UNIVERSITI PUTRA MALAYSIA

SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH DIABETIC KNOWLEDGE AND ATTITUDE AMONG OLDER PERSONS IN SELANGOR

GROUP 12

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EXECUTIVE SUMMARY

This research was conducted to determine the level of diabetic knowledge and attitude among older persons in Selangor, the sociodemographic characteristics of the respondents, the association between knowledge and sociodemographic factors, the association between knowledge and attitude towards diabetes mellitus, association between attitude and sociodemographic factors.

Diabetes is one of the main non communicable diseases in Malaysia. It doesn't only occur for older people, but it can be diagnosed in younger people as well. If it is not treated properly, it can result in other complications related to macrovascular and microvascular. Research studies also show diabetes mellitus patients show an increasing trend every year worldwide. In Particular, elderly show the highest prevalence.

A cross sectional study was conducted among Malaysian elderly aged 60 years and above that resided in Selangor for more than 6 months. Secondary data which was collected by an online questionnaire consists of three sections which are sociodemographic factors, knowledge on diabetes mellitus and attitude towards diabetes mellitus.

A total of 177 older persons in Selangor have took part in the study. There was a significant association between the sociodemographic factors of marital status, religion, and monthly income with diabetic knowledge among the older persons in Selangor. However, there was no significant association between the sociodemographic factors of age, gender, race, current employment status and level of education with diabetic knowledge among the older persons in Selangor. As for attitude towards diabetes, it was shown that there is significant association between the sociodemographic factors of race, religion, current employment status and monthly income with attitude towards diabetes among older persons in Selangor. There was no significant association between the sociodemographic factors of age, gender, marital status and educational level with attitude towards diabetes among older persons in Selangor. On the other hand, there was a significant association between diabetic knowledge and attitude towards diabetes among older persons in Selangor.

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CHAPTER 1: INTRODUCTION

1.1 Background of study

Diabetes is one of the four main non communicable diseases that cause mortality and morbidity in Malaysia. Diabetes occurs when the pancreas does not produce enough insulin or when the body cannot utilize the insulin it produces. (*Diabetes*, n.d.). Hence, it will cause hyperglycemia, or raise blood sugar. Uncontrolled hyperglycemia has been shown to be closely related to macro and microvascular complications such as renal failure, stroke and cardiovascular diseases.

Based on Country Report Malaysia, older persons are people who are in the age of 60 years and above. Being old or ageing is inevitable. The United Nations defined an ageing society when the population aged 65 and more to achieve 7% of the total population. It is predicted that the number of elderlies in Malaysia will constitute more than 15% of the population in 2030 (*Malaysia: Aging Population 2020 | Statista*, n.d.). The factors that contribute to this condition are the decline in fertility rate which relatively decreases in the number of young people and a low mortality rate among the adult population. As people age, it is bound to happen that there will be an increase in chronic illness and disorder. For example, type 2 diabetes mellitus which is a common chronic disease in the elderly. Furthermore, diabetes will use high resources for both family resources and government healthcare resources.

The National Health and Morbidity Survey of 2019 by the Ministry of Health Malaysia surveyed for non0communicable disease (NCD) with 14,965 respondents. It was estimated that 3.9 million (18.3%) of the adult population had raised blood sugar. Diabetes trends have two categories which were people who did not know they had diabetes and people who had been diagnosed with diabetes. For people who did not know they had diabetes showed prevalence from 7.2% to 8.3% and 9.4%. While, for people who had been diagnosed with diabetes shows prevalence of 4.0% to 5.1% and 8.9%. Both of these data were from 2011 to 2015 and 2019. In addition, an overall rising trend in prevalence by age groups was observed, from 5.9% in the age group of 19-29 years, to 11.7% in the 30-39 years, to 20.8% in 40-49 years age group, to 30.8% for participants in the 50-59 years age group. Lastly, to achieve a peak of 41.5% in the elderly group which is 60 years and above. (*(No Title)*, n.d.)

Family history, environmental factors, presence of damaging antibodies are risk factors for type diabetes. However, researchers can't fully understand why some people get type 2 diabetes and some don't. But the risk factors include obesity, lack of physical activity, family history, gestational diabetes, hypertension and high cholesterol. (*Symptoms and Causes - Mayo Clinic*, n.d.)

This study aimed to determine the sociodemographic associated with diabetes knowledge and attitude among older persons in Selangor. The association between the factors was assessed. In addition, the result from this study would help to provide further information on older diabetics' patients. This study might be useful for the Ministry of Health Malaysia (MOH) to provide adequate care to the older population.

1.2 Problem statement

1.2.1 Increasing prevalence of diabetes mellitus among older persons

According to the National Health and Morbidity Survey (NHMS) by National Institutes of Health (NIH) in 2019, there was an increase of diabetic patients from 13.4% in 2015 to 18.3% in 2019. Among the diabetic patients in 2019, 41.5% were elderly patients. (*(No Title)*, n.d.)

The number of patients diagnosed with diabetes mellitus in the population grow rapidly nowadays. Diabetes mellitus is one of the proportion of people over 65 years of age that continues to rise in the most substantial demographic transition of diabetics worldwide. They also stated that the incidence of diabetes was expected to be 4.4% in 2030 among all ages worldwide. (Wild et al., 2004)

1.2.2 Poor knowledge and attitude on diabetes among older persons

Increment in the prevalence of diabetes mellitus among older persons was strongly related with poor knowledge and attitude. Alsous Id et al. (2019) state that in order to encourage healthy lifestyle practices and frequent health checks, more educational initiatives were required, particularly in certain subgroups of patients, such as those who do not have a medical related field degree and are not first-degree relatives of diabetes mellitus. Poor knowledge and attitude was influenced by level of education

as stated that the degree of education (university or higher) and field-related education were predictors of good knowledge and positive attitude. (Alsous Id et al., 2019)

Poor diabetic knowledge and attitude among elderly can be seen in few studies. First by Borba et al. (2019) that mentioned that the general knowledge assessment found that 77.7% (95% CI 71.4, 83.3) of the diabetic elderly had inadequate knowledge of their condition and care, with a median of 5.5 points (IQR 4.0;7.5). In addition, a study carried by Gillani et al. (2018) showed that in relation to six of the things, individuals in older age groups displayed substantially lower awareness relative to individuals in younger age groups. For instance, a slightly lower proportion (39%) of older participants (65 years or older) indicated that they recognized that diabetes can be avoided by daily physical activity compared to those less than 35 years of age (60%), p,0.001.

1.2.3 Impact of poor knowledge and attitude on diabetes

As can be seen, one of the causes of the prevalence increase in diabetes was poor diabetic knowledge and attitude. The underlying impacts that contribute to this situation is poor diabetic knowledge that causes interruption in the development of skills in managing selfcare in diabetes. (Borba et al., 2019) Consequently, it will worsen the condition of diabetes due to bad attitude and practice. Low diabetic knowledge and attitude, making the patient become less aware of the complication of diabetes. Based on the study by Borba et al. (2019), they stated that the diabetic elderly people with low education were thirteen times more likely than older adults with more than eight years of research to have a negative attitude toward the disease.

It is very important to overcome this issue as it can affect the quality of life of the elders. The relation between the quality of life and the level of diabetes awareness was investigated. The P-value was 0.02 and there had been a strong correlation between a good level of diabetes awareness and a healthy climate. (Elazhary et al., 2018) On the CES-D self-rating scale, they showed signs of depression more often (21.3 percent vs 12.7 percent, $P < .001$). Thus, the quality of life was lower for older diabetics than for other people of the same generation. (Bourdel-Marchasson et al., 1997)

1.2.4 Factors associated with diabetic knowledge and attitude

Adequate knowledge and good attitude play a major role in reducing the prevalence of diabetes. There are few factors that were associated with diabetic knowledge and attitude. Balla (2014) stated that diabetes status, being male, age above 30 years, and high levels of education, smoking, and family history of diabetes were the factors that contributed to awareness about diabetes. In their sample, smokers were found to have 66% more than non-smokers with sufficient information about diabetes mellitus, which may be attributed to the proportion of smokers in the study population. They agreed with other research reagrding sex and education, where age and positive family history of diabetes were determinants of knowledge and poor knowledge among women and low levels of education were found. Asmamaw (2015) said that good knowledge was correlated significantly with the respondents' family history of diabetes mellitus. Compared to those who had no family history of diabetes mellitus, the probability of good knowledge among individuals who had a family history of diabetes mellitus four times increased the degree of knowledge.

In addition, poor source of information, poor enrollment of Media and NGOs to community on risk factors and consequences of the diseases compared to other countries cause the limitation on the diabetic knowledge. Diabetic attitude does depend on health care access, health education and behavior. (Asmamaw, 2015) Lastly, other demographic factors also contribute to the level of diabetic knowledge and attitude.

1.3 Research questions

- What is the level of knowledge and attitude related to diabetes mellitus among older persons in Selangor?
- What are the sociodemographic factors associated with knowledge and attitude related to diabetes mellitus among older persons in Selangor?

1.4 Significance of study

Upon completion of this study, it is expected that the findings will contribute to the existing knowledge and library. The findings of this study will provide baseline information related to the relationship between the sociodemographic factors and the diabetic knowledge and attitude of the older persons which will benefit relevant authorities and future research especially in the development of programs or intervention to improve knowledge and attitude of elderly with diabetes in Malaysia. According to Kassahun & Mekonen (2017), understanding the level and factors associated with the knowledge and attitude towards diabetes mellitus plays an important role in spreading the appropriate diabetes information to the community. The community can also increase their awareness on diabetes, then involve themselves in the prevention and management of the disease.

According to Borba et al. (2019), the ability of self-care can be reinforced and further contribute to improve the management of diabetes by doing a thorough investigation of these factors. The outcome of this research is closely related to public health as it is important in planning educational actions by taking both the cognitive aspects related to diabetes and the psycho-emotional aspects that influence self-care in consideration of an interdisciplinary nature. Besides, it is also believed that through this study, it can benefit the related health organisation because they can carry out more campaigns or awareness talks to improve the diabetic knowledge and attitude of the older persons. The population can have a better understanding about diabetes mellitus if awareness is created. (Alemayehu et al., 2020)

Kassahun & Mekonen (2017) stated that the knowledge that the community has can aid in evaluating the causes, risk of diabetes and inspire them to look for appropriate treatment and care. Through this study, the outcome can assist the healthcare workers in guiding and educating the older people that are diagnosed with diabetes mellitus to take care of themselves. By having a better understanding between the sociodemographic factors and the diabetic knowledge and attitude of the older persons, the healthcare workers can identify which method and way of approach they should use to take care and manage the older persons that have diabetes mellitus without neglecting their sociodemographic factors.

