

**KNOWLEDGE AND ATTITUDE RELATED TO DIABETES
MELLITUS (DM) AMONG NON-DIABETIC ACADEMIC STAFF IN
A UNIVERSITY IN SUNGAI LONG, SELANGOR, MALAYSIA**

By

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ABSTRACT

Background and Objectives: With the increasing prevalence of diabetes mellitus worldwide, understanding the awareness regarding the management of DM is crucial for developing effective intervention strategies. The present research was carried out to study the knowledge and attitude related to diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long, Selangor, Malaysia.

Methodology: A cross-sectional study was carried out among non-diabetic academic staff. The purposive sampling method was used to recruit participants who fulfill the inclusion criteria. The instrument was a validated English version questionnaire. Data collected were entered into SPSS Statistics 29.0 for analysis. Descriptive analysis and Chi-square test were used. The level of statistical significance was set as $p\text{-value} < 0.05$.

Results: A total of 209 non-diabetic subjects participated in this study (57.9% female and 42.1% male) with a response rate of more than 90%. Just over half (51.7%) of non-diabetic academic staff were knowledgeable and nearly two-thirds (61.7%) had good attitude. There was a significant association between knowledge and education level, medical background and family history of DM. Participants with held a bachelor's degree, had a medical background and a family history of DM showed significant association with knowledge of DM.

Conclusion: The study reveals that just over half of the non-diabetic academic staff were knowledgeable regarding DM, and majority exhibited a good attitude. Higher education levels, with medical background and a family history of DM were linked to better knowledge. Targeted education may be needed to improve understanding among others.

Keywords: knowledge, attitude, diabetes mellitus, non-diabetic, academic staff, university

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Date:

PERMISSION SHEET

It is hereby certified that LOW HUAN LE (ID No: 20UMB06431) completed this Research project titled ‘KNOWLEDGE AND ATTITUDE RELATED TO DIABETES MELLITUS (DM) AMONG NON-DIABETIC ACADEMIC STAFF IN A UNIVERSITY IN SUNGAI LONG, SELANGOR, MALAYSIA’ under the supervision of Ms Jagjit Kaur a/p Najar Singh (Supervisor) from the Department of Nursing, M. Kandiah Faculty of Medicine and Health Sciences.

I hereby give permission to the university to upload softcopy of my final year project/dissertation/thesis* in pdf format into UTAR Institutional Repository, which may be accessible to UTAR community and public.

Yours truly,

A handwritten signature in black ink, appearing to be 'LH LE', is written over a horizontal line.

(LOW HUAN LE)

DECLARATION

I hereby declare that the research project is based on my original work except for quotations and citations which have been duly acknowledge. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.



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Date: 27/09/2024

APPROVAL SHEET

This research project entitled '**KNOWLEDGE AND ATTITUDE RELATED TO DIABETES MELLITUS (DM) AMONG NON-DIABETIC ACADEMIC STAFF IN A UNIVERSITY IN SUNGAI LONG, SELANGOR, MALAYSIA**' is prepared by LOW HUAN LE and submitted as partial fulfilment of the requirements for the degree of Bachelor of Nursing (Hons) at Universiti Tunku Abdul Rahman.

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LIST OF ABBREVIATIONS

DM	Diabetes Mellitus
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
NCDs	Non-Communicable Diseases
NHMS	National Health and Morbidity Survey
OR	Odds Ratio
MK FMHS	M. Kandiah Faculty of Medicine and Health Sciences
FAM	Faculty of Accountancy and Management
FCI	Faculty of Creative Industries
LKC FES	Lee Kong Chian Faculty of Engineering and Science

CHAPTER 1

INTRODUCTION

1.0 CHAPTER OVERVIEW

This chapter describes the background, problem statement, followed by the research objectives, questions, hypotheses, conceptual and operational definition, and significance of the study.

