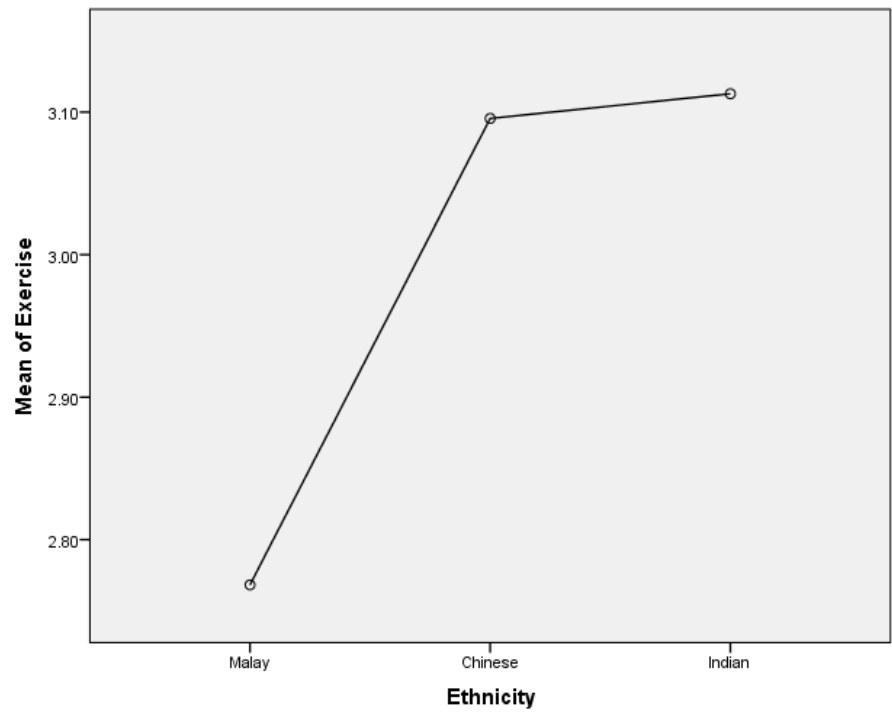
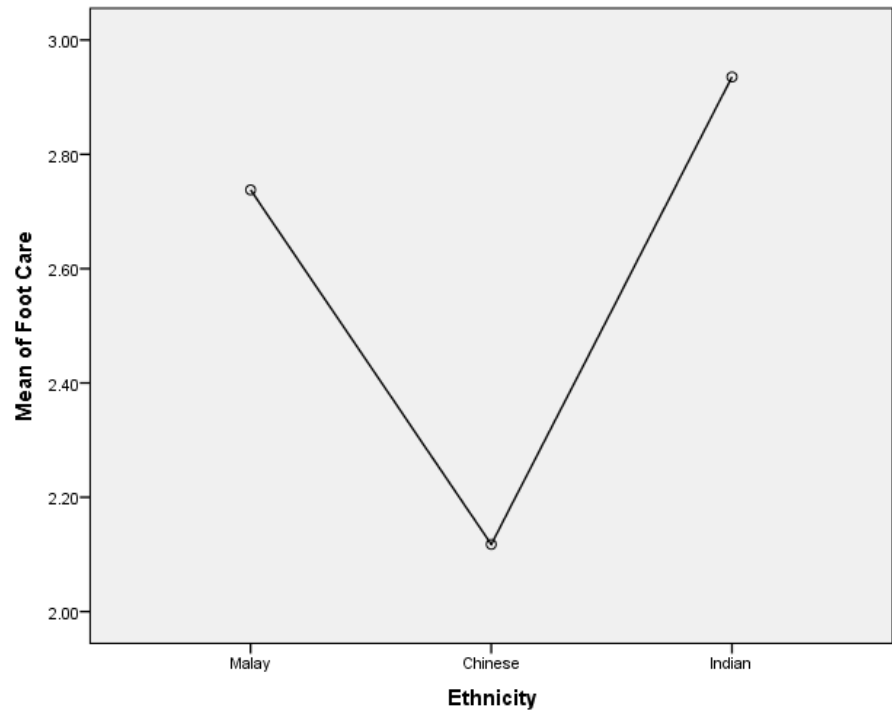
a. Uses Harmonic Mean Sample Size = 50.711.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