Binh et al. (2015) said that the research was done to assist local authorities and public health decision-makers in practicing communication and education activities to increase the knowledge about control of diabetes mellitus among the population by providing proof to them. The evolution of health literacy, patient counselling and education programs are essential in a community that has poor knowledge and control over their diabetes mellitus. (Karaoui et al., 2018)

A research done by Chinnappan et al. (2017) stated that in order to improve the level of understanding on diabetes mellitus, it is important to implement relevant strategies. The area of weaknesses should be well tackled when a better and well-planned educational event is proposed to enhance the knowledge that the public has on diabetes mellitus. Health campaigns should be held in order to promote the practice of healthy lifestyle together with the knowledge about risk factors, exercise, diet and also encourage screening in the community. The study that is done can also be utilized in designing future educational programs to manage diabetes mellitus. The creation of the programs should also include the methods to bring up competent diabetes educators by providing training methods that can upgrade the health care professions which are mainly the physicians and pharmacists so that they can educate the public on the management of diabetes mellitus.

According to Asmamaw (2015), the prevention and management of diabetes mellitus among people in Ethiopia are affected by the gaps in knowledge and attitude related to diabetes mellitus and its factors. Further studies can be done on how to increase the diabetic knowledge and improve the attitude among the older persons according to their sociodemographic status. While, for research done in Waghodia, Gujarat, India showed that there is a reasonable gap between knowledge, attitude and practices towards diabetes mellitus. (Rathod et al., 2014) The significance between knowledge and attitude towards diabetes with the practices on managing diabetes disease should also be studied further to assess the ability of old persons in taking care of themselves according to their level of education.

1.5 Study objectives

1.5.1 General objective

To determine the sociodemographic factors associated with diabetic knowledge & attitude among older persons in Selangor

1.5.2 Specific objectives

- To determine the level of diabetic knowledge and attitude among older persons in Selangor.
- To determine the sociodemographic characteristics of the respondents.
- To determine the association between sociodemographic factors and knowledge related to diabetes among older persons in Selangor.
- To determine the association between sociodemographic factors and attitude related to diabetes among older persons in Selangor.
- To determine the association between attitude and knowledge related to older persons in Selangor.

1.6 Study hypothesis

- There is a significant relationship between the sociodemographic factors and the knowledge related to diabetes mellitus among older people in Selangor.
- There is a significant relationship between the sociodemographic factors and the attitude related to diabetes mellitus among older people in Selangor.
- There is significant knowledge between attitude and knowledge related to diabetes mellitus among older people in Selangor.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Diabetes mellitus is defined as a one of the metabolic diseases characterized by hyperglycemia, which is elevated sugar in blood arising from defective insulin secretion, function or both. (Association, 2013) Diabetes can be classified into two types, which are type 1 and type 2.

Type 1 diabetes or juvenile-onset diabetes is a type totally deficient in insulin secretion. It is a condition of cellular-mediated autoimmune destruction of β-cells of the pancreas hence, no residual insulin secretion for survival. This usually occurs in younger age patients. ("Diagnosis and Classification of Diabetes Mellitus," 2005)

"Diagnosis and Classification of Diabetes Mellitus" (2005) also stated that type 2 diabetes mellitus or previously referred to as non-insulin dependent diabetes mellitus (NIDDM). It is a condition due to a combination of resistance to insulin action and lack of compensatory insulin secretory response. This means that the pancreas produces enough insulin, but insulin doesn't utilize the glucose because the cells are resistant to the action of insulin. This latter form of diabetes as often as possible undiscovered for many years due to the hyperglycemic conditions that develop gradually and at earlier stages is often not severe enough for the patient to realize any common symptoms of diabetes. Another thing to be noted, patients with gestational diabetes may also continue to be in hyperglycemic condition after birth, thus can be diagnosed as type 2 diabetes. According to the National Diabetes Institute (NADI), patients with type 2 diabetes are diagnosed with hypertension, hyperlipidemia, history of polycystic ovarian syndrome (PCOS) and obesity.

2.2 Diabetes mellitus and older persons

(Karim, n.d.) defined, ageing is a process of biological, sociological, economic, and chronological phenomenon. In addition, chronology has always been used as an indicator of lifespan in line with the United Nations and the Ministry of Health's recommendation which is 60 years and older.

So how is diabetes and being old related? According to the National Health and Morbidity Survey of 2019, 41.5% of the elderly were diabetic. (*(No Title)*, n.d.) This disease also appears to fasten the aging process which means a diabetic patient is physiologically approximately 10 years older than the original chronical age. In addition, there are some similarities between diabetes patient and aging process of the elderly which are (Morley, 1999):

i. Alteration in DNA unwinding rate
ii. Increased collagen cross-linking
iii. Increased free radical cavity
iv. Increased capillary basement-membrane thickening
v. Cataracts
vi. Atherosclerosis
vii. Decreased functional status

Furthermore, half of these patients are not aware of the disease and since they're older and tend to live longer, they usually used up a lot of healthcare resources in the next several decades and proven to be one of an important epidemic in the 21st century. (Meneilly & Tessier, 2001)

There are a few pathogeneses on how older people have a high risk of developing type 2 diabetes due to a combination of genetics, lifestyle, and aging influences. All of these will cause hyperglycemic effects due to reduction of B-cell function.

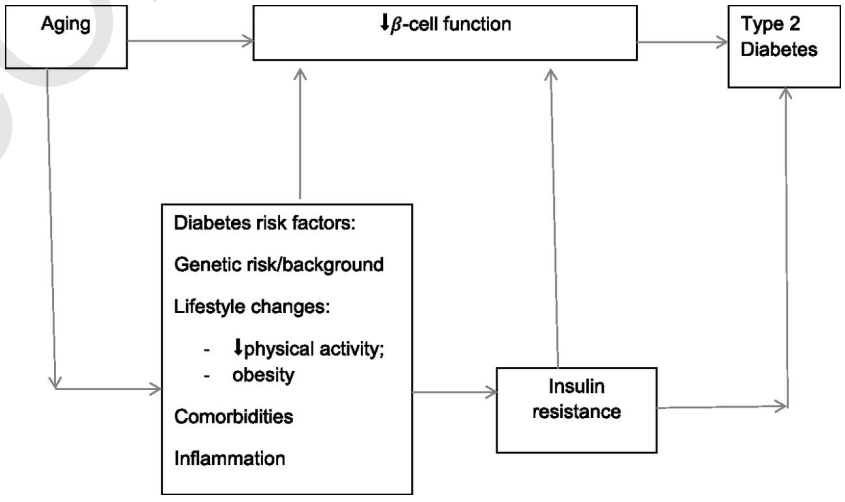

Figure 1: Pathogenesis of type 2 diabetes mellitus

Morley (1999) stated that hyperglycemic condition in elderly people as “hyperglycemia of aging’. How does this condition occur? This is because of an increase in body mass, an increase in adipose, and low physical activity.

Other than that, stated by Morley (1999), in adipose cells, there’s a hormone being produced that is called leptin. There’s a study being conducted for leptin. In rodents, leptin helped in decreasing food intake and help to cure congenitally obese mice. While in humans, leptin levels are directly proportional to adipose levels in the human body. This is related to a study conducted by the New Mexico Process Study, they found that leptin level is highly related to insulin resistance in older persons. (Kim et al., 2006)

Furthermore, amylin is also a hormone produced together with insulin in the pancreas by the islet of Langerhans. So, what are the functions of insulin stated by Kim?

i. Inhibits the second phase of insulin secretion
ii. Inhibit the effects of insulin at liver and muscle
iii. Slows gastric emptying
iv. Reduced food intake
v. Regulate memory processing

In the same paper, Kim stated that amylin was higher in older people than middle aged people due to the fact that a low level of amylin was no longer maintained. Hence, in older persons, high amylin levels were highly related to an increase in postprandial glucose levels.

Next, let’s take a look at the presentation and clinical features of diabetes in the elderly. As stated by Meneilly & Tessier (2001), the elderlies were unaware they had diabetes unless they’re hospitalized with complications of other related diseases such as myocardial infarction or stroke. Why? For a middle-aged person, the most common symptoms present are glucosuria and frequent thirst. But, in the elderly may be due to a high renal threshold for glucose hence no sugar present in urine until it is markedly elevated. Moreover, frequent thirst does occur frequently as people age. Older diabetic patients also may be present with nonketotic hyperosmolar coma as the first sign of diabetes(Meneilly & Tessier, 2001) So how does this occur? Morley (1999) stated that older people have unique features of ketoacidosis. Elder people need more insulin to stabilize their glucose than younger people.

Following an episode of ketoacidosis, the mortality rate of the elderly was 22% while the younger person had only 2%. Approximately the hospitalization durations were 6 days longer for the elderly instead of the younger patients.

Following all these causes and clinical features, that's why it is important to study sociodemographic factors associated with diabetic knowledge and attitude among older persons in Selangor.

2.3 Knowledge on diabetes mellitus among older persons

A study was carried out about knowledge and practices related to diabetes mellitus among 108 older adults with type 2 diabetes residing in Beijing and the average age is 68 years. The main objective of this study was to evaluate the relationship of demographic and clinical variables and attendance at diabetes educational programs with diabetes knowledge among a community sample of older diabetic patients in Beijing. A face-to-face interview was conducted.

The questions consist of assessment of diabetes knowledge and diabetes self-management, assessments of glucose, blood pressure, body mass index (BMI) and waist circumference. The Diabetic Knowledge Questionnaire (DKQ) scores of younger respondents (age less than 65 years) were substantially higher than those of older study participants (age more than 65 years). For questions about 'A fasting blood sugar level of 210 is too high (91.7% and 81.9%),' followed by 'Cuts and abrasions on diabetics heal more slowly (83.3% and 80.6%),' and 'Diabetes will hurt my kidneys (86.1% and 70.8%),' earned the most accurate responses. For questions about 'Diabetes is caused by a failure of the kidneys to keep sugar out of the urine (41.7% and 23.6%)', 'Regular exercise will increase the need for insulin or other diabetic medication (41.7 % and 19.4%)', and 'A individual with diabetes can cleanse a cut with iodine and alcohol (13.9% and 12.5%)' were the questions with the lowest percentage of correct answers. The result is followed by age less than 65 years and more than 65 years respectively.

In conclusion, the results show that older Chinese adults with diabetes have major diabetes awareness gaps. The DKQ's average response score showed that only about half of the

questions were correctly answered by the respondents. More significantly, more than half of the participants had no idea what causes diabetes and its physiology. A plurality, for example, voted in favor of incorrect questions about 'eating too much sugar and other sweet foods is a cause of diabetes' and 'Diabetes is caused by failure of the kidneys to keep sugar out of the urine'. (Hu et al., 2013)

2.4 Attitude towards diabetes mellitus among older persons

Borba et al. (2019) stated that the attitude towards diabetes mellitus can be determined by how the individual makes their decision to practice or not the self-care measures for diabetes control. Normally, this behavior is managed according to their knowledge level which may be acquired through personal experiences or professional orientations that the individual has to know so that they can maintain their health condition. The Brazillian version of the Diabetes Attitudes Questionnaire (ATT-19) is used to evaluate the attitude of the respondents towards diabetes. The total score ranges from 19 to 95 points, which leads to a mean score of 70 points. A positive attitude towards diabetes can be shown if the respondent scores ≥ 70 points. From this research, it is known that most of the respondents have a negative attitude towards diabetes mellitus, which is 85.6% of the respondents (95% Cl 80.0; 90.2). The associated factors that cause the negative attitude of older persons towards diabetes mellitus includes female gender, co-residence with other people, low educational level, low socioeconomic status, no smoking and poor glycemic control. Besides, being a man that lives alone and has some chronic complications of diabetes are also factors that cause the negative attitude towards the disease can be seen from the multivariate model. It is also stated that older persons with more than 8 years of study are thirteen times less likely to portray a negative attitude towards diabetes mellitus as compared to older persons that have a low schooling background. Diabetes is a chronic disease that will have more complications over time and the attitude of people towards managing diabetes becomes poorer as time of diagnosis increases.

