

KNOWLEDGE AND ATTITUDE TOWARDS  
DIABETIC RETINOPATHY AMONG DIABETIC  
PATIENTS IN OUTPATIENT CLINICS AT HOSPITAL  
UNIVERSITI SAINS MALAYSIA

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PATIENTS IN OUTPATIENT CLINICS AT HOSPITAL  
UNIVERSITI SAINS MALAYSIA

by

NUR DAFINAH BINTI ZOLKIFLEE

Dissertation submitted in partial fulfilment of  
the requirements for the degree of  
Bachelor of Nursing with Honours

June 2024

## CERTIFICATE

This is to certify that the dissertation entitled KNOWLEDGE AND ATTITUDE TOWARDS DIABETIC RETINOPATHY AMONG DIABETIC PATIENTS IN OUTPATIENT CLINICS AT HOSPITAL UNIVERSITI SAINS MALAYSIA is the bona fide record of research work done by Ms NUR DAFINAH ZOLKIFLEE during the period from October 2023 to June 2025 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Nursing (Honours)

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## DECLARATION

I hereby declare that this dissertation is the result of my own investigation, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

*dafinah*  
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KNOWLEDGE AND ATTITUDE TOWARDS DIABETIC RETINOPATHY AMONG  
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SAINS MALAYSIA

**Abstrak**

Tujuan kajian ini adalah untuk memastikan tahap pengetahuan dan tingkah laku tentang retinopati diabetik dalam kalangan individu bukan perubatan dalam komuniti yang menerima rawatan di klinik HUSM. Retinopati diabetik adalah komplikasi diabetes mellitus yang tidak terkawal berpanjangan. Masalah ini semakin menjadi isu sejak statistik peningkatan retinopati diabetik di negara pembangunan. Anehnya, tiada kajian dibuat berhubung isu ini di Malaysia. Dalam kajian keratan rentas berasaskan populasi ini, 151 pesakit diabetes yang dipilih secara rawak mengambil bahagian dalam temu bual bersemuka dengan penyelidik menggunakan soal selidik separa berstruktur. Data yang dikumpul dianalisis melalui SPSS versi 26.0. Ciri sosiodemografi, tahap pengetahuan dan tahap sikap dipersembahkan dalam statistik deskriptif. Selain itu, perkaitan antara ciri sosiodemografi, tahap pengetahuan dan tahap sikap telah dianalisis oleh Pearson Chi Square. Mata diberikan untuk setiap jawapan berdasarkan markah jawapan. Sikap yang baik untuk mengurangkan risiko mendapat retinopati diabetik adalah kurang daripada separuh daripada responden. Hasil kajian menunjukkan bahawa 82 (54.3%) peserta mempunyai tahap pengetahuan yang tinggi mengenai retinopati diabetik dan 70 (46.4%) peserta mempunyai tahap sikap yang tinggi terhadap retinopati diabetik. Tidak terdapat perkaitan antara skor pengetahuan dan skor sikap ( $p = 0.746$ ), keputusan menunjukkan hanya 39 (47.6%) peserta mempunyai pengetahuan yang baik dan sikap tahap tinggi. Akhir sekali, terdapat perkaitan antara faktor sosiodemografi [jantina ( $p = 0.024$ ), jenis diabetes mellitus ( $p = 0.000$ ), tempoh diabetes mellitus ( $p = 0.040$ )] dan tiada perkaitan antara [umur ( $p = 0.082$ ), tahap pendidikan ( $p = 0.292$ ), jenis rawatan ( $p = 0.977$ )] dan

tahap pengetahuan tentang retinopati diabetik. Oleh itu, tindakan atau strategi yang sewajarnya perlu diambil untuk menyelesaikan isu tersebut dan meningkatkan pengetahuan serta sikap pesakit yang hadir ke klinik pesakit luar.

**KNOWLEDGE AND ATTITUDE TOWARDS DIABETIC RETINOPATHY  
AMONG DIABETIC PATIENTS IN OUTPATIENT CLINICS AT HOSPITAL  
UNIVERSITI SAINS MALAYSIA**

**Abstract**

The purpose of this study is to ascertain the level of knowledge and behaviour about diabetic retinopathy among non-medical individuals in the community who receive treatment at the HUSM clinic. Diabetic retinopathy is a complication of prolonged uncontrolled diabetes mellitus. This problem getting an uprise issue since the statistic of diabetic retinopathy increase in development country. Surprisingly, there has no research done regarding this issue in Malaysia. In this population-based cross-sectional study, 151 randomly selected diabetic patients participated in face-to-face interviews with researchers using a semi-structured questionnaire. The collected data was analysed through SPSS version 26.0. Sociodemographic characteristics, level of knowledge and level of attitude were presented in descriptive statistics. Besides, the association between sociodemographic characteristics, level of knowledge and level of attitude was analysed by Pearson Chi-Square. Points are awarded for each answer based on the answer score. Good attitude to reduce the risk of getting diabetic retinopathy is less than half of the respondents. The results show that 82 (54.3%) of participants have a high level of knowledge on diabetic retinopathy and 70 (46.4%) of participants have high level of attitude on diabetic retinopathy. There was no association between knowledge score and attitude score ( $p = 0.746$ ), the result shows only 39 (47.6%) of participants have good knowledge and high-level attitude. Lastly, there was the association between sociodemographic factors [gender ( $p = 0.024$ ), type of diabetes mellitus ( $p = 0.000$ ),



duration of diabetes mellitus ( $p = 0.040$ ) and no association between [age ( $p = 0.082$ ), educational level ( $p = 0.292$ ), type of treatment ( $p = 0.977$ )] and the level of knowledge on diabetic retinopathy. Therefore, appropriate action or strategies should be taken to solve the issue and increase knowledge and attitude in patient attend outpatient clinic.