1.1 BACKGROUND

Diabetes mellitus (DM), a chronic illness characterized by high levels of blood sugar in the body, which results from a failure of the pancreas to produce sufficient insulin to maintain proper glycemic control (International Diabetes Federation, 2021; World Health Organization, 2023a).

There are three types of DM. The first types are Type 1 Diabetes Mellitus (T1DM), also known as insulin-dependent DM, which requires lifelong insulin therapy to maintain glycemic control. It usually impacts children and young adults. T1DM results from an autoimmune disease that causes insulin insufficiency. Whereas Type 2 Diabetes Mellitus (T2DM), also known as non-insulin dependent DM, can be managed by lifestyle changes. It is adult-onset diabetes, which constitutes more than 90% of diabetes cases (Ministry of Health Malaysia, 2020). It is caused by the body not responding effectively to insulin and is associated with insulin resistance in muscle and adipose tissue. T2DM is frequently associated with obesity, physical inactivity, and a poor diet (International Diabetes Federation, 2021; World Health Organization, 2023a). The last one is Gestational Diabetes Mellitus (GDM), which develop during

pregnant and typically resolves after childbirth. Women over the age of 45 are at a higher risk of experiencing DM during pregnancy. Moreover, those with a history of GDM are more likely to develop T2DM within five to ten years postpartum (International Diabetes Federation, 2021).

Globally, one in 10 adults is now living with diabetes (International Diabetes Federation, 2021). The National Diabetes Registry (NDR) Report 2013-2019 states that 463 million people worldwide have diabetes, with the majority residing in low- and middle-income countries (Ministry of Health Malaysia, 2020b; World Health Organization, 2023a). In 2019, diabetes was directly responsible for 1.5 million fatalities, and 48% of those fatalities occurred before the age of 70. Over the past few decades, there has been a gradual increase in both the number of cases and the prevalence of diabetes (World Health Organization, 2023a).

In Malaysia, DM is one of the selected non-communicable diseases (NCD) risk factors for adults ≥ 18 years old, and it had the second-highest prevalence of DM among ASEAN countries in 2014, at 9.9% (Ministry of Health Malaysia, 2016). Based on the key finding of National Health and Morbidity Survey (NHMS) 2023, noted that approximately 15.5% or 1 in 10 adults in Malaysia have diabetes (Ministry of Health Malaysia, 2023).

The latest NHMS 2019, findings show that the prevalence of people who have been diagnosed with DM has increased from 7.2% in 2011 to 8.3% in 2015 and 9.4% in 2019 (Ministry of Health Malaysia, 2020a). Based on NHMS 2019, the prevalence of overall diabetes among the major ethnic groups shows that there are 59.15%, 19.62%, 13.17% and 8.05% among Malays, Chinese, Indians, and others, respectively (Ministry of Health Malaysia, 2020b)

Regarding the previously mentioned statistics, nowadays, DM is becoming increasingly widespread. This underscores the critical need for promoting an in-depth understanding of the illness to promote a proactive approach to public health, including factors influencing its management and prevention, particularly among the younger generation that has high expectations for the future of our country.

1.2 PROBLEM STATEMENT

Diabetes Mellitus (DM) remains a major public health problem in Malaysia, with prevalence rates ranging from 7.3% to 23.8% based on published articles (Akhtar, et al., 2022). While previous studies have focused on healthcare institutions and community settings, revealing varied knowledge and attitudes towards DM (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque, 2019; Ikmal Md Bakri, et al., 2022; Rosmini Remali, et al., 2019), there is a notable research gap regarding non-diabetic academic staff in universities. Despite existing research on students, healthcare providers, community members, and both

diabetic and non-diabetic patients, no studies have specifically addressed the knowledge and attitudes towards DM among non-diabetic academic staff in Malaysia. Additionally, academic staff are playing a crucial role not only as educators but also as influencers who can increase awareness regarding DM among themselves, their family, and their students.