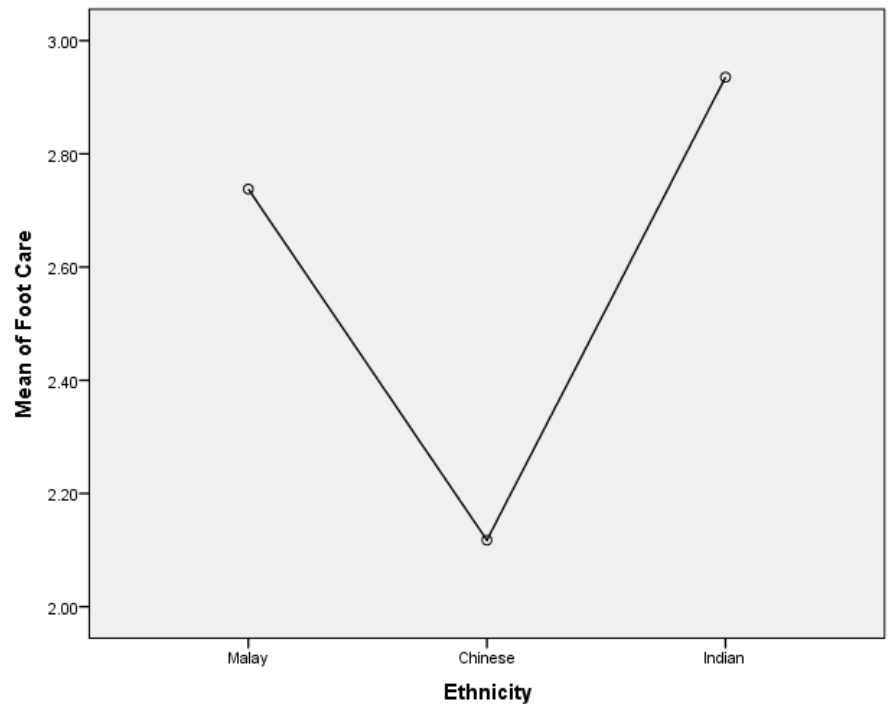
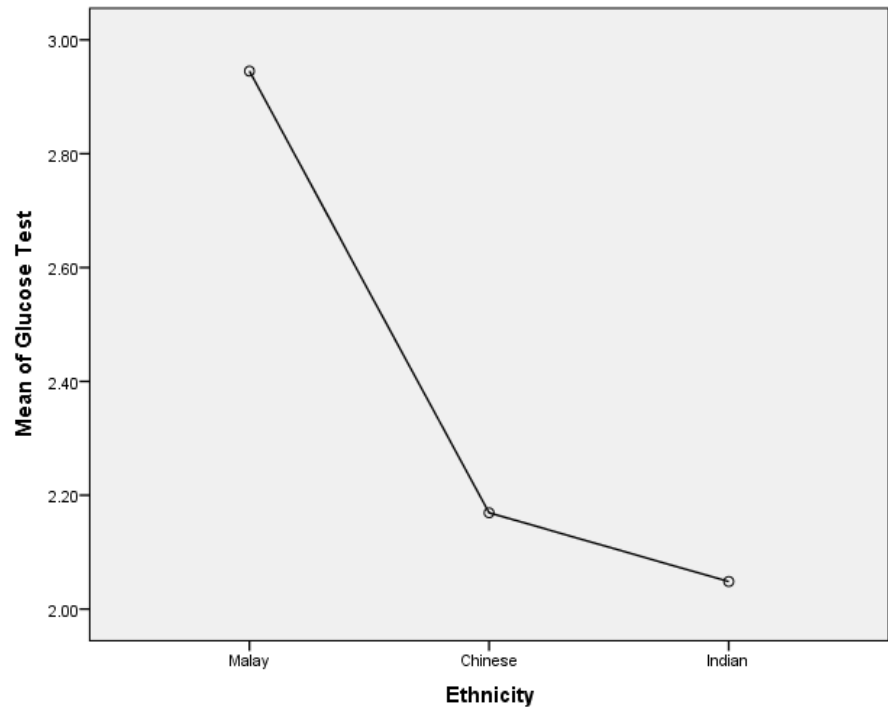
Means Plots