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## **LIST OF ABBREVIATION**

T2DM	Type 2 Diabetes Mellitus
T1DM	Type 1 Diabetes Mellitus
USM	Universiti Sains Malaysia
HUSM	Hospital Universiti Sains Malaysia
HBM	Health Belief Model
KPP	Klinik Pakar Perubatan
KRK	Klinik Rawatan Keluarga
HREC	Human Research Ethical Committee



# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter includes the research's background, problem statement, objectives (both general and specific), study hypothesis, study significance, and definitions of concepts and operations that are presented.

### 1.2 Background of the Study

Diabetes is a chronic metabolic condition characterised by high levels of blood glucose (or blood sugar), which causes serious damage to the heart, blood vessels, eyes, kidneys, and nerves over time. Type 2 diabetes is the most prevalent, normally affecting adults, and arises when the body develops insulin resistance or fails to produce enough insulin (WHO, 2022). A rising number of blind people in middle-income countries are developing blindness from diabetic retinopathy, which is a major cause of new-onset blindness in working-age populations in industrialised nations (Srinivasan, 2017).

Over time, retinopathy will develop in every diabetic patient. The prevalence is directly correlated with the length of diabetes (Dr Manesh, 2006). There is a significant morbidity burden associated with diabetes mellitus (DM) and its complications. One obvious consequence of diabetes that affects the eyes is diabetic retinopathy, which accounts for a sizable percentage of blindness globally (Mersha, 2021). To improve early identification and appropriate response, awareness and adequate knowledge of this extremely common condition are essential (Al-Yahya, 2020).

Most study done in Asia, they found that knowledge and attitude related with diabetic retinopathy was low and unsatisfied. On the other hand, even older age has unsatisfied knowledge but good attitude preventing diabetic retinopathy. They explained that unexposed specific information regarding diabetes mellitus complication causes

them to have low knowledge of diabetic retinopathy but good attitude in preventing diabetic retinopathy because they follow the yearly eye appointment given. Study done in Malaysia, according to age category, most of the population (n=3305) was under 60 years old, making up around 61.5% of the total, whilst most of the population (n=3305) was over 60 years old, making up 38.5%. Which is high in number. Besides, 15% were diabetic retinopathy who were 60 years of age or older (Ngah,2020).

Given the above discussion, it is evidence that there are indeed low knowledge and attitude among diabetic patient regarding this complication. As we see, low knowledge of diabetic retinopathy among diabetic patient increases the risk of diabetic retinopathy incidence. Again, it is for this reason that research on level of knowledge and attitude regarding diabetic retinopathy among diabetic patients in outpatient clinics needs to be done in order for the healthcare professional to pay attention and look through these issues as well as coming up with some appropriate action and solution.

### **Problem Statement**

Malaysian Diabetes Index (MDI) reveals more than half (52%) of respondents do not know that diabetes cannot be cured, while 51% think that diabetes is easy to manage. Besides, about 1 in 3 respondents (37%) with diabetes do not know the abnormal blood sugar level readings (Astrazeneca, 2021). In current study shown that it seems that Malaysians might not be completely aware of the health issues that arise from diabetes.

Diabetes complications are an irreversible condition that increases the risk of developing heart disease, kidney disease, blindness, nerve damage, and amputations, among other illnesses. The degree of diabetes, glycaemic management, other medical conditions, and patient adherence to prescribed treatment influence the prognosis of diabetic retinopathy (Diabetic retinopathy, 2023).

The most important risk factors for the development of diabetic retinopathy are the duration of diabetes, poor glycaemic control, and the presence of hypertension. Additional risk factors for diabetic retinopathy include pregnancy, puberty, having a higher body mass index, and having had cataract surgery (Simó-Servat, 2019). Therefore, effective glycaemic management is essential for diabetic retinopathy prevention (Naserrudin et al., 2022).

Comprehensive statistics regarding the incidence and progression of diabetic retinopathy are essential for developing important public health programs, like screening campaigns. Screening for retinopathy associated with diabetes is crucial for early detection, treatment, and avoidance (Sabanayagam, Banu, Chee, 2019). The implementation of measures by healthcare authorities to enhance patient and practitioner understanding regarding the management of diabetes risk factors is necessary to reduce the incidence of diabetic retinopathy (Naserrudin et al., 2022).

The purpose of this research is to examine the perspectives of diabetic patients who visit the clinic at Hospital Universiti Sains Malaysia (USM) regarding health and related issues such as diabetes and its complications. The results of this study will also help researchers to understand better what additional work can be done locally to raise awareness of diabetic retinopathy.

This study is conducted to analyse how diabetic patients that who attends the clinic at Hospital University Science Malaysia (HUSM) see health and related concerns like diabetes and diabetes complication. Then, through this study we can better understand what more we can do at the local level in improving awareness regarding diabetic retinopathy.