This gap is critical, as NCDs account for 74% of all deaths globally, with over 15 million people dying each year between the ages of 30 and 69 (World Health Organization, 2023b). Studies have shown that adults aged 40 and above are more susceptible to NCDs, including DM and pre-diabetes (Khardori, 2024; Basina, 2023; Chowdhury, et al., 2023). Furthermore, research by Kuruvilla, Mishra, and Ghosh (2023) revealed that the prevalence of NCDs among university employees was 10.15%, with 7.2% specifically for DM. Given these statistics, understanding the knowledge and attitudes related to DM among non-diabetic academic staff is crucial for developing targeted interventions to reduce the risk and enhance preventive measures within this population.

1.3 RESEARCH OBJECTIVE

To study knowledge and attitude related to diabetes mellitus (DM) and analyze the associations between sociodemographic characteristics, knowledge, and attitude among non-diabetic academic staff in a university in Sungai Long.

1.3.1 SPECIFIC OBJECTIVES

1. To determine knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long.
2. To determine the attitude towards DM among the non-diabetic academic staff in a university in Sungai Long.
3. To analyse the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long.
4. To analyse the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitude towards DM among the non-diabetic academic staff in a university in Sungai Long.
5. To analyse the association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long.

1.4 RESEARCH QUESTIONS

1. What is the knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long?
2. What is the attitude towards DM among the non-diabetic academic staff in a university in Sungai Long?
3. What is the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of

DM) and knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long?

4. What is the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitude towards DM among the non-diabetic academic staff in a university in Sungai Long?
5. What is the association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long?

1.5 HYPOTHESIS

1.5.1 NULL HYPOTHESIS

HO1- There is no association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long.

HO2- There is no association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitude towards DM among the non-diabetic academic staff in a university in Sungai Long.

HO3- There is no association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long.

1.5.2 ALTERNATIVE HYPOTHESIS

HA1- There is an association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long.

HA2- There is an association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitude towards DM among the non-diabetic academic staff in a university in Sungai Long.

HA3- There is an association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long.

1.6 CONCEPTUAL AND OPERATIONAL DEFINITIONS

1.6.1 KNOWLEDGE

Knowledge refers to capacity to know something or someone (Oxford Language, 2023). Knowledge in this study is defined as the understanding of the information of DM on 31 items, divided into 5 subscales, like understanding of DM (5 items), the risk factor of DM (6 items), signs and symptoms of DM (8 items), control and management of DM (7 items) and complications of DM (5 items) to assess the knowledge regarding DM among the non-diabetic academic staff. Each item is given three options, which are "True," "False," and "Do not know". All "Yes" responses are considered correct for the 31 items in this Part C of the questionnaire. One point is allocated for each correct answer, and zero points is allocated for each wrong answer and option "Do not know." The total

score of each participant was summed for all 31 items and median were calculated to categorize as knowledgeable (if participants scored $\geq$ median) or not knowledgeable (if participants scored $<$ median). A higher total score indicates better knowledge regarding DM.

1.6.2 ATTITUDE

Attitude refers to an opinion about something or someone (Oxford Language, 2023). Attitude in this study was defined as the approach of the populations towards 8 items related to DM. Each item is assessed with a three-point Likert scale (agree, neutral and disagree). All “Agree” responses are considered correct for the 8 items in this Part D of the questionnaire. One point is allocated for each positive answer (agree), and zero points is allocated for each negative answer (neutral and disagree). The total score of each participant was summed for all 8 items and mean scores were calculated to categorize as having good attitude (if participants scored $\geq$ mean score) or poor attitude (if participants scored $<$ mean score). The higher the total score, the better the attitude towards DM.

1.6.3 DIABETES MELLITUS (DM)

A chronic disease that results when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces (World Health Organization, 2023a).

1.6.4 NON-DIABETIC

Those who are non-clinically diagnosed as diabetes or not known diabetic.