## APPENDIX G

## G1 Engagement Interview Log Sheet

Questions	Notes
How did you find out that you have diabetes?	
In your experience, what is the most important factor that motivates you to monitor your diabetes condition?	
Having to live with diabetes, how do you see yourself different from your friends who don't have diabetes?	
What is typically a good day to you in managing your health?	
What is typically a bad day to you in managing your health?	
Other relevant info	

### Master Interview Log

**Opening statement:** Thank you for taking the time to work on the survey. Now, I would like to ask you a few questions just in case there is some important information which was not covered in the survey.

1. How did you find out that you have diabetes?
2. In your experience, what is the most important factor that motivates you to monitor your diabetes condition?
3. Having to live with diabetes, how do you see yourself different from your friends who don't have diabetes?
4. What is typically a good day to you in managing your health?
5. What is typically a bad day to you in managing your health?

## G2 Compilation of Engagement Interviews

Subj no	Q1	Q2	Q3	Q4	Q5	Other Info.
1/012	I passed out at work place and was sent to hospital. The doctor then told me I have diabetes.		The choice of food, especially during social hang-outs, there are a lot of food that I can't eat. I feel left out sometimes, watching them enjoying the food which I can't eat. I feel less and less interested to hang out with my gang.		When my friends do not seem to understand my feelings. Sometimes they made intimidating remarks when seeing me eating food that contains sugar or carbohydrate. Those remarks such as "You will die faster", "you will lose your arms or legs if you don't keep to your diet" ruin my mood and de-motivate me. But I know they said these for my own good.	
2/020	During my annual body check exercise, metre reading by my doctor	I wanted to live active lifestyle for longer period of time. Monitoring my reading help constantly remind me u not OK!	So far no difference from others, except constantly aware of diet(food).	After done my gym(exercise), I felt good for 2 days.	no gym for a week, physically and psychologically not feeling good	Listen to your HEART; too much exercise n too little food won't work together. Constantly monitor your reading can help balance these
3/037				Measuring my blood glucose according to the nurse's instructions, once before meal, once 2 hours after meal. 6 times a day...everyday. I follow the instruction very well. I have them all recorded in the booklet.		Must know and be familiar with your blood sugar responses every day; before and after meal, morning, afternoon, and at night...so that you are well aware of your condition and do the right thing to care for it.
4/043		I want to live in this world as long and I can, to ensure that I must control my sugar level as advice by the experts.				

5/058	I like to eat desserts. My family has the history, so, I read up about diabetes, listen to friends' sharing, paid attention to its symptoms. One day, I realized I had some of the diabetes symptoms such as frequent thirst and hunger, get tired easily...and I went for a check.	Fear, fear of other diabetes-related complication. One of my relatives had her toes amputated due to diabetes, another one has kidney problem. I don't want to get those problems. So I try my best to control my diet by eating healthily and in moderation. Besides, be positive and happy as day goes by. I think a happy heart is important.	Not much difference except I have a fixed schedule when it comes to food, drink, and medication. When I need to eat, I eat. I don't delay it. Of course when I am out socializing, I will remind myself to choose my food wisely. Oh, I sweat a lot, I am sweaty all day long, need to change clothes from time to time.	A good day to me means I manage to follow my regimen closely, and stay positive.	I am not sure what a bad day is for me because I don't really have one.	Must take the prescriptive medicine, don't simply skip or stop it. Don't miss doctor's appointment, have the fear for complication...occasionally try out alternative methods to control blood sugar level.
6/059	Before I have diabetes, I ate unhealthily. I had goreng pisang and coke every day. One day, I found my skin at the lower abdomen itchy. Initially I tried to use my own methods to sooth the itchy feeling but they didn't work out. Though it's embarrassing, I went to see a doctor for a check. Doctor told me I have diabetes, my fasting blood glucose was between 22 -25, so, I was given oral medication. Two months after that, I was found to have high blood pressure. Until 3 years ago, I started insulin.	Get support. I ganged up with some friends who are also diabetics, 5 of us to exercise together, 3 times a week.	Not much except for the diet. I eat less than them, go for sugar-free beverages, I got a nickname "Siti Fatimah Kosong" from them.	My good day is usually weekdays. I can have more control over my diet and time for exercise on weekdays.	Weekends, especially Sunday. I tend to overeat over the weekend.	Watch your diet and do exercise are the must.
7/060	That time, I was 33 years old, I had difficulty urinate, so I went to see a doctor. After the doctor checked on me, he said I have diabetes. I was given medication immediately. ... I started insulin about 4-5 years ago.	I think the motivation is to avoid my diabetes getting more and more severe because I don't want to end up having kidney failure or leg amputation.	No difference from my friends. Initially, when I was newly diagnosed, I practiced stricter diet. But now, no. ... My meals are just usual normal kind of food. Just that I cut down a bit on sugary drinks and I eat brown rice instead of white rice... No, I don't need to change my eating habit too much. I have medicine and insulin to control my diabetes... Moreover, I enjoy good food and those social outings with my buddies. Sometimes we drive all the way to Klang just to eat <i>bak kut teh</i> , it was fun.	My good day is my working days. I work as a security at a factory. Every night I will have to walk my rounds. So, I consider that as my daily exercise.		