### **1.3 Research questions**

1. What is the level of knowledge towards diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM?
2. What is the level of attitude of risk-reducing diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM?
3. Any association between the level of knowledge and the level of attitude toward diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM?
4. Is there any association between selected sociodemographic factors (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) and diabetic patient's knowledge towards diabetic retinopathy?
5. Is there any association between selected sociodemographic factors (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) and diabetic patient's attitude towards diabetic retinopathy?

### **1.4 Study Objective**

#### **1.5.1 General Objective**

This study aims to improve knowledge regarding diabetes mellitus complication which is diabetic retinopathy among diabetic patients in outpatient clinics at Hospital Universiti Sains Malaysia (USM).

#### **1.5.2 Specific Objectives**

The following specific objectives of this study are:

1. To determine the level of knowledge of diabetic retinopathy among diabetic patients in outpatients clinics at Hospital USM.
2. To determine the level of attitude diabetic retinopathy among diabetic patients in Hospital USM.

3. To determine the association between the level of knowledge and the level of attitude toward diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM.
4. To determine the association between selected sociodemographic data (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of knowledge towards diabetic retinopathy among diabetes patients in outpatient clinics at Hospital USM.
5. To determine the association between selected sociodemographic data (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of attitude toward diabetic retinopathy among diabetes patients in outpatient clinics at Hospital USM.

## **1.5 Study Hypothesis**

### **Hypothesis 1**

(H<sub>0</sub>): There is no significant association between the level of knowledge and the level of attitude toward diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM.

(H<sub>A</sub>): There is a significant association between the level of knowledge and the level of attitude toward diabetic retinopathy among diabetic patients in outpatient clinics at Hospital USM.

### **Hypothesis 2**

(H<sub>0</sub>): There is no significant association between selected socio-demographic characteristics (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of knowledge toward diabetic retinopathy among diabetes patients in outpatient clinics at Hospital USM.

(HA): There is a significant association between selected socio-demographic characteristics (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of knowledge toward diabetic retinopathy among diabetes patients in outpatient clinics at Hospital USM.

### **Hypothesis 3**

(H<sub>0</sub>): There is no significant association between selected sociodemographic data (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of attitude toward diabetes retinopathy among diabetes patients in outpatient clinics at Hospital USM.

(HA): There is a significant association between selected sociodemographic data (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus) with the level of attitude toward diabetes retinopathy among diabetes patients in outpatient clinics at Hospital USM.

### **1.6 Significance of the study**

The finding from this study will determine diabetic patient's knowledge and attitude towards diabetic retinopathy. It is hoped that the findings of the study can contribute to the understanding that diabetic patients were experiencing low awareness level and identify the key knowledge gap related to disease.

The fundamental component of healthcare is education. Consequently, nurses are essential in helping people with diabetes by establishing the support systems within the community that many depend on for guidance and assurance. Nurses not only assist with providing medications, such as insulin, which has the potential to save a patient's life but giving awareness about complication of illness as one of important components. Nurses also offer vital psychological and healthcare guidance to help patients manage the everyday difficulties that a chronic illness can present.

Despite contributing beneficial meals and lifestyle recommendations, nurses are crucial in increasing public knowledge of the warning signs and symptoms of type 2 diabetes to facilitate early diagnosis and treatment (Boulton, 2020).

In this study, the researcher wished to conduct a study regarding the matter of knowledge and attitude on diabetes retinopathy based on the current location in Hospital universiti Sains Malaysia. Besides, it can become a reference for healthcare professionals especially researcher to plan for a better understanding the diabetic patient.

### 1.7 Operational definition

The operational terms used in this research proposal are shown below :

Terms	Conceptual Definition	Operational Definition
Knowledge of diabetic retinopathy	Perception of a subject acquired through study or experience that is shared by a diabetic patient (Cambridge University Press, 2023)	Refers to the information that the diabetic patient has about diabetic retinopathy.
Attitude of diabetic retinopathy:	A behaviour resulting from diabetes mellitus regarding diabetic retinopathy to diabetic patients (Cambridge University Press, 2023)	Refers to the act that the diabetic patient has about to lower the possible risk factors contributing to the development of diabetic retinopathy.
Retinopathy	A disease of retina that involves the growth of abnormal blood vessels in the retina (Cambridge University Press, 2023)	A complication of diabetes mellitus.

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Diabetic patient	A person that diagnosed with diabetes mellitus (Cambridge University Press, 2023)	In this study, diabetic patient aged more than 18 years old that able to read and write and able to answer the questionnaire that receive treatment at selected outpatient clinic in Hospital USM.
Outpatient clinic	A place for patient who visits a for treatment or guidance about diabetic retinopathy (Cambridge University Press, 2023)	Refers to the Klinik Pakar Perubatan (KPP) and Klinik Rawatan Keluarga (KRR).

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## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

To further our understanding of this matter, this literature review will evaluate and expand on prior research on it that includes many points of view from researchers.

#### **2.1 Epidemiology**

##### **2.1.1 Worldwide**

With an estimated 950,000 cases, diabetic retinopathy is the primary cause of visual impairment and blindness in the World Health Organisation European Region (WHO, Promoting diabetic retinopathy screening, 2023).

##### **2.1.2 Asia**

Most of the world's diabetic population is in Asia. In addition, 230 million Asians or around 55% of the global diabetic population have diabetes presently, and by 2040, that figure is predicted to rise to over 355 million (Yang, 2019).