1.6.5 ACADEMIC STAFF

A group of people who are employed to carry out work in an academic institution (Oxford Language, 2023). Based on Higher Education Provider (HEP) Act 1996 and Malaysian Qualifications Agency (MQA) guidelines, academic staff are individuals involved in teaching, research, student supervision, and academic administration, including positions such as Professor, Associate Professor, Senior Lecturer, Lecturer, Tutor, and Research Fellow (Malaysian Qualifications Agency, 2014).

1.6.6 UNIVERSITY

Conceptual definition: An institution of tertiary education (Oxford Language, 2023)

Operational definition: Refer to Universiti Tunku Abdul Rahman (UTAR) Sungai Long campus.

1.6.7 SOCIODEMOGRAPHIC CHARACTERISTICS

1.6.7.1 GENDER

Gender is the male or female sex, particularly when considering social and cultural distinctions rather than biological ones (Oxford Language, 2023). In this study, gender as nominal data was categorized into 2 groups, which are male and female.

1.6.7.2 AGE

The duration of time that a person or object has existed (Oxford Language, 2023). In this study, age was originally collected as ratio data and categorized into four groups, which is below 30, 31-40, 41-50, and 51 and above.

1.8.7.3 ETHNICITY

A status of being part of a group that is conceived to share a common ancestor or a common national or cultural legacy (Oxford Language, 2023). In this study, ethnicity was recorded as nominal data with four options, which is Malay, Chinese, Indian, and others. The data was then categorized into Chinese and Non-Chinese groups (Malays, Indian and others).

1.6.7.4 EDUCATION LEVEL

The division of formal learning (Oxford Language, 2023). In this study, educational level as nominal data was categorized into 4 groups, which are bachelor's degree, master's degree, Doctor of Philosophy (PhD).

1.6.7.5 MEDICAL BACKGROUND

A group of academic units focused on a significant field of study (Cambridge Dictionary, 2023). In this study, M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS), Faculty of Accountancy and Management (FAM), Faculty of Creative Industries (FCI), and Lee Kong Chian Faculty of Engineering and Science (LKC FES) is recorded as nominal data. The data will then be grouped into those with a medical background (MK FMHS) and those without a medical background (FAM, FCI, LKC).

1.6.7.6 FAMILY HISTORY OF DM

The presence of diabetes in close blood relatives of an individual. In this study, family history of DM was measured as nominal data with the options: "Yes," "No," and "Do not know."

1.7 SIGNIFICANCE OF THE STUDY

This study highlights the importance of knowledge and attitudes related to DM. It aims to enhance knowledge of DM among non-diabetic academic staff and providing comprehensive information, fostering positive attitudes that encourage informed lifestyle choices for DM prevention. Moreover, by offering accurate and updated information, it can also influence the attitudes and practices of the academic staff. Lastly, the findings serve as a valuable reference for future research on DM knowledge and attitudes, with the potential to advance nursing practice through evidence-based interventions.

1.8 SUMMARY

This study is conducted to determine the knowledge and attitude related to diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long, Selangor, Malaysia. This will highlight the knowledge and attitude related to DM among the non-diabetic academic staff, as well as the relationship between sociodemographic characteristics.

CHAPTER 2

LITERATURE

REVIEW

2.0 CHAPTER OVERVIEW

This chapter explained the search strategy and literature review of the study.