8/061	That year I was 40 years old and had fibroid. During all the examinations before the fibroid surgery, my doctor found that I had high blood sugar level. Then I when through several diabetes tests to confirm that.	My bigger motivator is my responsible for my family. I am still young, I need to stay healthy to look after my family, my children. So I must take care of my health.	Not much difference except being more watchful and careful for what I eat.		
9/062	I was diagnosed for having diabetes about 15 years ago, during my regular health check. Initially I was given medicine and 3 years ago, I started my insulin.	A bit of friend support. My special motivation is to follow my medication schedule closely, don't miss medicine and insulin so that I can eat like a normal person.	I feel like a normal person, not much difference than a person without diabetes...don't feel like a diabetic...have faith in God	Adhere to my medication schedule.	I don't have bad day, every day is good for me.
10/073	I was 60 that year, which is 2 years ago...I lost weight drastically, from 62 kg to 55 kg, thirsty and tired all the time. I complained to my daughter and she brought me for a check and found out I have diabetes.	I am not sure what is my motivator. All I know is to embed the diabetes care into my daily routine, make it part of my routine, like taking my medicine, be careful with what I eat, and remain physically active in house chores.	Practice healthy eating, manage to avoid risky food, and no sugary drinks.	Overeat especially during festive seasons like Chinese New Year, wedding dinners...inactive, going to bed feeling guilty.	Remain physically active, must sweat, don't remain inactive.
11/074	I went for a medical checkup for the purpose of further study and realized I have diabetes. I was advised to monitor my health by lifestyle modification in the 1 <sup>st</sup> 5 years. Later, I was given medicine.	I am afraid of the complication, amputation. I am still young and I wanna live longer and enjoy my life.	Besides being more careful with what I eat, the rest in the same like normal people.	Live life as usual, free of complications, practice good diet and stay happy.	If my fasting blood glucose is higher than 9, Check blood glucose once a week.
12/080	I used to have sweet tooth, I loved sweet taste, used to like to add both sugar and condensed milk to my coffee. That was a period of time that I was troubled by fainting spell, and weight loss for no reason. I thought that they were caused by my hypertension problem but after seeing the doctor, I was told that I have diabetes.	I am afraid of my toes or legs being chopped off. So I work very hard to change my liking for sweet, control my choice of food and make it my habit. Now I don't like to eat sweet stuff as much as I used to.	Not much different. In fact, as I remain more physically active, I feel more energetic and less frequent to feel tired.	Eat healthily and stay physically active such as engaging in activities and do more house chores.	no Control diet is the most important thing.
13/081	I was experiencing some diabetes-related symptoms such as thirst, fatigue, and most disturbing of all, itchy skin all over my body. After doctor's examination and blood test, he told me that I have diabetes.	To avoid the itch sensation. It is unbearable.	Choose my food carefully, reduce the portion, and slow down in body movements.		