##### **2.1.3 Malaysia**

Malaysia has the highest diabetes rate in the Western Pacific area and one of the highest in the world, with an annual cost of roughly 600 million US dollars. Diabetes prevalence increased by 68.3% from 11.2% in 2011 to 18.3% in 2019 (Sabanayagam, Banu, Chee, 2019). Over time, the overall number of diabetes patients in emerging nations increased. The incidence increased in Malaysia from 11.6% in 2006 to 17.5% in 2015. According to the findings of the National Health and Morbidity Survey, also known as NHMS I (1986), NHMS II (1996), and NHMS III (2006), the prevalence of diabetes mellitus is expected to reach 15.3% by 2020, but it has already achieved those level nine years earlier. The updated forecast is 21.6%, meaning that by 2020, 4.5 million Malaysians who are 18 years of age or older are predicted to have diabetes (Ahmad et al.,

2020). Meanwhile, according to the National Health and Morbidity Survey 2019, roughly 3.9 million Malaysians have diabetes. (Akhtar, Nasir, Ali, Asghar, Majeed, & Sarwar, 2022). The results arouse concerns because diabetes prevalence is still on the rise in Malaysia. The incidence has increased from 13.4% in 2015 to 18.3% in 2019 (Astrazeneca, 2021).

## **2.2 Diabetes Mellitus and Diabetic Retinopathy.**

One of the most dangerous conditions for global public health is diabetes mellitus, which has a major impact on socioeconomic advancement and public health globally (Akhtar et al., 2022). Interestingly, insulin is a major hormone involved in anabolism that affects the metabolism of carbohydrates, lipids, and proteins. Chronic hyperglycemia is a metabolic disorder caused by inadequate or inefficient insulin production, or both (Poznyak et al., 2020).

Diabetes mellitus classification into different types, including type 1 diabetes and type 2 diabetes. Deficient insulin production is an indicator of type 1 diabetes, sometimes referred to as insulin-dependent, or childhood-onset diabetes, and it necessitates the daily injection of insulin. Nine million individuals worldwide suffer from type 1 diabetes in 2017, with most of them residing in high-income nations. Its etiology and prevention strategies are unknown. Type 2 diabetes affects more than 95% of those who have the disease. Previously, type 2 diabetes was referred to as adult-onset or non-insulin dependent. This kind of diabetes was exclusively diagnosed in adults until recently, but it is now increasingly happening in youngsters as well. The way your body uses sugar, for energy is impacted by type 2 diabetes. If left untreated, it prevents the body from using insulin as it should, which can result in elevated blood sugar levels. Type 2 diabetes has the potential to seriously harm the body over time, particularly the blood vessels and nerves (Kharroubi, 2015). According to Radi et al. (2021) there will be a rise

in diabetic retinopathy related blindness and visual impairment from 27% in 2020 to 69% in 2030.

Diabetes mellitus is a primary cause of blindness worldwide because of its eye complications. The most frequent microvascular complication is diabetic retinopathy and the leading cause of blindness in those 55 years of age and older. It is referred to abnormal when patient complaint loss of sight or blinding. Study had done among Vietnamese patients with type 2 diabetes mellitus to determine the risk factors related to diabetic retinopathy. The study found that there is a high rate of diabetic retinopathy implication, and many patients are not identified until they have problems and visual impairment, which makes treatment highly difficult (Vu, Nguyen Thi Binh, Dinh Thi My, et al, 2023). One of the main causes of visual impairment and blindness is diabetic retinopathy (Sabanayagam, Banu, Chee, 2019)

Controlling modifiable risk factors with regular eye exams and suitable therapies has been demonstrated to slow the progression of diabetic retinopathy. Globally, diabetics have varying rates of diabetic retinopathy. According to several studies, the prevalence of diabetic retinopathy is 28.5% in the US, 30.3% in the UK, 32.2% in Australia, 39.6% in Japan, 39.3% in Malaysia, and 46.1% in Jordan (Amna Rizwan, 2021).

### **2.3 Knowledge of Diabetic retinopathy**

A study done by Al-Yahya found that the average diabetic knowledge score was 10 (good). When it came to diabetic retinopathy, the average knowledge score was 4.5, which is below ideal. Inadequate understanding of the significance of a recurring eye exam was the most frequent obstacle to regular follow-up compliance (47.1%) (107). Out of 313 individuals, only 237 answered the question on how poor glucose management might exacerbate diabetic retinopathy. Of those surveyed, 54 (22.8%) thought that

inadequate management of blood glucose might exacerbate diabetic retinopathy. While most participants, 54.4% (129) thought that renal issues might exacerbate diabetic retinopathy. 95.2% (295) of the participants were aware that blood tests might identify elevated blood sugar levels. But just 25.2% (78) were aware that excessive blood sugar levels might also be found in urine.

Good understanding of diabetes mellitus was substantially correlated with younger age ( $p < 0.049$ ) and higher levels of education ( $p < 0.0001$ ). Among the 305 respondents, 82.6% (252) selected the eye as the organ most likely to be impacted by diabetes, with the kidneys coming in second at 54.4% (129). 10.2% (32) of the patients were unaware that diabetes mellitus raises the risk of infections. It is interesting to note that whilst 28.7% (70) felt they needed a fundus examination annually, 54.9% (134) thought they needed one every five years (Al-Yahya, Alsulaiman, Almizel, et al, 2020).