A study was carried out in France that includes 1092 individuals that have type 2 diabetes which are 45 years old and above to determine the attitude towards the disease. Every category of respondent has their own attitude and beliefs towards diabetes mellitus which causes them to manage the disease in different levels. From a gender perspective, men and

women have different attitudes towards the self-management of diabetes mellitus. Men have a more positive attitude towards the disease as they take responsibility for their own illness, handle the emotional and social aspects well and do not look at the disease as a burden. On the other hand, women show feelings of dissatisfaction and anger towards the disease, which causes them to have poor motivation and face difficulties in self-managing diabetes. Thus, men that are known as household providers historically can adapt better to adversity that helps them in having a more positive attitude towards managing diabetes mellitus compared to women that portrays a more passive behavior. (Mosnier-Pudar et al., 2010)

According to Kassahun & Mekonen (2017), attitude towards diabetes is how the community thinks and reacts towards diabetes mellitus. In their study, they measured the attitude of the community by using a five points Likert's scale of 11 questions. Respondents that scored higher than the mean score, it means they have a good attitude towards diabetes mellitus and vice versa. The outcome of their study shows that the mean score of the participant's attitude was 1.56 ± 0.5. 332 out of 594 of the respondents scored higher compared to the mean score, which means 55.9% had a good attitude. While 44.1% of the respondents had a bad attitude towards diabetes mellitus. Abdo & Mohamed (2010) said that from a community-based study he did in Egypt, the elderly had a lower level of knowledge and attitude towards diabetes mellitus when compared with the younger generations. Thus, there is a significant relationship between the sociodemographic factors with the diabetic knowledge and attitude among the older persons.

2.5 Factors associated with diabetic knowledge and attitude among older persons

2.5.1 Sociodemographic factors

2.5.1.1 Age

Based on a study about KAP regarding diabetes in the general population in Pakistan, Gillani et al. (2018) stated that there is higher knowledge on five knowledge items in younger age respondents compared to respondents aged more and equal to 60 years. For instance, a larger percentage (55.9 percent) of respondents aged 31–44 years knew that limiting carbohydrate consumption can manage diabetes compared with those aged ≥ 60 years (44.6

percent). In addition, in another study about diabetic knowledge and attitude towards selfcare of elderly in primary health care in Brazil states that the protective factors for inadequate diabetes knowledge were the age between 60 and 69 years and living alone. A systematic review has shown that age is an obstacle to the development of self-care and management skills (Borba et al., 2019)

2.5.1.2 Gender

Chinnappan et al. (2017)stated that the study examined the understanding among the population of Klang Valley, Malaysia, of diabetes mellitus. There was no noticeable gap in information between the sexes. The relationship between gender and knowledge is examined in literature and it was stated that gender is not a determinant of knowledge about diabetes mellitus. In Malaysia, men and women have equal exposure and rights to be educated. This is one of the reasons why the new Malaysian National Health Morbidity Survey IV 2015 found that the prevalence of diabetes mellitus in women is 18.3% higher than in men at 16.7%.

2.5.1.3 Marital status

Al-Aboudi et al. (2016) indicated that by using the Mann–Whitney test, there is a marked difference in knowledge score regarding marital status (P = 0.045). Patients who were not married performed better than those who were married (8.91±2.09 vs. 10.66±1.63). Thus knowledge scores were found to be strongly linked to marital status, which is consistent with Persell et al. (2004)'s results. The aim of this study was to observe if there was a correlation between knowledge and attitude and health-related quality of life (HRQoL) in type 2 diabetes patients in Riyadh, Saudi Arabia. About 75 patients were involved in this study.

2.5.1.4 Ethnicity

Based on a study about diabetic knowledge, attitude and understanding of type 2 diabetes mellitus among ethnic groups in Scotland, it provided evidence that Indian and Pakistani communities in Glasgow have limited knowledge and understanding of diabetes. Similar findings were discovered in Nottingham's

Pakistani community and Coventry's Indian community. This study was carried among 145 type 2 diabetes patients of Pakistani, Indian and British (White) origin in Glasgow, Scotland, UK. Further analysis revealed no substantial differences between the Indian and Pakistani groups (mean=14.3, mean 13.8 respectively), while the White group scored slightly higher (mean=17.7) than the other two. This lack of diabetic knowledge was linked to the illiterate patients, who were all from India and Pakistan, especially the female gender, which corresponded to their old culture. According to the same report, the Indian group had a slight negative attitude (mean=8.2) against the severity of type 2 diabetes, while the White (mean=9.8) and Pakistani (mean=9.1) groups did not. Furthermore, attitudes about the importance of strict glucose regulation in diabetes were significantly higher in the white community (mean: White=15.4, Indian=13.2, Pakistani=13.9). All of the findings, however, were highly influenced by the ethnic's own health beliefs and culture. (Baradaran & Knill-Jones, 2004)

2.5.1.5 Religion

Based on a study in Malaysia about religious affiliation influences glycemic control in primary care patients with type 2 diabetes mellitus. About 212 patients with diabetes type 2 patients consist of ethnic Chinese, Malay and Indian and religion Islam, Hinduism, Buddhism and Christianity participated in this study with the mean age of 62.7 years. All the Malay participants were Moslem, while the Chinese embraced a variety of religions (other from Hinduism and 14.5 % did not observe a religion) and most Indians were Hindus. They discovered that religiosity was linked to short term glycemic control (FPG) while religion significantly linked to long term glycemic control (HbA1c level). Christians had the lowest mean FPG (75.52 mmol/L) and HbA1c (77.46 %) levels among religious groups, whereas Chinese had the lowest HbA1c level among ethnic groups. In addition, Chinese had the lowest mean BV score (51.73%). There was negative correlation found for BV score and FPG while there was significant association between religions and HbA1c level (lowest: Christian=77.46%, highest: Moslems=111.08%). The reasons in the outcome of the study were not stated. In conclusion, the diabetic knowledge, attitude and practices do depend on the beliefs and

practices of the religion itself and most importantly diabetic KAP influenced by the level of religiosity of the individuals itself. (Med et al., n.d.)

There is a lack in the study about diabetic knowledge and religion, in a study about KAP of diabetes in Rural Bangladesh state that the difference in the knowledge scores between different religion (Hindu and Muslim) related with the educational level among the minority casts religion (Hindu) in the area involved itself. (Gillani et al., 2018) But there are many studies about religion and diabetic management for example a study from Nigeria (Adejumo et al., 2015), a study about religion's impact on Ramadan fasting for patients with DM (I R Musa, n.d.) and many more.

2.5.1.6 Current employment status

Nadzri et al. (2014) mention that although most of the population (66%) had positive attitudes toward diabetes, 33.30 percent of respondents indicated that because of busy work, they never check their blood glucose for diabetes screening. In those with a positive attitude towards diabetes, variables such as education level and current employment status have been found to be strongly linked to their characteristics. This is evident from the fact that good education and current employment status are likely to increase the overall quality of your work.

2.5.1.7 Educational level

Al-Rasheedi (2014) stated that 67.7 percent is the rate of patients who have had impaired glycemic control. The level of education had little effect on glycemic regulation, but patients at a high level of education had a greater understanding of the risks and a high rate of dietary adherence. Two or more diabetic complications are known in around 70.5 percent of patients. In this study, the percentage of patients with impaired glycemic control was high. It has also been shown that the degree of education may not be a strong indicator of improved compliance with therapies. There was a high rate of poor adherence to diet and exercise, particularly among women, despite the significant importance of adequate diet and exercise in controlling diabetes.

Another study concluded that there is a strong relation between education level and diabetic knowledge and practice. (Karaoui et al., 2018) They mentioned that the patients with a university degree had a higher diabetes mellitus awareness score (Beta = 0.448, p = 0.001) than patients with a lower level of education. For those practicing a particular diet, the other covariate was significantly associated with increased diabetes-related awareness (Beta = 0.482, $p < 0.001$). A higher level of expertise and experience was significantly associated with the educational level of the participants. Compared with those who attended primary or complementary education, a patient with diabetes mellitus who completed high school or university studies had a substantially improved awareness and practice score.

2.5.1.8 Monthly income

Having higher family monthly income, ever hearing about diabetes and exposure to diabetes health education were the determining factors of diabetes knowledge in this study. Respondents whose family income per month were 2000 Ethiopian Birr had 0.4fold increase in diabetes knowledge level as compared to those having family income per month 500 Ethiopian Birr. These findings were supported by studies conducted in Debre Tabor, Malaysia and India which stated that those who belonged to the upper socioeconomic strata had more knowledge. (Kassahun & Mekonen, 2017)

2.5.2 Other factors

2.5.2.1 Family history of diabetes mellitus

According to Asmamaw (2015), respondents that have family history of diabetes mellitus are 3.9 times more likely to have a better knowledge and understanding about the disease compared to the respondents that do not have a family history of diabetes mellitus. It is believed that the exchanging of information regarding diabetes mellitus among family members that shares the family history of diabetes mellitus aids in raising the awareness of the disease and increasing the support they have for each other in facing diabetes mellitus.