14/085	I usually don't arrange for annual body check. That was a time when my lower private part was itchy. The itch was unbearable that I have to go for a check. After the check, the doctor told me that I have diabetes.	I am afraid to get into the kind of life that I have to take insulin injection on daily basis...afraid of kidney problem, and afraid of amputation.	I get tired easily...I feel that I am physically less fit than them.	The day I adhered to the diabetes regimen, stick to my proper diet, move around more till I sweat...body not feeling stiff.	Rainy day where I couldn't have my regular morning walk, and at times when I overate.	Less rice, less meat.
15/089	My family has a history of diabetes and high blood pressure, so I make a point to go for health examination every year. I came to know my diabetes through the annual body health check.	In the past, I was busy making a living and raising my children. And now as I finally have the time for myself, I want myself to be able to enjoy it. Of course without good health, it's impossible. Yea, it's time for me to enjoy life after all these years of hard work.	Not much difference, actually. All my friends who wish to enjoy good health would have to lead a healthy lifestyle whether they have diabetes or not.	Typical good day for me is that I manage to exercise for an hour either in the morning or in the evening, and eat healthily for all 3 meals.	Typical bad day for me is I get too tied up with my errands or bad weather that I couldn't go out of the house to exercise...and worse, end the day with heavy dinner. I try my best not to let it happen too often.	Reset your priority. Change to a good lifestyle. If you value your health, you got to really rearrange your priority of using your time. Daily or weekly goals must be set to do something that will benefit your health. You will see the results after sometime.
16/090	I found out that I have diabetes many years ago. I felt tired for no reason, so I went to one of my ex-student whom have become a doctor for a check. My blood glucose was very high, 13 something and he recommended me to go to the hospital to double-check. And the result confirmed that I have diabetes. Initially doctor recommended that I watch me diet...no medication. But went on diet didn't work for me. So I was put on medication since then.	My motivation to maintain my health? Oh, I want to live happily and healthily. I can't afford to be weak because I am single. I take care of myself.		Eat properly, don't get carried away with good food, especially those contain much sugar in it. I also resort in alternative methods such as lemon juice and herbs. Many ways to keep my blood glucose normal.	I don't really have a bad day because I know how to control my blood sugar level.	Avoid sweet stuff (food), and get enough sleep.
17/092	...for 2 weeks already, I felt tired for no reason...very sleepy in the day, at work, but couldn't sleep well in the night. So, I went to see the doctor and found out the tiredness was cause by diabetes.	My motivation ...to exercise comes from my son. Every Saturday he will accompany me to play badminton. It's fun to have him playing badminton with me.	Most of the time, same. Normal...just that I get tired easier as compared to them.	Manage to choose the right food to eat, especially for dinner, less or no rice. Play badminton and do Yoga for 20 minutes every morning.	...sometimes lazy to play badminton...	Most importantly is to be careful of what you eat and do exercise.