Three-year research conducted in Saudi Arabia on 250 patients with type 2 diabetes suggested that the prevalence of diabetic retinopathy might be as high as 15.2%, which is unsatisfactory (Magliah et al., 2018). It is surprising to see that just 50% of participants were aware that diabetes can cause vision issues. Of those, 53% (166) were aware that the illness damages the retina, and 40.6% (127) were aware that it can result in cataracts (Al-Yahya, Alsulaiman, Almizel, et al, 2020).

Besides, another research was done with 358 people of participants. Showed that, only 125 respondents (34.9%) were aware of diabetic retinopathy, and only 122 (34.1%) had the appropriate understanding of diabetic retinopathy (Faryal Farooq, & Shahid Hussain Bapar, 2021). Another current study found that the most significant impediment to successful eye screening, which might lead to improved ocular performance. The majority (74.2%) of patients attributed this to a lack of awareness, 9.8% on a lack of access to competent eye care, and 12.1% to time constraints/jobs. Fear of bad news was

also a factor for 2.3% of patients, which should be addressed with adequate counselling by nurses and ophthalmologists (Amna Rizwan, 2021).

## **2.4 Attitude on Diabetic Retinopathy**

A study done by Faryal Farooq, found that patients' attitudes toward preventing diabetes-related eye problems vary; 18(25.0%) stated they did, 3(4.2%) said they did not, and 51(70.8%) indicated they were unsure (Farooq, 2021).

24 out of 74 respondents (32.4%), did not attend their yearly fundusoscopic screening appointments because they had strong eyesight and did not feel the need for an annual examination. Poor attitude towards diabetic retinopathy was substantially correlated ( $p < 0.013$ ) with responders' high educational attainment. Remarkably, 58.1% (162) of the 279 respondents felt it was acceptable to occasionally deviate from the diabetic diet. However, 23.9% (67) of the 280 respondents said it was acceptable to neglect to take their prescription. 62.9% (175) of respondents said that if there were no symptoms, it was unnecessary to have frequent ocular examinations. Even when their blood sugar was under control, 210 people, or 75.8% of them, thought they should see an ophthalmologist again. Diabetes and diabetic retinopathy had average attitude scores of 0 and 2 (both unsatisfactory) (Al-Yahya, et. al, 2020).

## **2.5 Association between socio-demographic factors and Knowledge and Attitude**

### **2.5.1 Age**

Study done in Saudi Arabia, show that age less than 30 years having the highest percentage of good knowledge regarding diabetic retinopathy with 62.9%. This contrasts with age less than 60 years with only 33.3%. While age in between 30 to 60 years show 50.9% good knowledge regarding diabetic retinopathy (Al-Yahya, 2020).

Age does affect the patient attitude regarding diabetic retinopathy. It is believed that the older respondent is more acknowledge with retinopathy than the younger age. Since, older age is more prone to get disease, so they may be aware and practice healthy lifestyle. Study done in Northeast China, shown that positive attitude towards diabetic retinopathy among 60 years and above are higher than below 60 years with respectively 53.59% and 46.41% (Qi, 2022). Study done in Saudi Arabia shown that participants with age in between 30 to 60 are high in percentage of good attitude towards diabetic retinopathy with 42% and 40.5% with respondent more than 60 years and low in percentage (39%) for participant age below 30 years old (Al-Yahya, 2020). Another study done by Alqahtani shown that participants with age in between 51 to 60 are high in percentage of good attitude towards diabetic retinopathy with 84.3% and 84.1% with respondent more than 60 years, 31 to 40 years (81.1%), 41 to 50 years (79.5%) and 18 to 30 years (78.9%) (Alqahtani, et al, 2023).

### **2.5.2 Gender**

A study done in Saudi Arabia, shows that good knowledge towards diabetic retinopathy among female gender having the highest percentage with 51.5%. This contrasts with male gender with only 48.6% (Al-Yahya, 2020).

A study done in Northeast China showed that positive attitudes towards diabetic retinopathy among females are higher than males with respectively 61.15% and 38.85% (Qi, 2022). Meanwhile, a study done in Saudi Arabia showed males are higher in percentage of good attitudes than females with 47.2% and 33.7% (Al-Yahya, 2020). A study done by Al-Asbali at private hospital shown that male respondent high in percentage for positive attitude (57.9%) than female (42.1%) (Al-Asbali, 2020). Another study done in Saudi Arabia, shown that female got high

level in positive attitude with percentage 80% and male with 82.1% (Alqahtani, et al, 2023).

### **2.5.3 Educational level**

Study done in Saudi Arabia, show that good knowledge towards diabetic retinopathy among postgraduate (64.3%), collage (54.4%), secondary (53.8%), high school (41.2%), illiterate (36.8%) and primary (35.7%) (Al-Yahya, 2020).

Education may influence patient attitude regarding the diabetic retinopathy. Study done in Northeast China, show that negative attitude towards diabetic retinopathy among primary education are higher with 14 respondents followed with middle education with 2 respondent and 0 respondent from high education (Qi, 2022). Study done in Saudi Arabia shown that all educational level has poor attitude towards diabetic retinopathy with primary level (68%), illiterate (65.6%), collage (62.9%), high school (57.9%), secondary (57.1%) and postgraduate with 54.3% (Al-Yahya, 2020). A study done by Al-Asbali at private hospital shown that school level got high in percentage for positive attitude (52.6%) than college (42.1%) and others (5.3%) (Al-Asbali, et al, 2020). Another study done in Saudi Arabia, shown that college degree got high value in positive attitude with percentage 81.4%, higher degree (80%) and diploma with 79.4% (Alqahtani, et al, 2023).