2.5.2.2 Living area

A research held in Vietnam showed that people that live in urban areas had a better knowledge about diabetes mellitus compared to people that live in the rural areas. In general, 16.4% of the respondents from urban areas have better knowledge regarding the treatment of diabetes mellitus compared to only 8.9% of respondents in the rural areas. Their findings also gave evidence that the community living in developed countries has better diabetic knowledge compared to the community that lives in the developing countries. In Kenya, only 27.2% of the respondents have good knowledge on diabetes. While in Mongolia, 15.6% of its people living in urban areas have no knowledge on diabetes, which is lower than the 26.6% of the people that are living in the rural areas. Similarly, in India, roughly 20-25% of participants in the studies do not know what diabetes is. The diabetic knowledge and its risk factors among communities in Bangladesh is also very limited in the rural areas. (Binh et al., 2015)

2.6 Conceptual framework

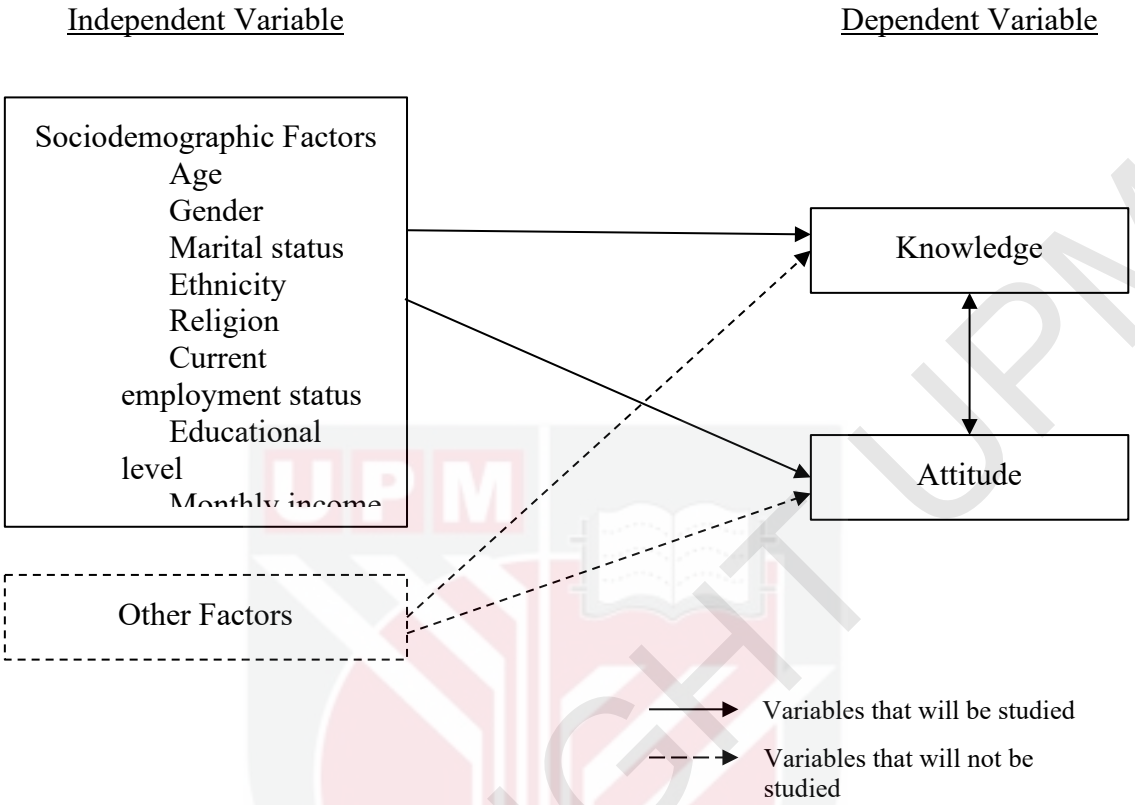

Figure 2: Factors associated with diabetic knowledge and attitude among older persons.

This research was conducted on the association between sociodemographic factors with diabetic knowledge and attitude among older persons in Selangor, Malaysia. In this study, there were 4 variables which include 2 independent variables and 2 dependent variables. However, we only focused on one independent variable, which was the sociodemographic factors which are made up of age, gender, marital status, ethnicity, religion, current employment status, educational level and monthly income. While the 2 dependent variables that were studied are the knowledge about diabetic disease and the attitude of the individual towards diabetic disease. If the 3 variables can link and correlate with each other under the circumstances that the other factors are constant during the research period, it will be able to prove that there is a significant relationship between the sociodemographic factors with diabetic knowledge and attitude of older persons in Selangor.

According to Mosnier-Pudar et al. (2010), it is proven that there are various levels of challenges in managing diabetes mellitus by the patients themselves due to their different backgrounds. Thus, it is important for the physician to plan different strategies and support

for their patients from each group of sociodemographic level accordingly. This can help them to have changes in their attitude and then have a better metabolic control.

Kassahun & Mekonen (2017) stated in their research that is held in South East Ethiopia that monthly income and the education level of the individual play an important role in determining how much diabetic knowledge they have and whether they will have a positive and negative attitude towards diabetes. From the research, participants that have higher educational levels are known to have a more positive attitude towards diabetes. This may be due to the fact that they had the opportunity to get exposed to the diabetes disease which increased their awareness and understanding about the disease. They can also communicate with the healthcare workers regarding the disease if they have any doubts. Besides, in Ethiopia, females that are mostly housewives have a slower learning and understanding level in all aspects compared to males.

A research in Vietnam also proved that the diabetic knowledge increases with educational levels. Respondents that have a better knowledge of diabetes mellitus are also more likely (93.6%) to show a positive attitude towards diabetes mellitus. (Binh et al., 2015)

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents the detailed methodology of the study involving elaboration on the study location, study design, study duration, study population, sampling population, sampling frame, sampling unit, sample size, sampling method, study instruments, study variables, operational definition, data collection, data analysis, quality control and ethical approval.

3.2 Study location

The study was conducted in Selangor. Selangor is located on the west coast of Peninsular Malaysia. Selangor has nine districts which are Gombak, Kuala Langat, Kuala Selangor, Petaling, Sepang, Hulu Langat and Sabak Bernam. Based on statistics, there were 6569.5 population in Selangor as of the first quarter of 2020. Based on the National Health and Morbidity Survey 2019 (*(No Title)*, n.d.), prevalence of diabetes patients in Selangor was around 16.22% to 18.12%. In Malaysia, the prevalence of elderly with diabetes in 2019 in Malaysia was 41.5% which was the highest among all age groups.

3.3 Study design

The study design that was applied is cross sectional study. A cross-sectional study was defined as a type of observational research that analyzes data of variables collected at one given point in time across a sample population or a pre-defined subset. This study type was also known as cross-sectional analysis, transverse study, or prevalence study. Questionnaires were drafted and distributed for the participants to fill in through google form method. This method of study is easier and quicker to be conducted. The prevalence for all the factors for the research were measured efficiently through this method.

3.4 Study duration

The duration of the study was 5 months and 15 days from 20 December 2020 to 5 July 2021. It was divided into two phases:

- Phase 1 was from 20 December 2020 - 29 January 2021, which sums up a total of 41 days equivalent to 1 month and 10 days. In this phase, it included the preparation, submission, presentation of research proposal and submission of documents to JKEUPM.
- Phase 2 was from 1 March 2021 to 5 July 2021, which is a total of 4 months and 5 days. In this phase, it included the process of data analysis of secondary data, final presentation, poster competition and submission of the final report.

3.5 Study population

The study population were older persons aged 60 years old and above.

3.6 Sampling population

The sampling population were older persons aged 60 years and above residing in Selangor.

3.6.1 Inclusion criteria

Older persons that have been residing in Selangor for more than 6 months and older persons who can understand English or Malay to help answering the questionnaires.

3.6.2 Exclusion criteria

- Non-Malaysian
- Non-permanent resident of Selangor

3.7 Sampling frame

List of older persons aged 60 years old and above identified in potential WhatsApp groups involving community associations, alumni, family members etc., that are living in Selangor.

3.8 Sampling unit

The sampling unit in this research was an older person that is aged 60 years old and above, living in Selangor.

3.9 Estimated sample size

The estimated sample size was determined by calculating the **n** using the single proportion and two proportion formula. The highest n will be chosen as the sample size for this research.

3.9.1 Single proportion formula:

$$n = \frac{Z^2_{1-\alpha/2}}{d^2}[p\ (1 - p)]$$

Where,

n = sample size $Z_{1-\alpha/2}$ = statistic corresponding to level of confidence

p = prevalence d = error margin

It was assumed that $Z_{1-\alpha/2}$ = 1.96 (standard score value for 95% confidence level of two sides normal distribution) with an error margin (d) of 7%. The prevalence (p) was taken from a similar study done in Brazil (de Lima et al., 2020) which was 34.3% for good knowledge about diabetes mellitus.

Then, substitute the data $Z_{1-\alpha/2}$ = 1.96 ; p = 0.343 ; d = 0.07 into the formula:

$$n = \frac{1.96^2}{0.07^2}[0.343\ (1 - 0.343)]$$

$$n = 784\ [0.343(0.657)]$$

$$n = 784\ (0.225)$$

$$n = 176.4$$

$$n \simeq 177$$

∴ the sample size is 177.

Taking into consideration the 10% of non-response rate for any unpredictable events, the final sample size was calculated by the following formula:

$$n_{final} = n + (n \times 10\%)$$

Then, substitute the data n = 177 into the formula:

$$n_{final} = 177 + (177 \times 10\%)$$

$$n_{final} = 177 + 17.7$$

$$n_{final} = 194.7$$

$$n_{final} \simeq 195$$

∴ the final sample size is 195.

3.9.2 Two proportion formula:

$$n = \{[z(1-\alpha/2)*\sqrt{2\underline{P}(1-\underline{P})}] + [z(1-\beta)*\sqrt{P_1(1-P_1) + P_2(1-P_2)}]\}^2 / (P_1-P_2)^2$$

Where:

$\underline{P}$ = (P1 + P2)/2

P1 = estimated proportion (e.g., for intervention group - from previous study)

P2 = estimated proportion (e.g., for control group - from previous study)

Z (1-α/2) = statistic corresponding to level of confidence

z (1-β) = power

In this study, we will be using the data from the previous study, (de Lima et al., 2020) Since the study will determine the association of sociodemographic factors and diabetic Knowledge and Attitude.

Sociodemographic factors (Age: 60 to 69 years and >69 years)

Knowledge:

1) P1: Erderly age 60-69 years with good diabetic knowledge =0.420
2) P2: Erderly age 70 and above with good diabetic knowledge =0.205

First, find the $\underline{P}$ by substituting the data $P_1 = 0.420$; $P_2 = 0.205$ into the formula:

$$\underline{P} = (0.420+0.205)/2$$

$$\underline{P} = 0.313$$

Then, substitute the data $Z_{1-\alpha/2} = 1.96$; z (1-β) = 0.84 ; $\underline{P} = 0.313$ into the formula:

$$n = \{1.96*\sqrt{2(0.313)(1-0.313)}] + [0.84*\sqrt{0.420(1-0.420) + 0.205(1-0.205)}]\}^2 / (0.420-0.205)^2$$

$$n = 71.765$$

∴ the sample size is 72

Because it is a two-proportion formula, n must be time with 2 to calculate for two group.

∴ n= 72 ×2=144

Taking into consideration the 10% of non-response rate for any unpredictable events, the final sample size can be calculated by the following formula:

$$n_{final} = n + (n \times 10\%)$$

Then, substitute the data n = 144 into the formula:

$$n_{final} = 144 + (144 \times 10\%)$$

$$n_{final} = 144 + 14.4$$

$$n_{final} = 158.4$$

$$n_{final} \simeq 158$$

∴ the final sample size is 158.

The final sample estimated sample size that is chosen is $n_{final} = 195$ calculated by the single proportion formula because it gives a larger n as compared to using the two proportions formula.