18/115	<p>It was about 5 years ago, I was admitted to the hospital because I had difficulty breathing...due to flu, and later the doctor said it's pneumonia. The breathing problem was so severe that I almost went into a coma...and actually, I fainted in the hospital. According to the doctor, after I regained consciousness, he injected a medicine with steroid to ease my breathing problem. But the side-effect of the injection is it triggered my diabetes.</p>	<p>I want to live as healthy as possible. I have this diabetes not by choice, I should not be punished with poor health or diabetes complications. Ya, there is this old couple whom have lived with diabetes for many years without getting other diabetes-related complications. They are very health conscious and manage their diabetes very well. I basically look up to them, learning or following their ways to manage my health.</p>	<p>Not much different from my other friends except I need to be more aware of my blood sugar level from time to time, don't overeat nor get too hungry. I find time to exercise, make a point that I eat a lot of veggies and some fruits every day. It's basically a healthy lifestyle that everybody should follow.</p>	<p>Eating healthily like have more veggies, less fat or oily food, drink beverage with less or without adding sugar, eat my meds, keeping my blood sugar in check, and exercise for at least 30 min.</p>	<p>too busy with work, have late and heavy dinner, and no time for exercise.</p>	<p>maintain a healthy lifestyle.... watch what you eat and regular exercise.</p>
19/140	<p>First of all, the diabetes runs in my family history. So, I kind of look out for its symptoms. ...I was admitted to the hospital to treat my cellulite problems, and I went through all kind of tests and later found that I have diabetes.</p>	<p>Having a family history of diabetes makes me more aware of getting it. My fear to get admitted to hospital is my motivation of self-care, basically.</p>	<p>Not really have big differences except choosing my food more carefully during celebrations. Oh, I feel physically weaker than my other friends who don't have diabetes.</p>	<p>If my fasting blood glucose is 6 and lower, it's considered a good day to me.</p>	<p>Typically bad day for me would be blood sugar shows 8 or higher, feel tired easily and heavy head.</p>	
20/161	<p>My doctor said I have unattended diabetes. How did I find out that I have diabetes? My story is sometime last year, I tripped and fell on my left arm. I broke my thumb and my arm was dislocated. I needed to go for a surgery to fix it. Before the surgery, the doctor asked me whether I have diabetes and I said I don't know. So, he did several blood tests and informed me that I have diabetes.</p>	<p>...to be able to enjoy life. I love my life and I am happy with my life. I want to enjoy life as long as I can.</p>	<p>Oh, the biggest difference is I have to cut down on sugar, which means no more afternoon tea with colleagues. I also eat my dinner earlier nowadays, which means less social dinners with friends... as you know social dinners usually start around 7:30 pm and last for 1-2 hours, with lots of good food. And, I have to say 'no' to after meal desserts. Usually they eat I watch. Oh, the doctor even asks me to go easy on certain kind of fruits which contain too much glucose. And for weekends, I have to get up early to join my neighbors for morning walk and exercise...and less driving around to hunt for good food.</p>	<p>I call my good day as "good patient day" as in I eat healthy food like having oatmeal for breakfast, more veggies, less rice, less meat, and less oil for lunch and dinner, in the appropriate portion, drink the tank or coffee without adding sugar, no extra bits or junk food ... and I manage to walk more at work instead of sitting there for hours just to do work. Then, have my dinner before 7 pm.</p>	<p>My bad day means I do/eat things that I shouldn't have, such as having late and heavy dinner, finish the whole serving of dessert all by myself, and feeling lazy to exercise. But I try my best to keep these bad days as few as possible.</p>	<p>Manage your sugar level consistently. Change your unhealthy lifestyle to a healthy one step-by-step. Keep the glucose level steady, don't let it fluctuate too much.</p>

21/175	I came to know that I have diabetes through my annual health check.	My motivation comes from knowing my roles, a role as a father, husband, boss, etc ... they are many people under my care and responsibility. So, I must take good care of myself, and my health. And also, I wanna stay away from taking diabetes medicine.	The difference is not really that obvious. In my age, many of my friends or business associates are suffering from some kind of chronic illness, be it high blood pressure, high cholesterol, high urine acid or diabetes. We all have to be more careful in choosing our food and engage in physical exercise regularly.	A good care day for me is manage to eat healthily and do some exercise, be it gym or play some golf with friends.	Bad day is when I have too many celebrations or business dinners to attend; and, they take away my time for exercise.	I suggest, manage your diabetes condition while you still can and don't let it get worse. The best way is to do your best to change to a healthier lifestyle, learn up how to estimate the calories in your food and drink, make exercise part of your daily or weekly routine, and check your blood glucose regularly.
22/199	It was sometime last year that I wasn't feeling very well, I felt very tired after driving for about 10 minutes even without doing any rigorous exercise, my neck was stiff and I felt giddy...the symptoms endured for days. So I went for a check at Hospital KL. After checking my blood pressure, I was referred to do an ECG test immediately. Then after that, a heart specialist informed me that I needed to be admitted to the hospital for a few days for them to monitor my blood pressure and heart condition. During that 5-day stay in the hospital, I went through several other tests. The repeated blood glucose tests showed that I have diabetes.	It should be my fear for serious complications. I am still very young, I have a lot of plans in life and I want to reach out to them. I want to be able to lead a healthy and functional life.	Compare to my peers who have no health problems, I am less active and energetic. I get tired and experience shortness of breath easily. My feet swell easily even after a short walk. When going out with my friends, I cannot feast on the food as much as I wish...I have to choose my food carefully to avoid food that is high in calorie and fat. To be safe for meat, I stick to chicken breasts and some fish all the time.	Good day for me is when I manage to normalize my blood glucose and reduce my blood pressure, both readings are good in the glucometer and blood pressure machines, ...days that I feel fresh and have the energy to do my work.	Bad day is when I didn't sleep well, wake up feeling tired, don't have the energy or mood to go to work.	I think the most important thing for effective self-care is to have a discipline lifestyle; be consistent, that includes diet, exercise, get enough sleep and stick to the timetable consistently.