### **2.5.4 Type of diabetes mellitus**

Study done by Alqahtani in Saudi Arabia, show that type two diabetes mellitus shown a greater level of positive attitude rather than type one diabetes mellitus and other with 84.2%, 79.4% and 66.7% (Alqahtani, et al, 2023).

### **2.5.5 Type of treatment received**

Study done in Northeast China, show that positive attitude towards diabetic retinopathy among oral pills are higher with 57.63%, followed by insulin treatment

with 38.85% and diet control with 3.52% (Qi, 2022). A study done by Al-Asbali at private hospital shown that oral medication got high in percentage for positive attitude (34.2%) than mixed treatment (26.3%), insulin (21.1%), missing treatment (13.2%) and diet control (5.3%) (Al-Asbali, 2020). Another study done in Saudi Arabia, shown that injection got high level in positive attitude with percentage 82.5%, medication (82%), diet with 78.4% and none with 75.6% (Alqahtani, et al, 2023).

### **2.5.6 Duration of diabetes mellitus**

Study done in Saudi Arabia shown that duration of diabetes mellitus less than 10 years is high in percentage of good knowledge towards diabetic retinopathy (53.6%) than duration of more than 20 years with 50% and 42.6% in between 10 to 20 years (Al-Yahya, 2020).

Increasing duration of diabetes mellitus will affect patient attitude with practicing good attitude in preventing diabetes mellitus complication. Study done in Northeast China, show that positive attitude towards diabetic retinopathy among disease duration more than 10 years are higher than the duration of disease less than 10 years, respectively with 55.93% and 44.07% (Qi, 2022). Meanwhile, study done in Saudi Arabia shown that duration of diabetes mellitus more than 20 years is high in percentage of poor attitude towards diabetic retinopathy (72.7%) than duration of less than 10 years with 61.8% and 55.6% in between 10 to 20 years (Al-Yahya, 2020). The high percentage level of positive attitude associate with duration of diabetes mellitus between over 10 to 15 years (84.4%), over 15 years (83.1%), 1 to 5 years (82.8%) and over 10 to 15 years (78.8%) (Alqahtani, et al, 2023).



## **2.6 Theoretical and conceptual framework**

Health Belief Model (HBM) will serve as the study's underlying theory. The Health Belief Model (HBM) has been one of the most popular conceptual frameworks in health behaviour research since the early 1950s. It is used to guide health behaviour interventions as well as explain changes in and maintenance of health-related behaviours.

### **2.6.1 An Overview of the Health Belief Model (HBM)**

The theoretical literature for this study is based on the Health Belief Model (HBM). The main contention of HBM is that the perceived severity and susceptibility to illness as well as the belief in the efficacy of the advised health behaviour (like prevention of diabetic retinopathy) influence an individual's likelihood of adopting a specific health behaviour.

Perceived susceptibility to disease, perceived severity, perceived benefits, perceived barriers, self-efficacy to engage in a behaviour, and cues to action are among the primary components that make up the HBM. The thoughts on the possibility of obtaining an illness are referred to as perceived susceptibility, while thoughts about the detrimental consequences of getting the illness are referred to as perceived severity. Regarding diabetic complication, which is diabetic retinopathy, an individual's opinions about receiving an eye check-up are referred to as perceived advantages, while the idea that receiving an eye medical check-up is restricted because of psychological, physical, or economic considerations is referred to as perceived obstacles. Cues to action are things like information, people, and occasions that influence someone to get an eye check-up (Wong, 2020). The general framework of the relations among modifying factors and individual belief to individual action. (See Figure 2.1)

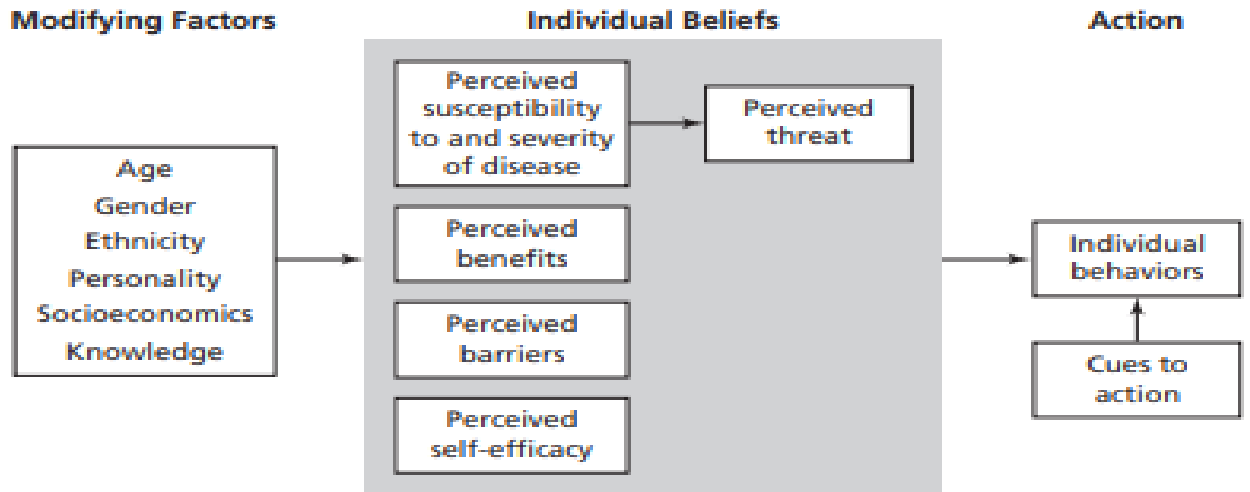


Figure 2. 1 The Health Belief Model Components and linkages.