2.1 SEARCH STRATEGY

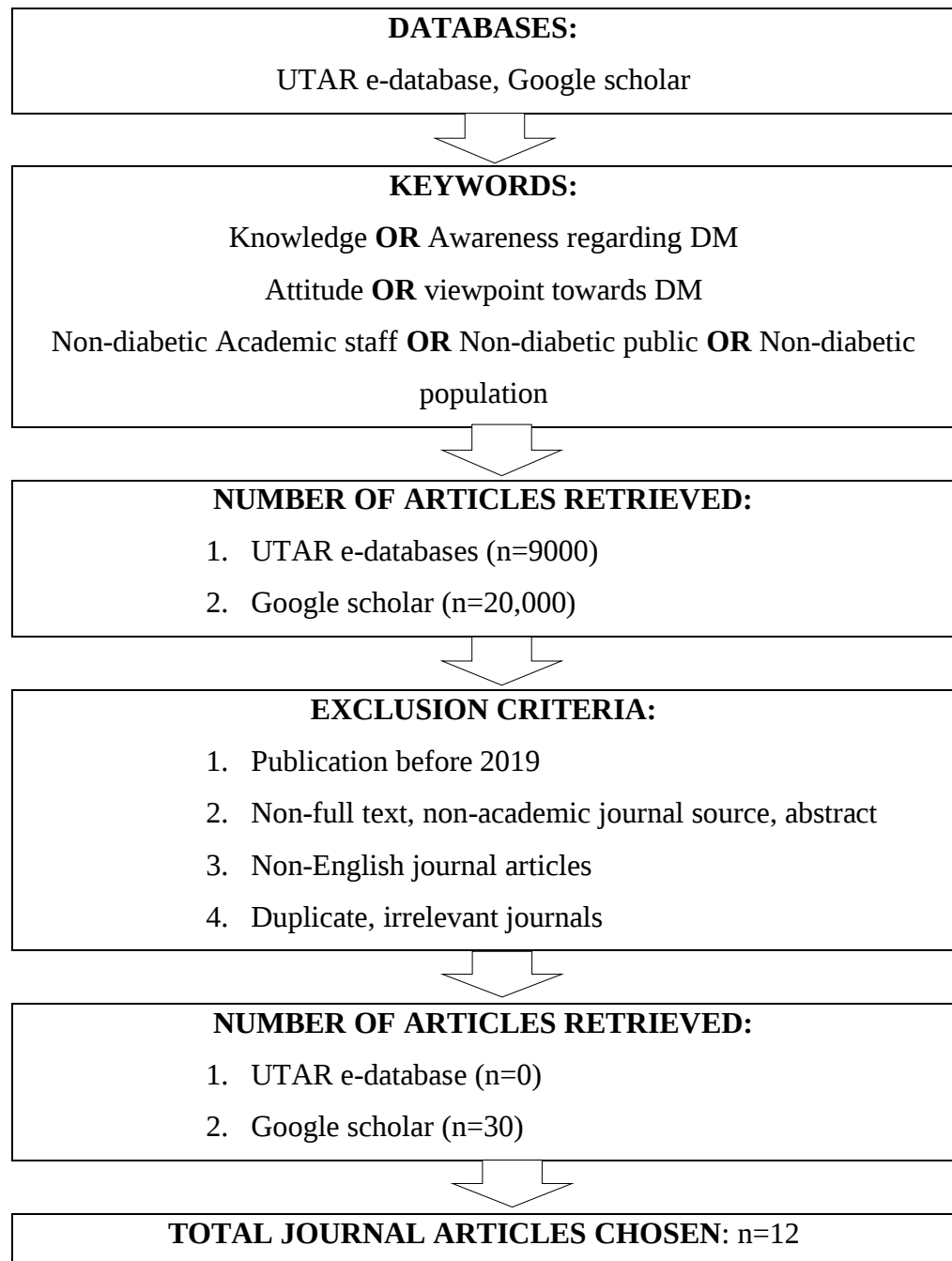


Diagram 2.1 Search strategy flowchart

Diagram 2.1 shows the search strategy flowchart. The literature search was carried out using the UTAR e-database and Google Scholar. Boolean search techniques, utilizing the operators "AND" and "OR" were applied with relevant keywords. A total of 12 articles were retrieved for this study.

2.2 REVIEW OF LITERATURE

This section incorporates current literature on knowledge and attitudes related to DM, as well as sociodemographic characteristics. It highlights key scientific findings from previous studies that serve as important guidance for this research.