**G3 Demographics****Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	22	33.00	68.00	54.9545	9.96889
Valid N (listwise)	22				

**Gender**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	7	31.8	31.8	31.8
Female	15	68.2	68.2	100.0
Total	22	100.0	100.0	

**Ethnicity**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Malay	3	13.6	13.6	13.6
Chinese	15	68.2	68.2	81.8
Indian	4	18.2	18.2	100.0
Total	22	100.0	100.0	

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Length of Diabetes (month total)	22	9	300	117.05	92.865
Valid N (listwise)	22				

## APPENDIX H

### Papers Arising from Present Research

Yap, C.C., Tam, C.L., Saravanan, M. & Kadirvelu, A. (2015). Personal attributions, emotion managements, social supports, and diabetes knowledge in diabetes self-care adherence. *International Journal of Collaborative Research on Internal Medicine & Public Health*, 7(6), 104-119. [ORIGINAL RESEARCH]

#### **Personal attributions, emotion managements, social supports, and diabetes knowledge in diabetes self-care adherence.**

##### **Abstract**

**Introduction:** The Malaysian diabetic population is growing larger and faster. The growth has already exceeded the estimation made by the World Health Organisation (WHO). It causes huge financial burden to the Malaysian healthcare system. Further, the overall glycaemic control is ranked as suboptimal indicating that diabetes is not well-controlled in Malaysia as well as challenging the effectiveness of its existing diabetes self-management education.

**Aim & Objectives:** Obtaining a deeper understanding of patients' attitudes towards diabetes management would help in improving the effectiveness of the existing diabetes education and management. Based on Self-Determination Theory, this study explored the participants' psychosocial aspects by examining the strength of each predictor in their self-care activities.

**Methods:** This was a cross-sectional study. Eleven scales were used in this survey (which included emotion management, personal attributions, social supports and diabetes knowledge). Purposive sampling was adopted among 187 adults living with Type 2 diabetes in Peninsula Malaysia through various healthcare entities.

**Results:** Pearson's correlation analysis showed significant association between the 10 variables and diabetes self-care adherence; multiple regression analysis indicated that self-efficacy, anxiety, and optimism were the useful predictors, accounting to 13.9% unique contribution to the variance of self-care index. Besides, diabetes knowledge and social supports were not predictive of self-care activities.

**Conclusion:** These findings highlighted the role of competency-based self-care mastery training and mental health elements in the diabetes education and management could achieve desired adherence to physician's advice and better management of the disease. Desired adherence can be achieved without good level of diabetes knowledge and social supports amongst adult diabetics.

**Keywords:** Self-care adherence, personal attributions, emotion managements, social supports, diabetes knowledge, type 2 diabetes, Peninsula Malaysia

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**Psychosocial variables influencing diabetes self-management and quality of life:  
A pilot study.**

**ABSTRACT:** Diabetes leads to severe complications if early and proper management is absent. In Malaysia, the diabetes population is expanding and it potentially exhausts healthcare systems. Thus, understanding this population in terms of their attitudes toward the disease management is essential in order to strengthen the effectiveness of the existing diabetes education. Rooting itself in Self-Determination Theory, this research sets forth to explore the psychosocial aspects in disease management and quality of life in the population. Study 1 identifies the strength of each predictor in diabetes self-management; Study 2 examines the relationship between self-perceived management and actual adherence; and, Study 3 investigates the quality of life living with diabetes. There were 32 Malaysian adults with Type 2 diabetes volunteered their participation in this pilot study; via purposive sampling at a medical centre and acquaintances. Thirteen scales relevant to attributions, emotion management, social support, diabetes knowledge, and life quality were administered. The preliminary analyses revealed that locus of control, depressed feelings, social supports, and diabetes knowledge show the significance in predicting diabetes self-management; no significant relationship was found between the participants' self-perceived management and actual adherence; and, no relationship was found between the level of adherence and quality of life.