[Source: Glanz, Rimer, & Viswanath, (n.d.)]

## 2.6.2 Conceptual Framework

The current framework was determined under the guidance of Health Belief Model (HBM). It was important for researchers to acknowledge other variables that influence patient knowledge regarding diabetic retinopathy. In the meantime, if adequate knowledge was delivered to diabetic patients on how to practice effective glycaemic management, it will benefit in preventing patients from getting diabetic retinopathy.

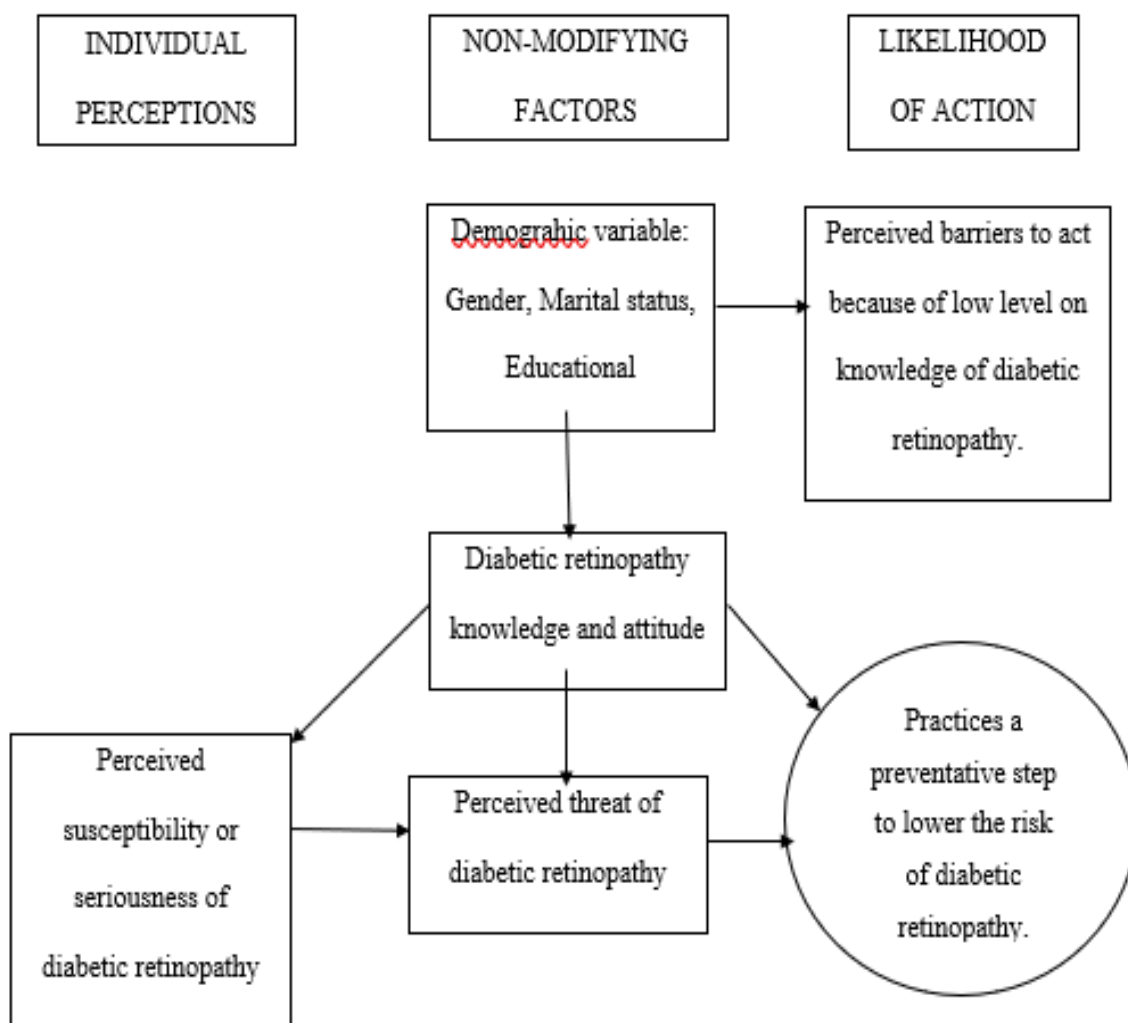


Figure 2. 2 Modified Conceptual framework of relationship between knowledge and attitude of diabetic retinopathy.

## CHAPTER 3

### METHODOLOGY

#### 3.1 Introduction

The technique chosen for the research will be explained in this chapter, along with the rationale behind it. To fulfill the study's objectives, it is essential to choose and comprehend an acceptable research design. A cross-sectional design is explained in the chapter's opening paragraphs, along with the rationale for using it. The next section includes a description of the study setting, population, participant selection criteria, sampling plan, sample size determination, and instrumentation, including ethical considerations right through data collection methods. A part of this chapter that outlines the suggested statistical analysis employed with the quantitative data will also be included.