2.2.1 KNOWLEDGE REGARDING DIABETES MELLITUS (DM)

A cross-sectional Malaysian study found that among 319 members of the public (86.2% non-diabetic, 13.8% diabetic), 80.3% (n=256) of the participants had good scores on knowledge towards DM. The respondents were able to answer knowledge about the disease, symptoms, complications, prevention and treatment of DM (Soo, Dali and Shakar, 2021). Similarly, a cross-sectional Saudi survey found that among 433 schoolteachers, 57% (n=247) had a moderate level of knowledge about diabetes, while 31.4% (n=136) had a good level of knowledge, and 11.5% (n=50) had a poor level of knowledge (Abdulrahman, et al., 2021).

In contrast, a cross-sectional Qatar study found that among 2400 non-diabetic Qatar nationals and long-term residents, 69% of the participants had lowest knowledge score, 20% had intermediate knowledge score and only 2% had high knowledge score towards DM (Al-Mutawaa, et al., 2022). Therefore, it can be concluded that while knowledge regarding DM is generally good among academic staff populations, there is still a knowledge gap among participants and a gap in the literature, as no previous studies related to DM have specifically conducted among academic staff.

2.2.2 ATTITUDE TOWARD DIABETES MELLITUS (DM)

The cross-sectional Malaysian study found that among 319 members of the public (86.2% non-diabetic, 13.8% diabetic), 98.4% (n=314) had good scores on attitude towards DM (Soo, Dali and Shakar, 2021). This result was similar to a cross-sectional Qatar study which done by among 2,400 non-diabetic members of the public, percentage of participant who score high, intermediate and low score of attitudes towards DM is 32%, 55% and 13%, respectively (Al-Mutawaa, et al., 2022).

In contrast, a cross-sectional Saudi study found that among 1207 non-diabetic Saudi residents, only 577 (47.8%) had positive attitudes towards DM, while 630 (52.2%) had negative attitudes towards DM (Baig, et al., 2023). Overall, attitudes towards DM among non-academic populations vary across different settings, and there is a noticeable lack of studies conducted in Malaysia,

particularly among the academic staff. Therefore, further research was necessary in this region to address the existing gaps in knowledge and attitude.

2.2.3 SOCIODEMOGRAPHIC CHARACTERISTICS

2.2.3.1 GENDER

A cross-sectional Malaysian study found no association ($p\text{-value} > 0.05$) between gender and knowledge or attitude among 187 respondents (65.8% non-diabetic, 34.2% diabetic) (Ikmal Md Bakri, et al., 2022). Whereas a cross-sectional Qatar study reported significant association between gender and both knowledge and attitude related to DM among 1428 registered students at the foundation year, where females had better knowledge ($p\text{-value} < 0.001$) and attitude ($p\text{-value} = 0.009$) score compared to males (Gazzaz, 2020). Findings on the association between gender and DM knowledge and attitude were inconsistent, with one study showing a significant association and another showing none, highlighting a gap in the existing literature on which gender has better knowledge of DM.

2.2.3.2 AGE

A cross-sectional Malaysian study found significant association between age and knowledge towards DM ($p\text{-value} < 0.001$) among 104 non-diabetic outpatients, where older participants had better knowledge regarding DM, possibly due to their focus on health. However, the same study also reported no significant association between age and attitude towards DM ($p\text{-value} > 0.50$) among 104

non-diabetic outpatients (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque, 2019). A cross-sectional Saudi study found no significant association ($p\text{-value}>0.817$) between age and knowledge regarding DM among 1207 non-diabetic Saudi residents. However, the same study found significant association ($p\text{-value}=0.226$) between age and attitude towards DM, where aged 30 and below ($n=494$, 78.4%) had high attitude score compared to aged 30 and above ($n=136$, 21.6%) (Baig, et al., 2023). Findings on the association between age, knowledge, and attitude towards DM are mixed, with some studies showing significant relationships and others finding none. These differences highlight a gap in the literature regarding how age influences DM knowledge and attitudes.