3.10 Sampling method

The sampling method that was used in this research is the universal sampling method, involving all eligible respondents that had responded and completed the online questionnaire distributed through WhatsApp application. Although the estimated sample size was 195, the total number of eligible older persons in the existing data was only 177. Therefore, by using the universal sampling method, all 177 respondents will be included in the analysis. Online written consent was obtained from individual respondents prior to the data collection.

3.11 Study instrument

The online questionnaire "Perceived Barriers Towards Management and Control Of Geriatric Diabetes" consisted of three sections, namely sociodemographic factors, knowledge on diabetes mellitus and attitude towards diabetes mellitus.

- Section A: Sociodemographic factors

  Sociodemographic factors of each respondent were collected, consisting of 8 factors: age, gender, marital status, ethnicity, religion, current employment status, educational level and monthly income.
- Section B: Knowledge on diabetes mellitus

  Knowledge on diabetes mellitus was measured using the 3-point likert scale, 'Yes', 'No' and 'Unsure', consisting of 10 items. The mean or median score will be used to categorize the score into good and poor knowledge.
- Section C: Attitude towards diabetes mellitus

  Attitude towards diabetes mellitus was measured using the 5-point likert scale, 'Strongly agree', 'Agree', 'Neutral', 'Disagree' and 'Strongly disagree', consisting of 5 items. The mean or median score will be used to categorise the score into positive and negative attitudes.

3.12 Study variables

- Dependent variable: Knowledge about diabetic disease and the attitude of the individual towards diabetic disease.
- Independent variable: Sociodemographic factors which are made up of age, gender, marital status, ethnicity, religion, current employment status, educational level and monthly income.

3.13 Operational definition of variables

3.13.1 Dependent variable

- **Knowledge:** Refers to the understanding of the sign and symptoms, consequences of poorly controlled diabetes and preventive lifestyle related to DM. For the purpose of this study knowledge will be categorized into good and poor based on the mean or median score.

- **Attitude:** It is the beliefs and the thoughts related to diabetes mellitus. For the purpose of this study, the attitude will be categorized into positive and negative based on the mean or median score.

3.13.2 Independent variables

- Sociodemographic factors:
  1) **Age** - The duration of time that an individual has lived. It is calculated by the birth date of the respondent. Only respondents that are more than 60 years old (lived more than 60 years) will be considered.
  2) **Gender** - It is the characteristic of women or men that are socially constructed which includes their behavior and roles. Gender of the respondents will be grouped into male or female. Male is an individual that is capable of producing gametes that are known as sperms. Female is an individual that is capable of producing or bearing gametes that are known as egg cells (ovum).
  3) **Marital status -** It is used to describe the situation of the individual's relationship with someone. It can be categorized as single, married and widowed or divorced. Single status can be applied to an individual that his relationship with a significant other is not legally recognized. Married status is where an individual is involved in a wedding ceremony with another individual that he shares a romantic relationship with in concordance with valid regulations. Widowed status is where the spouse of the individual has passed away and divorced status means that people that were once married have completed the legal separation procedure by ending their relationship in a court of law.
  4) **Ethnicity** - It is a social group that shares the same culture, beliefs and language that has been part of their community for several generations. In this study, the participants will be divided into Malay, Chinese, Indian or other ethnicities. Malay ethnicity means individual that professes the religion of Islam, habitually speaks Malay and conforms to Malay custom. Chinese ethnicity are individuals that are of Chinese blood which are born in or immigrated in Malaysia. India ethnicity means individuals that are the descendants of those who migrated to Malaysia during the British

colonization of Malaya. Other ethnicities include individuals that are not Malay, Chinese or Indian.

5) **Religion -** A religion is a group of people that shares a common belief system in a god or gods with a specific set of ritual and literature. It will be grouped into Islam, Christian, Buddha, Hindu and other religion in this study. Islam is a religion that emphasizes mono-ethism and worshipping of the God known as Allah in Arabic. Christian is a religion where the individuals follow Chirstianity, a mono-ethistic Abrahamic religion based on the life and teachings of Jesus Christ. Buddha is a religion of eastern and central Asia growing out of the teaching of Siddhārtha Gautama that suffering is inherent in life and that one can be liberated from it by cultivating wisdom, virtue, and concentration. Hindu is a religion that is henotheistic, which means they worship a single deity, known as "Brahman," but still recognize other gods and goddesses. Other religions include individual that are not Islam, Christian, Buddha or Hindu.
6) **Current employment status -** Employment status is the status of a person that is occupied to work for an employer or company. He/she may be a fulltime employee, part time employee, self-employed or unemployed. Self-employment means that the person is working as freelance or he/she is an owner for their own business. While, for unemployed indicates that the person is out of job or maybe looking for another job. Other than that, the respondents can be a housewife/man that manages the family's household or a retiree which is a person who has retired from working.
7) **Educational level** - Education level is the highest level of education that the respondent has successfully accomplished. This is validated through the assessment of knowledge, skills and competencies. In Malaysia, it is categorized into several groups which are no formal education, primary school, SRP / PMR or equivalent, SPM / STPM or equivalent, diploma or equivalent, degree / above or equivalent which is bachelor's degree for undergraduate or postgraduate like Master's degrees or doctorate degree (PhD).
8) **Monthly income -** Monthly income is the amount of money that people earn monthly. There are a few categories in which no income is probably due to they're retirement in the private sectors. Next are RM 1,000 and below, RM

1,001 – RM 2,000, RM 2,001 – RM 3,000, RM 3,001 – RM 4,000, RM 4,001 and above.

3.14 Data collection

This study was done using secondary data which was collected under a different project.

3.15 Data analysis

Descriptive (frequency, percentage, median) and bivariate analysis (chi-square).

3.16 Quality control

The questionnaire was evaluated for its content with validation which were face and content validity. Other than that, we also evaluated reliability for this study.

- Validation:
  a) Face validity - The draft of the questionnaire was initially distributed among 10 older persons aged 60 years old and above to ensure their understanding of the content of the questionnaire. We added a few more questions in Section B like "can diabetes damage the kidneys" to get more regarding respondents' knowledge. Most of them commented that the questionnaire is simple and easy to answer.
  b) Content validity - The content has been assessed by Prof. Madya Dr. Halimatus Sakdiah Minhat and Dr. Hakimah Mohammad Sallehuddin. The contents were permitted to be written. We were also corrected regarding a few typo errors.
- Reliability: Cronbach's Alpha which is an index of reliability was used to measure how reliable the questionnaire is. Alpha coefficient ranges from 0 to 1. 0 is the poor scale while 1 is an excellent scale. Cronbach alpha values for knowledge and attitude were 0.65 and 0.74 respectively. Other than that, pretests of the questionnaire were conducted and distributed to a smaller group to ask their opinions regarding the questionnaire.

3.17 Ethical approval

- Individual consent form from individual respondents.
- Ethical clearance was obtained from Ethic Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) with reference number of JKEUPM-2021-075

CHAPTER 4: RESULTS

4.1 Response Rate

A total of 177 respondents answered the questionnaire for this study. The response rate was calculated using the formula:

Response rate = Total response / Targeted response x 100

Response rate = 177/195 x 100 = 90.77%

4.2 Normality test

The continuous data which were collected in our study is total knowledge score and total attitude score. The variables were checked for normality using Histogram, Kolmogrov-Smirnov test and Shapiro-Wilk test. For the normality test of total knowledge score, the minimum score for total knowledge score is 10, while the maximum score for total knowledge score is 30. The histogram was skewed to the left but not significant. Kolmogorov- Smirnov test and Shapiro-Wilk test show a p- value <0.05. All tests indicate that the total knowledge score among the older individuals in Selangor is not normally distributed. For the normality test of total attitude score, the minimum score for total attitude score is 5, while the maximum score for total knowledge score is 25. The histogram was skewed to the left but not significant. Kolmogorov- Smirnov test and Shapiro-Wilk test showed a p- value <0.05. All tests done indicated that the total attitude score among the older person in Selangor is not normally distributed.

4.3 Level of diabetic knowledge among older persons in Selangor

Table 1: Frequency of answers regarding diabetic knowledge among older persons in Selangor

Question (Knowledge)	Yes		No		Unsure	
	N	%	No	%	N	%
Eating too much sugar and sweet food is a cause of diabetes	166	93.8*	5	2.8	6	3.4
A common cause of diabetes is a lack of resistance towards insulin in the body	147	83.1	12	6.8*	18	10.2
Insulin is produced by the kidneys	76	42.9*	46	26.0*	55	31.1
Diabetes can be healed	72	40.7	37	20.9*	68	38.4
The best way to assess your diabetes is through urine tests	71	40.1*	32	18.1	74	41.8
Diabetes can damage the kidneys	113	63.8*	3	1.7	61	34.5
Uncontrolled sugar can lead to decreased sensitivity of the hands, fingers and feet	118	66.7*	7	4.0	52	29.4
Frequent urination and thirst are signs of low blood sugar	60	33.9	44	24.9*	73	41.2
The medication is more important than diet and exercise to control diabetes	60	33.9	64	36.2*	53	29.9
Hypoglycemia (low blood sugar) is caused by too much food	70	39.5	51	28.8*	56	31.6

*The corrects answer for the question referred to reliable sources.

Based on Table 1, most of the respondents answered 'yes' for question 1 (Eating too much sugar and sweet food is a cause of diabetes) (93.8 %) that suggest the respondent having good knowledge for this specific question. Furthermore, for question 5 (The best way to assess your diabetes is through urine test) the majority answered 'unsure' with 41.8 %. All the number of responses and percentage for other knowledge questions was shown in Table 1. While, according to the table 1, most of the respondents have good knowledge (67.2%).

Table 2: Frequency of level of diabetic knowledge among older persons in Selangor

Level of Knowledge	N	%
Median Score = 3 (IQR = 1)		
Good Knowledge (score > 3)	119	67.2
Poor Knowledge (score < 3)	58	32.8

The overall score for diabetic knowledge among older persons in Selangor showed that 67.2% (N=119) had a good knowledge and 32.8% (N=58) had poor knowledge, with a median of 3 points. Table 2 showed the level of diabetic attitude among older persons in Selangor.

4.4 Level of diabetic knowledge and diabetic attitude among older persons in Selangor

Table 3: Frequency of answers regarding diabetic attitude among older persons in Selangor

Question (Attitude)	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
In general, I believe that										
people who do not follow their recommended diabetes treatment don't really care about controlling their diabetes	3	1.7	3	1.7	5	2.8	24	13.6	142	80.2
controlling their diabetes should be the most important thing in the lives of people with diabetes	3	1.7	0	0	3	1.7	19	10.7	152	85.9
if people with diabetes do not cooperate and follow their recommended treatment, there is not much that healthcare professionals can do for them	2	1.1	5	2.8	5	2.8	20	11.3	145	81.9
decisions about caring for diabetes should be made by the doctor	7	4	4	2.3	13	7.3	21	11.9	132	74.6
diabetic patients should be referred to dieticians to help them with their diet	2	1.1	4	0.6	4	2.3	23	13	147	83.1

Based on Table 3, there were 5 most of the respondents answered 'strongly agree' for question 2 (In general, I believe that controlling their diabetes should be the most important thing in the lives of people with diabetes. While for question that respondents answer 'strongly disagree' the most was question 4 (In general, I believe that decisions about caring for diabetes should be made by the doctor). All the number of responses and percentage for other attitude questions was shown in Table 3.