#### 3.2 Study Design

The cross-sectional study design was conducted to determine the level of knowledge and attitude of diabetic retinopathy among diabetic patients in outpatient clinics at Hospital Universiti Sains Malaysia (USM).

#### 3.3 Study Location

For this study, the research location was located at selected outpatient clinics at Hospital University Sains Malaysia (HUSM) in Kubang Kerian.

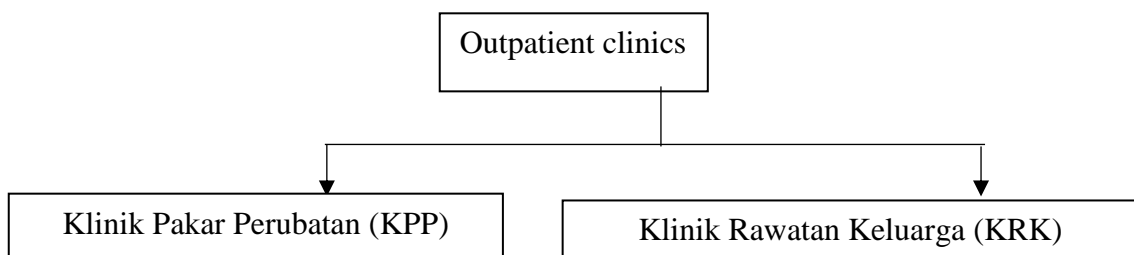


Figure 3. 1 Outpatient clinic in Hospital USM

### 3.4 Study Population

The target population was carried out among diabetes patients who came to seek treatment at Hospital Universiti Sains Malaysia.

### 3.5 Selection Criteria

#### 3.5.1 Inclusion Criteria

- All adults diagnosed with diabetes mellitus more than 6 months.
- Aged more than 18 years old until 65 years.

#### 3.5.2 Exclusion Criteria

- Patient diagnosed with diabetic retinopathy.
- Patients that have mental illness.

### 3.6 Sampling Method

Purposive sampling was applied to select the sample population for this study.

### 3.7 Sample Size Calculation

The sampling size estimation for each objective was calculated by using web tool, <https://wnarifin.github.io/ssc/sscorr.html> (wan ariffin, 2013).

Variables	Standard deviation	Mean	Min sample	Sample size with 20% dropout rate
First objective (Duan, 2020).	3.65	2.47	9	11
Second objective (Memon, 2015).	6.62	2.03	41	49

Third objectives (Keesara, 2022).	0.59	0.8	20	24
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Sample size for fourth objective was calculated by using web tool, <https://wnarifin.github.io/ssc/sscorr.html> (wan ariffin, 2013).

Variables	P1(%)	P2(%)	Min sample	Sample size with 20% dropout rate
Age (Memon, 2015).	0.579	0.05	11	13
Gender (Qi, 2022).	0.612	0.389	78	94
Educational level (Qi, 2022).	0.639	0.14	14	17
Type of diabetes mellitus (Alqahtani, et al, 2023).	0.842	0.667	94	113
Type of treatment (Al-Asbali, 2020).	0.342	0.132	64	77

Duration of diabetes mellitus (Al-Yahya, et al, 2020).	0.727	0.556	123	151
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Therefore, the biggest sample size from all objectives and after plus dropout 20% which is 151.

### 3.8 Study Instruments

A self-administered questionnaire adopted from (Srinivasan, 2017) study was used in this study.

The questionnaire comprises 4 sections.

- I) Section A consists of demographic information like age, gender, educational level, type of diabetes mellitus, type of treatment, and duration of diabetes mellitus (6 items).
- II) Section B questions are designed to distinguish the subjects' general knowledge of diabetes (5 items)
- III) Section C questions are designed to distinguish the diabetic knowledge of diabetic retinopathy (6 items)
- IV) Section D questions are designed to distinguish the subject's general attitude of diabetic retinopathy (4 items)

#### 3.8.1 Translation of instruments

The English version of the original questionnaire (Srinivasan, 2017) was translated into Bahasa Malaysia language. Since the data was collected from the local public who speak fluent Malay, the questionnaire was translated into Malay

and validated by a bilingual expert in Language Centre and Literacies, Health Campus Universiti Sains Malaysia, Kubang Kerian, Kelantan. A forward and backward translation from English to Malay and Malay to English again was performed. The purpose of the translation of the questionnaire into Malay language is to accommodate the national language that is commonly used among Malaysians.

### 3.8.2 Validity and Reliability of Instrument

The original questionnaires had been validated by the original author (Srinivasan, 2017) and Cronbach's alpha from this study was 0.706.

A Pilot study was carried out among 25 patients in the ward to identified whether respondents can understand and answer the questionnaire. The Cronbach alpha value was 0.706.

### 3.8.3 Variables Measurement

The variables used in this study can be categorized into dependent and independent variables. Table 3.1 summarizes the grouping of the variables.

Table 3. 1 Independent and Dependent Variables

<b>Independent Variables</b>	<ul style="list-style-type: none"> <li>• socio-demographic characteristics (age, gender, educational level, type of diabetes mellitus, type of treatment, duration of diabetes mellitus).</li> </ul>
<b>Dependent Variables</b>	<ul style="list-style-type: none"> <li>• Knowledge on diabetic and diabetic retinopathy</li> <li>• Attitude on diabetic retinopathy</li> </ul>