2.2.3.3 ETHNICITY

A cross-sectional Malaysian study found no significant differences in knowledge ($p\text{-value}=0.871$) and attitude ($p\text{-value}=0.381$) related to DM among the various racial groups studied, including Malays and others. (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque, 2019). Another Malaysian study found significant association between ethnicity and both knowledge ($p\text{-value}=0.012$) and attitude ($p\text{-value}<0.001$) towards DM among 316 participants, where Malay participants had higher mean scores in both areas, with a mean knowledge score of 21.84 compared to 19.91 for non-Malays, and a mean attitude score of 28.99 compared to 25.82 for non-Malays (Al-Naggar, et al., 2017). These varying results suggest that the relationship between ethnicity and DM-related knowledge and attitude may be influenced by other contextual factors, such as population demographics and the scope of the studies.

2.2.3.4 EDUCATION LEVEL

A cross-sectional Malaysian study found no significant association between the level of education with knowledge (p-value=0.437) and attitude (p-value=0.576) among 104 non-diabetic outpatients. However, despite the overall lack of significant association, it was observed that participants with master's and PhD degree holders were more likely to have a positive attitude towards DM (Baig, et al., 2023). A cross-sectional Jordan study found significant association between level of education with knowledge (p-value<0.040) and attitude (p-value<0.001) related to DM among 1702 public members, where participants with university level education or higher (Master and PhD) had higher level of knowledge and attitude score than participants with education up to secondary school and college (Alsous, et al., 2019). In short, these findings suggest that higher education may play a role in shaping attitudes and knowledge about DM, though results may vary across different populations.

2.2.3.5 MEDICAL BACKGROUND

A cross-sectional Jordan study found significant association (p<0.001) between education related to medical field and knowledge or attitude related to DM among 1702 public members, where participants with education related to medical field were more knowledgeable and have positive attitude related to DM (Alsous, et al., 2019). While a cross-sectional Saudi study found significant association (p<0.001) between education related to medical field and knowledge or attitude related to DM among 3208 Saudi adults, where participants who received education related to medical field were more prevalent in the good

knowledge group and positive attitude group (Alqahtani, et al., 2020). This inconsistency underscores a need for further research on the role of medical background in DM awareness.

2.2.3.6 FAMILY HISTORY OF DM

A cross-sectional Saudi study found significant association ($p\text{-value} < 0.001$) between family history of DM with knowledge and attitude related to DM among 1,207 non-diabetic residents, where those who with a family history of DM were 2.10 times and 1.95 times more likely to be knowledgeable and have positive attitudes, compared to those without a family history of DM (Baig, et al., 2023). While a cross-sectional Jordan study also reported significant association ($p < 0.001$) between having first degree relatives with DM knowledge regarding DM among 1702 public members, where those with a first-degree relative with DM were found to be more knowledgeable than those without such relatives (Alsous, et al., 2019). Overall, both studies showed people with a family history showed better knowledge and attitude towards DM. This variability highlights a gap in understanding the influence of family history on DM awareness.

2.2.4 ASSOCIATION BETWEEN KNOWLEDGE AND ATTITUDE RELATED TO DIABETES MELLITUS (DM)

A cross-sectional Malaysian study found no significant association between knowledge and attitude scores regarding DM regarding T2DM (p-value=0.070) among 104 non-diabetic outpatients (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque, 2019). Whereas a cross-sectional Qatar study found significant association between knowledge and attitude regarding DM (p-value<0.001) among 2400 non-diabetic Qatar nationals and long-term residents (Al-Mutawaa, et al., 2022). This discrepancy points to a gap in understanding the role of education in DM awareness.