Table 4: Frequency of level of diabetic knowledge among older persons in Selangor

Level of Attitude	N	%
Median Score = 25 (IQR = 1)		
Good Attitude (Score = 25)	118	66.7
Poor Attitude (Score < 25)	59	33.3

The overall score for diabetic attitude among older persons in Selangor showed that 66.7% (N=118) had a good attitude and 33.3% (N=59) had poor attitude, with a median of 25 points, ranging from 5 to 25 points. Table 4 showed the level of diabetic attitude among older persons in Selangor.

4.5 Sociodemographic characteristics of the respondents

Table 5: Frequency of sociodemographic factors of respondents

Sociodemographic Factors	N	%
Age Group		
60 - 74 years old	163	92.1
75 years old & above	14	7.9
Gender		
Male	98	55.4
Female	79	44.6
Marital Status		
Single/Widowed	29	16.4
Married	148	83.6
Race		
Malay	72	40.7
Non-Malay	105	59.3
Religion		
Muslim	76	42.9
Non-Muslim	101	57.1
Current Employment Status		
Have Job	72	40.7
Jobless	105	59.3
Educational Level		
Not Educated	6	3.4
Educated	171	96.6
Monthly Income		
No Income	56	31.6
Have Income	121	68.4

Table 5 showed the distribution of the respondents according to sociodemographic factors. The majority of the respondents were the age group of 60-74 years old (92.1 %), were male (55.4 %), and were married (83.6 %). Non-Malay were the majority with 59.3 % and mostly were non-Muslim (57.1 %). Most of the respondents were currently jobless (59.3 %), received education (96.6 %) and had monthly income (68.4 %). A detailed analysis with the value and percentage were shown in the table above.

4.6 Association between sociodemographic factors and knowledge related to diabetes among older persons in Selangor

Table 6: Chi square analysis between the sociodemographic factors and diabetic knowledge level among older persons in Selangor

Sociodemographic Factors	Knowledge Level				P-value
	Good		Poor		
	N	%	N	%	
Age Group					0.391
60 - 74 years old	111	68.1	52	31.9	
75 years old & above	8	57.1	6	42.9	
Gender					0.211
Male	62	63.3	36	36.7	
Female	57	72.2	22	32.8	
Marital Status					0.279
Single/Widowed	22	75.9	7	24.1	
Married	97	65.5	51	34.5	
Race					0.241
Malay	52	72.2	20	27.8	
Non-Malay	67	63.8	38	36.2	
Religion					*0.026
Muslim	58	76.3	18	23.7	
Non-Muslim	61	60.4	40	39.6	
Current Employment Status					0.151
Have Job	44	61.1	28	38.9	
Jobless	75	71.4	30	28.6	
Educational Level					0.395
Not Educated	3	50.0	3	50.0	
Educated	116	67.8	55	32.2	
Monthly Income					*0.008
No income	30	53.6	26	46.4	
Have Income	89	73.6	32	26.4	

(*) Showed significant association result.

Table 6 showed the association between sociodemographic factors and knowledge related to diabetes among older persons in Selangor.

For the age group, there was no significant association between age group and knowledge level (p=0.39). The percentage of the age group 60-74 years old (n=111, 68.1%) having good attitudes was significantly higher than the age group 75 years old and above. (n=8, 57.1%).

For gender, there was no significant association between gender and knowledge level (p=0.21). The percentage of female (n=57, 72.2%) having good knowledge was higher than male (n=62, 63.3%).

For marital status, there was no significant association between marital status and knowledge level (p=0.30). The percentage of single/widowed (n=22, 75.9%) having good knowledge was higher than married (n=97, 65.5%).

Regarding race, there was no association between race and knowledge level (p=0.24). The percentage of non-Malay (n=67, 63.8%) having good knowledge was higher than Malay (n=52, 72.5%).

Regarding religion, there was a significant difference of knowledge level between Muslim and non-Muslim (p=0.03). The proportion of having good knowledge was significantly higher among Muslim (n=58, 76.3%) than non-Muslim (n=61, 60.4%).

Regarding current employment status, there was no significant difference of knowledge level between having a job and jobless (p=0.15). The proportion of having good knowledge was significantly higher among jobless (n=75, 71.4%) than having a job (n=44, 61.1%).

In educational level, there was no significant difference of knowledge level between having not educated and educated (p=0.40). The proportion of having good knowledge was significantly higher in educated (n= 116, 67.8%) than not educated (n=3, 50%).

In monthly income, there was a significant difference of knowledge level between no income and having income (p=0.01). The proportion of having good knowledge was significantly higher in having income (n= 89, 73.6%) than no income (n=30, 53.6%).

4.7 Association between sociodemographic factors and attitude related to diabetes among older persons in Selangor

Table 7: Chi square analysis between the sociodemographic factors and diabetic attitude level among older persons in Selangor

Sociodemographic Factors	Attitude Level				P-value
	Good		Poor		
	N	%	N	%	
Age Group					1.000
60 - 74 years old	109	66.9	54	33.1	
75 years old & above	9	64.3	5	35.7	
Gender					0.915
Male	65	66.3	33	33.7	
Female	53	67.1	26	32.9	
Marital Status					0.566
Single/Widowed	18	62.1	11	37.9	
Married	100	67.6	48	32.4	
Race					*0.009
Malay	40	55.6	32	44.4	
Non-Malay	78	74.3	27	25.7	
Religion					*0.014
Muslim	43	56.6	33	43.4	
Non-Muslim	75	74.3	26	25.7	
Current Employment Status					*0.003
Have Job	57	79.2	15	20.8	
Jobless	61	58.1	44	41.9	
Educational Level					0.180
Not Educated	6	100.0	0	0.0	
Educated	112	65.5	59	34.5	
Monthly Income					0.052
No income	43	76.8	13	23.2	
Have Income	75	62.0	46	38.0	

(*) Showed significantly association result.

Table 7 showed the association between sociodemographic factors and attitude related to diabetes among older persons in Selangor.

For the age group, there was no significant association between age group and attitude level (p=1.00). The percentage of the age group 60-74 years old (n=109, 66.9%) having good attitudes was significantly higher than the age group 75 years old and above. (n=9, 64.3%).

For gender, there was no significant association between gender and attitude level (p=0.02). The percentage of female (n=53, 67.1%) having good attitudes was significantly higher than male (n=65, 66.3%).

For marital status, there was no significant association between marital status and attitude level (p=0.57). The percentage of married (n=100, 67.6%) having good attitude was significantly higher than single/widowed (n=18, 62.1%).

Regarding race, there was significant association between race and attitude level (p=0.01). The percentage of non-Malay (n=78, 74.3%) having good attitude was significantly higher than Malay (n=40, 55.6%)

Regarding religion, there was a significant difference of attitude level between Muslim and non-Muslim (p=0.01). The proportion of having good attitude was significantly higher among non-Muslim (n=75, 74.3%) than Muslim (n=43, 56.6%).

Regarding current employment status, there was a significant difference of attitude level between having a job and jobless (p=0.01). The proportion of having good attitude was significantly higher among having a job (n=57, 79.2%) than jobless (n=61, 58.1%).

In educational level, there was no significant difference of attitude level between not educated and educated (p=0.18). The proportion of having good attitude was significantly higher among the not educated (n=6, 100%) than educated (n=112, 65.5%).

In monthly income, there was no significant difference of knowledge level between no income and having income (p=0.052). The proportion of having good knowledge was significantly higher in no income (n= 43, 76.8%) than income (n=75, 62.0%).

4.8 Association between diabetic attitude and diabetic knowledge related to older persons in Selangor

Table 8: Chi square analysis between the diabetic attitude and diabetic knowledge level among older persons in Selangor

Knowledge Level	Good Attitude		Poor Attitude		Total
	N	%	N	%	
Good Knowledge	64	53.8	55	46.2	119
Poor Knowledge	54	93.1	4	6.9	58
Total	118	66.7	59	33.3	177

P-value = 0.000

Based on the Chi-Square tests, it showed that there is significant association between diabetes knowledge and attitude related to older persons in Selangor (p=0.000). 64 out of 118 individuals with good knowledge have a good attitude towards diabetes (74.2%) while 54 out of 58 individuals with poor knowledge have a good attitude (58.3%). Thus, it showed that more people with good knowledge have good attitudes towards diabetes compared to people with poor diabetic knowledge. Results were shown in table 8.

CHAPTER 5: DISCUSSION

5.1 Response Rate

177 respondents participated in our study out of 195 respondents in our sample size, giving us a response rate of 90.77%. The 177 respondents were elderly from Selangor who aged from 60 years and above. Table 5 showed the distribution and frequency percentage of our respondents' age group, gender, marriage status, race, religion, current employment status, education level and monthly income. According to table 5, majority of the respondents who participated in our study were of the age group 60 - 74 years old (92.1%) and 55.4% were male. 83.6% of the respondents were married. Malay ethnicity and Islamic religion respondents had major participation in this study which 40.7% and 42.9% respectively as Malay ethnicity and Islamic religion are the primary ethnic and religion in Malaysia. For current employment status, most of them were retired (26.6%) and unemployed (25.6%). This can be related to the retirement age in Malaysia which is 60 years and above. For educational level, 96.6% of the respondents were educated. Lastly for monthly income, 68.4 % got income.

5.2 Association between sociodemographic factors and knowledge related to diabetes among older persons in Selangor

Age showed no statistically significant association with knowledge in our study (p=0.39). This finding from our research is in accordance with the study about KAP regarding diabetes in the general population in Pakistan, Gillani A. H. et al, (2018) (p=0.264). For example, in one of the items, a significantly higher proportion (55.9%) of respondents aged 31–44 years knew that reducing carbohydrate intake can control diabetes compared with those aged ≥60 years (44.6%). These findings support our results as respondents aged 60 years and above had a poorer knowledge.

Gender showed no statistically significant knowledge level (p=0.21). This was similar to a study conducted by Chinnappan et al., (2017). They found that there was no noticeable difference between both sexes and gender was not a factor regarding difference of knowledge about diabetes (p > 0.991) with male 57.6% and female 57.7%. This finding tally with our result.

Marital status showed statistically no significant association with knowledge level (p=0.30). This was differerent with our study because, according to Al-Aboudi IS et al., (2016), by using Mann-Whitney test, they found out that patients who were not married performed better than married patients (p=0.045). Patients who were not married performed better than those who were married (8.91±2.09 vs. 10.66±1.63) and have strong association. This finding differs with our result because we found out that single/widowed respondents had better knowledge than married respondents.

There was no association between race and knowledge level (p=0.24). According to a study by Baradaran et al. (2004) in Nottingham's Pakistani community, Coventry's Indian community and British for type 2 diabetic patients revealed that there were no substantial differences between the Indian and Pakistani groups (mean=14.3, mean=13.8 respectively). These support our results that non-Malay having good knowledge was higher than Malay. Religion showed statistically significant association with knowledge between Islam and non-Islam (p=0.03). The proportion of having good knowledge is significantly higher among Islam (n=58, 76.3%) than non-Islam (n=61, 60.4%). In a study from Med et al. (n.d.) it said that the diabetic knowledge in religion was heavily associated by the level of religiosity of the individual. Hence, the was negative correlation found between religions and the HbA1c of the patients according to religion.

Religion showed statistically significant association with knowledge between Islam and non-Islam (p=0.03). This was similar to a study by Fakir M. Amirul Islam et al., 2014 it said that significant differences in knowledge scores between Hindu and Muslim may also be attributed to the lower education level amongst lower minority casts in the Hindu religion such as in Cobbler and Fishermen (p<0.01). These support our results that Islam having good knowledge was higher than non-Islam.

There was no statistically significant difference of knowledge level between having a job and being jobless (p=0.15). Study by Najib et al., (2014) mentioned that current job status has been found to be strongly linked to their characteristics of having good knowledge (p<0.01). This differs from our result, because respondents who were jobless performed better than respondents who were having a job. This was probably because in current economy, people who were working have higher stress level that causes them to not keep up to date with health knowledge.

In educational level, there was no statistically significant difference of knowledge level between not educated and educated (p=0.40). This is parallel from finding a study by Karaoui et al., 2018 (p=0.011). They mentioned that the patients with a university degree had a higher diabetes mellitus awareness score (Beta = 0.448, p = 0.001) than patients with a lower level of education (Beta = 0.066, p = 0.064). This finding tally with our result.

Monthly income showed there was a statistically significant association of knowledge level between no income and having income (p=0.01). The finding was parallel to the study conducted by Kassahun & Mekonen, 2017 that stated that those respondents whose average monthly family income of ≤500 Ethiopian Birr were 0.4 times (AOR = 0.4, CI = 0.2,0.6) and 501–1000 (AOR = 0.4, CI = 0.2,0.7) Ethiopian Birr were 0.4 times less likely to have diabetes knowledge as compared to those earned ≥ 2000 Ethiopian Birr. These support our results that having income knowledge was higher than no income.

5.3 Association between sociodemographic factors and attitude related to diabetes among older persons in Selangor

Table 7 showed the association between sociodemographic factors and attitude related to diabetes among older persons in Selangor.

In our study, we did research on the associations between sociodemographic factors (age group, gender, marriage status, race, religion, current employment status, education level and monthly income) and the level of attitude to diabetes among older persons in Selangor. The significant associated factors based on bivariate analysis for diabetes attitude among elderly were being non-Malay, non-Islam, having job and having no monthly income.

The results of our study show that there was no significant association between age group and attitude level. A study by Borba et al. (2019) stated that age was not associated with the attitude level toward diabetes (p=0.387). It showed that the percentage of individuals aged 70 years (88.6%) and above with a negative attitude was higher than individuals age <70 years old (84.1%). These findings support our results as respondents aged 75 years and above had a poorer attitude.

For gender, there was no significant association between gender and attitude level. de Lima et al. (2020) stated that there was no association between gender and attitude level (p=0.742). In this study it showed that female (26.6%) has higher percentage for positive attitude toward diabetes compared to male (19.7%). This finding is tally with our result.

The results of our study also showed that for marital status, there was no significant association between marital status and attitude level. A study by de Lima et al. (2020), stated that there was no association between marital status and attitude level (p=0.638). It showed that the percentage of married (25.2%) having a good attitude was significantly higher than single/widowed (22.4%) (de Lima et al., 2020). These findings support our results as married respondents had a higher percentage of good attitudes towards diabetes.

Our study showed that there was a significant association between race and attitude level toward diabetes. A study by Ishak (2016) stated that non-Malay, having family care during periods of illness, having family support, having acceptable and good diabetes knowledge, and having chronic kidney disease (CKD) and neuropathy were the significant associated factors based on simple and multiple linear regressions for diabetes self-care among elderly. It showed that being non-Malay made the diabetes self-care score 5.275, which was higher (95% CI: 1.94, 8.61) than the Malay score after controlling for other variables. Another study by Chew et al., 2011 states that a significant association was found between ethnic groups and HbA1c ($F = 5.491$, $p = 0.005$, $df = 2$). The mean HbA1c level of the Chinese was significantly lower than that of the Malays and the Indians shown by Scheffe´ post hoc analysis. These findings support our results as Malay participants has poorer level of attitude to diabetes.

Regarding religion, there was a significant difference of attitude level between Islam and non-Islam. Med et al. (n.d.) stated that there is a negative correlation was found between Moslems' BV score and HbA1c level ($r = –0.34$, $p = 0.007$). The correlation was still significant after controlling for the duration of diabetes ($r = –0.37$, $p = 0.007$). Moslem had had significantly higher mean rank HbA1c when compared with Christians, atheists, Roman Catholics and Buddhists. These finding support our results as Islamic participants has lower percentage of good diabetic attitude (56.6%, p=0.014).

In educational level, there was no significant difference of attitude level between not educated and educated. de Lima et al. (2020) stated that there is no association between

educational level and attitude level (p=0.777). It showed that the percentage of respondents schooling for 0-4 years (24.8%) with a good attitude was significantly higher than schooling for 5 years and above (23.1%) (de Lima et al., 2020). These findings support our results as non-educated respondents had a higher percentage of good attitudes towards diabetes.

Regarding Current employment status, Najib et al., (2014) stated there was a significant difference of attitude level between have job and jobless (p<0.01). This study showed that 51.33% of employed individual had good attitude while 32.67% of unemployed individual had good attitude These finding support our results as employed participants had higher percentage of good diabetic attitude (n=57, 79.2%, p=0.01).

The findings of our study showed that there was a no significant difference of attitude level between no income and having income which different from previous study. Abbasi Y.F. et. al, 2018 stated that there was significant association between monthly income and attitude level toward diabetes (p<0.001). The result of this study showed that individuals with higher monthly income (RM3501-RM5000) has highest percentage (100%) compared to others (<RM2500, RM2500-RM3500). However, our findings were contradictory with the past studies. This may be due to the limitation that our study faced which was the respondents involved were the older persons in Selangor only. Furthermore, the respondents were afraid because they might be unable to pay the medical bill, so they tried to practice a better attitude toward diabetes.

5.4 Association between attitude and knowledge related to older persons in Selangor

There was statistically significant association between diabetes knowledge and attitude related to older persons in Selangor (p<0.000). 64 out of 119 individuals with good knowledge have a good attitude towards diabetes (74.2%) while 54 out of 58 individuals with poor knowledge have a good attitude (58.3%). Hence, we can see that respondents with good knowledge have good attitudes obtained higher percentage than respondent with poor knowledge toward diabetes.

According to a study by Borba et al. (2019), the attitude towards diabetes mellitus can be determined by how the individual makes their decision to practice or not the self-care measures for diabetes control. This behavior is also related to their knowledge level whether through their own experience or advice from professional healthcare. From this research, it was known that most of the respondents have a negative attitude towards diabetes mellitus, which is 85.6% of the respondents (95% Cl 80.0; 90.2). But this is due to many factors such as low educational level or low socioeconomic status.

There was also a study by Abdo & Mohamed (2010). They conducted a study from a community in Egypt, it showed that the elderly had a lower level of knowledge and attitude towards diabetes mellitus when compared with the younger generations.

Thus, we can see from these studies that knowledge and attitude are greatly associated. So, when a person has good knowledge, he has a good attitude and vice versa.

CHAPTER 6: CONCLUSION

6.1 Conclusion

In our study done on 177 older persons in Selangor, there is significant association between the sociodemographic factors of religion and monthly income with diabetic knowledge among the older persons in Selangor. However, there was no significant association between the sociodemographic factors of age, gender, marital status, race, current employment status and level of education with diabetic knowledge among the older persons in Selangor. As for attitude towards diabetes, it was shown that there is significant association between the sociodemographic factors of race, religion and current employment status with attitude towards diabetes among older persons in Selangor. There was no significant association between the sociodemographic factors of age, gender, marital status, educational level and monthly income with attitude towards diabetes among older persons in Selangor. On the other hand, there was significant association between diabetic knowledge and attitude towards diabetes among older persons in Selangor.

6.2 Limitations

Our study focused solely on the older persons in Selangor, so the generalization of our study was only limited to those older persons that reside in Selangor. Besides, our study was a cross-sectional study, which could not determine a causal relationship and study a temporal relationship. Furthermore, there was also non-respondent bias as some of the older persons do not answer the questionnaire because they do not understand the terms used.

6.3 Recommendations

Based on the research that we conducted, we suggested other researchers to extend the study to older persons in other states in Malaysia to determine the level of diabetic knowledge among older persons. This could also assist in identifying the attitude of older persons towards diabetes. Diabetes is very common in older persons and the attitude of a diabetes patient is very important in deciding the outcome of their diabetes treatment.

Moreover, diabetic knowledge and the correct attitude towards diabetes should be widely disseminated among the older persons. Awareness can be increased among older persons

by organizing campaigns in the community or health facilities, thus further promoting the importance of a healthy lifestyle. Displaying simple posters and holding interesting exhibitions can greatly assist the older persons to increase their diabetic knowledge and attitude towards diabetes because their attention can easily be drawn towards the colorful presentation. This method is very crucial as it can educate the older persons regarding diabetic knowledge and the right attitude towards diabetes.

APPENDIX

Appendix 1

Sample size estimation:

Prevalence Formula		
No.	Factors	N
1)	Attitude towards diabetes mellitus	157
Two Proportion Formula		
No.	Factors	N
1)	Schooling (0-4 years & 5 years and above) related to good diabetic knowledge	480
2	With or without other diseases related to good diabetic knowledge	27

Appendix 2

Questionnaire Regarding Perceived Barriers Towards Management And Control Of Geriatric Diabetes

Soal Selidik Mengenai Halangan Terhadap Pengurusan Dan Pengendalian Diabetes Geriatrik

Section A: Sociodemographic Factors

BahagianA: Faktor Sosiodemografi

Please answer ALL questions below and put (√) in the answer box whichever appropriate to you.

Sila jawab SEMUA soalan dan letakkan (√) *pada kotak jawapan pada mana-mana jawapan yang bersesuaian dengan anda.*

1. Date of birth/ *Tarikh lahir* : _____

2. Gender/ *Jantina* : [ ] Male/ *Lelaki*
   [ ] Female/ *Perempuan*

3. Marital status/ *Status perkahwinan* : [ ] Single/ *Bujang*
   [ ] Married/ *Berkahwin*

4. Ethnicity/ *Kaum* : [ ] Malay/ *Melayu*
   [ ] Chinese/ *Cina*
   [ ] Indian/ *India*
   [ ] Others/ *Lain- lain*: _____

5. Religion/ *Agama* : [ ] Islam
   [ ] Christian/ *Kristian*
   [ ] Buddha
   [ ] Hindu

6. Current employment status/ *Status pekerjaan semasa* : [ ] Full time employment/ *Pekerjaan sepenuh masa*
   [ ] Part time employment/ *Pekerjaan separuh masa*

[ ] Self employed/ *Bekerja sendiri*
[ ] Unemployed/ *Menganggur*
[ ] Housewife/man/ *Suri Rumah*
[ ] Retire/ *Bersara*

7. Educational level/ *Tahap pendidikan*: [ ] No formal education/ *Tiada pendidikan formal*
[ ] Primary school/ *Sekolah rendah*
[ ] SPR/PMR or equivalent/ *SPR/PMR atau yang bersamaan*
[ ] SPM/STPM or equivalent/ *SPM/STPM atau yang bersamaan*
[ ] Diploma or equivalent/ *Diploma atau yang bersamaan*
[ ] Degree/above or equivalent *Ijazah/ ke atas atau yang bersamaan*

8. Monthly income/ *Pendapatan bulanan* : [ ] No income/ *Tiada pendapatan*
[ ] RM 1,000 and below / *RM 1,000 dan kebawah*
[ ] RM 1,001 – RM 2,000
[ ] RM 2,001 – RM 3,000
[ ] RM 3,001 – RM 4,000
[ ] RM 4,001 and above

Section B: Diabetic Knowledge

Bahagian B: Pengetahuan tentang diabetes

Please tick (√) for the most appropriate answer for each statement below.

Sila tanda (√) pada jawapan yang bersesuaian dengan pernyataan di bawah.

No	Statements	Yes	No	Unsure
1.	Eating too much sugar and sweet foods is a cause of diabetes. *Makan terlalu banyak gula dan makanan manis adalah penyebab diabetes.*			
2.	A common cause of diabetes is a lack of resistance			

	towards insulin in the body. *Kebiasannya, penyebab diabetes adalah kekurangan atau kurang keberkesanan insulin dalam badan*			
3.	Insulin is produced by the kidneys. *Insulin dihasilkan oleh buah pinggang.*			
4.	Diabetes can be healed. *Diabetes boleh sembuh*.			
5.	The best way to assess your diabetes is through urine tests. *Kaedah terbaik untuk menilai diabetes adalah melalui ujian air kencing.*			
6.	Diabetes can damage the kidneys. *Diabetes boleh merosakkan buah pinggang.*			
7.	Uncontrolled sugar can lead to decreased sensitivity of the hands, fingers and feet. *Gula yang tidak terkawal boleh menyebabkan kurang kepekaan/sensitif tangan, jari dan kaki.*			
8.	Frequent urination and thirst are signs of low blood sugar. *Kerap membuang air kecil dan dahaga adalah tanda darah rendah gula.*			
9.	The medication is more important than diet and exercise to control diabetes. *Penggunaan ubat adalah lebih penting daripada diet dan bersenam untuk mengawal diabetes.*			
10.	Hypoglycaemia (low blood sugar) is caused by too much food *Hipoglisemia (gula darah rendah) disebabkan oleh pemakanan yang banyak.*			

Section C : Diabetic attitude

Bahagian C: Sikap pesakit diabetes

Please tick (√) for the most appropriate answers for the each statement below.

Sila tanda (√) pada jawapan yang bersesuaian dengan pernyataan di bawah.

1. Strongly disagree / Sangat tidak bersetuju
2. Disagree / Tidak bersetuju
3. Neutral / Neutral
4. Agree / Bersetuju
5. Strongly agree / Sangat bersetuju

No.	Statements	1	2	3	4	5
In general, I believe that *Secara umum, saya percaya bahawa*						
1.	...people who do not follow their recommended diabetes treatment don't really care about controlling their diabetes. *...orang yang tidak mengikuti rawatan diabetes yang disyorkan mereka tidak begitu peduli untuk mengawal diabetes mereka.*					
2.	...controlling their diabetes should be the most important thing in the lives of people with diabetes. *...mengawal diabetes mereka harus menjadi perkara terpenting dalam kehidupan penghidap diabetes.*					
3.	...if people with diabetes do not cooperate and follow their recommended treatment, there is not much that healthcare professionals can do for them. *... jika penghidap diabetes tidak bekerjasama dan tidak mengikuti rawatan yang disyorkan, tidak banyak yang dapat dilakukan oleh profesional penjagaan kesihatan untuk mereka.*					
4.	...decisions about caring for diabetes should be made by the doctor.					

	... keputusan mengenai merawat diabetes harus dibuat oleh doktor.					
5.	...diabetic patients should be referred to dieticians to help them with their diet. *... pesakit diabetes harus merujuk pakar diet untuk membantu mereka dalam diet mereka.*					

Appendix 3

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED

CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. **STUDY TITLE:**
Sociodemographic Factors Associated With Diabetic Knowledge And Attitude Among Older Persons In Selangor

2. INTRODUCTION:
This research is to study the relationship between sociodemographic factors with diabetic knowledge and attitude among older persons in selangor.

3. WHAT WILL YOU HAVE TO DO?
You will have to fill in your personal information including birth date, gender, ethnicity, religion, marital status, current employment status, educational and monthly income. Besides, you will need to fill in answers for the 10 questions on knowledge about diabetes mellitus. Lastly, you will need to fill in the answers for 10 questions about your attitude towards diabetes mellitus by using the 5-point likert scale. Please note that participation is voluntary, and participants may withdraw anytime without penalty or loss of benefit.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?
You should not participate if you are not a resident in Selangor that is 60 years old and above.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) **TO YOU AS THE SUBJECT?**
Once the research is done, you will know whether your knowledge towards diabetic mellitus is sufficient and whether your attitude towards it is good.

(b) **TO THE INVESTIGATOR?**
The investigator can determine if there is truly a significant relationship between sociodemographic factors with diabetic knowledge and attitude among older persons in Selangor. If proven, measures have to be taken because diabetes mellitus is one of the four main non communicable diseases that cause mortality and morbidity in Malaysia.

6. WHAT ARE THE POSSIBLE RISKS?

There is no significant risk to the respondents.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

The research investigators will collect personal information about you as part of the study but your identity (name, identification card number) will not be asked. The data obtained from this study are allowed to be shared during discussions or any other related sessions with our research team. However, apart from our team, any other information concerning you will be kept in strict confidentiality.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

No	Name	Dept & Address	H.P/Office/Fax	E-mail
1	PROF MADYA DR. HALIMATUS SAKDIAH MINHAT	DEPT. OF COMMUNITY HEALTH, FMHS UPM	012-3438175	halimatus@upm.edu.my
2	DR. HAKIMAH MOHAMMAD SALLEHUDDIN	DEPT. OF MEDICINE, FMHS UPM	017-2598323	drhakimah@upm.edu.my
3	NURUL ANIS SALSABIELA BINTI GHAZALI	BACHELOR OF DOCTOR OF MEDICINE, FMHS UPM	019-4156555	200602@student.upm.edu.my
4	LOO CHENG YEE	BACHELOR OF DOCTOR OF MEDICINE, FMHS UPM	011-65612993	200920@student.upm.edu.my
5	SITI NASUHA BINTI HAMBALI	BACHELOR OF DOCTOR OF MEDICINE, FMHS UPM	019-8581824	204138@student.upm.edu.my

*Please initial here if you have read and understood the contents of this page*_____

9. CONSENT

I ..... Identity Card No. .....
address.....
.....hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature .....
(Respondent)

Signature .....
(Witness)

Date :.....

Name :.....

I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date .....

Signature .....
(Researcher)

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN
Faktor Sosiodemografi berkaitan dengan Ilmu Pengetahuan tentang Penyakit Kencing Manis dan Sikap dalam golongan Warga Emas di Selangor

2. PENGENALAN
Kajian ini adalah untuk mengkaji hubungan di antara faktor sosiodemografi dengan ilmu pengetahuan tentang penyakit kencing manis dan sikap dalam golongan warga emas di Selangor.

3. APAKAH YANG PERLU ANDA LAKUKAN?
Anda harus mengisi maklumat peribadi termasuk tarikh lahir, jantina, etnik, agama, status perkahwinan, status pekerjaan semasa, tahap pelajaran dan pendapatan bulanan. Selain itu, anda perlu menjawab 10 soalan berkaitan dengan ilmu pengetahuan tentang penyakit kencing manis. Akhir sekali, anda harus menjawab 10 soalan tentang sikap anda terhadap penyakit kencing manis dengan menggunakan skala likert 5-point. Untuk makluman anda, penyertaan dalam kajian ini adalah secara sukarela dan peserta boleh menarik diri pada bila-bila masa tanpa denda atau kerugian.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Anda tidak boleh menyertai kajian ini jika bukan warga emas yang berumur 60 tahun ke atas yang menetap di Selangor.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?
Selepas kajian tamat, anda akan dapat tahu adakah ilmu pengetahuan anda tentang penyakit kencing manis adalah mencukupi dan adakah sikap anda terhadap penyakit kencing manis adalah baik.

b) KEPADA PENYELIDIK?
Penyelidik dapat menentukan bahawa adakah hubungan di antara faktor sosiodemografi dengan ilmu pengetahuan tentang penyakit kencing manis dan sikap antara warga emas di Selangor signifikan. Jika dibuktikan benar, tindakan yang berpatutan harus dikenakan kerana penyakit kencing manis merupakan salah satu penyakit utama yang menyebabkan kematian dan morbidit di Malaysia.

6. ADAKAH IA BERISIKO?

Kajian ini tidak berisiko kepada peserta.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Penyelidik akan mengumpul maklumat peribadi anda sebagai sebahagian daripada kajian ini. Namun, identiti anda (nama, nombor kad pengenalan) tidak akan ditanya. Maklumat yang dikumpul untuk kajian ini dibenarkan untuk dikongsi dengan kumpulan kajian kami semasa perbincangan dan sesi pertemuan yang lain. Maklumat anda yang telah kami kumpul akan disimpan dalam kerahsiaan kepada pihak lain yang tidak terlibat dalam kumpulan kajian kami.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

No	Nama	Jabatan & Alamat	H.P/Pejabat/Fax	E-mel
1	PROF MADYA DR. HALIMATUS SAKDIAH MINHAT	JABATAN KESIHATAN KOMUNITI, FPSK UPM	012-3438175	halimatus@upm.edu.my
2	DR. HAKIMAH MOHAMMAD SALLEHUDDIN	JABATAN PERUBATAN, FPSK UPM	017-2598323	drhakimah@upm.edu.my
3	NURUL ANIS SALSABIELA BINTI GHAZALI	BACELOR DOKTOR PERUBATAN, FPSK UPM	019-4156555	200602@student.upm.edu.my
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Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya..... No Kad Pengenalan. ..... beralamat..... .....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imej/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ..... Tandatangan .....
(*Responden*) (*Saksi*)

Tarikh :..... Nama :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ..... Tandatangan .....
(*Penyelidik*)

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