2.3 CONCEPTUAL FRAMEWORK

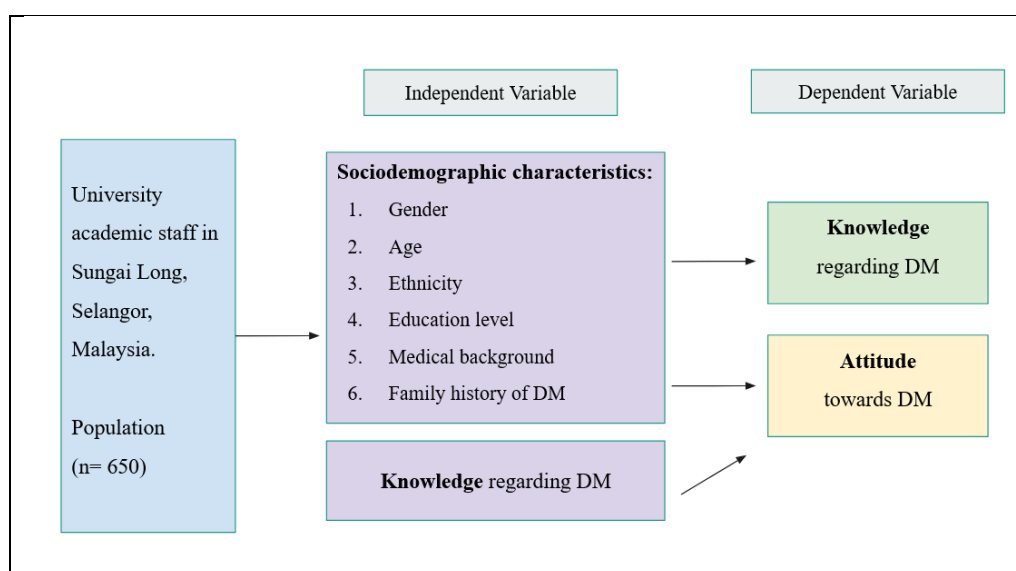


Diagram 2.2 Conceptual framework on knowledge and attitude related to diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long, Selangor, Malaysia

Diagram 2.2 shows the conceptual framework of the relationship between sociodemographic characteristics, knowledge, and attitude related to DM among non-diabetic academic staff. Sociodemographic characteristics and knowledge were identified as independent variables to distinguish influences on attitude (dependent variables), which answered research objectives 3 and 5. For knowledge, it could be an independent variable and a dependent variable in this study. Therefore, the sociodemographic characteristics were proposed to be affected by knowledge, which was analysed based on the fourth research objective.

2.4 SUMMARY

In summary, the literature review highlights the complex interplay between knowledge, attitudes, and sociodemographic characteristics (gender, age, ethnicity, higher qualification of study, family history of DM) in shaping perceptions of DM. Addressing gaps in knowledge and attitudes related to DM among non-diabetic academic staff is essential for effective DM management and prevention efforts in the university setting.

CHAPTER 3

METHODOLOGY

3.0 CHAPTER OVERVIEW

Chapter 3 describes the research design, variables, sampling, research instrument, data collection process, ethical considerations and summary of this chapter.

3.1 RESEARCH DESIGN

A quantitative, cross-sectional study was conducted. This study design was chosen because it seeks to analyse data from a population at a single point in time. It is also often used to measure the prevalence of health outcomes and is usually fast, inexpensive, and easy to conduct (Wang and Cheng, 2020).

3.1.1 RESEARCH SETTING

The study was carried out at the Sungai Long campus of Universiti Tunku Abdul Rahman (UTAR). UTAR was established in 2002 as a not-for-profit institution, offering a wide range of academic programs at the Sungai Long campus, from foundation studies to bachelor's degrees, as well as postgraduate diplomas, master's, and PhD programs across various fields.

3.1.2 POPULATION

3.1.2.1 TARGET POPULATION

All the non-diabetic academic staff from four facilities in UTAR.

3.1.2.2 ACCESSIBLE POPULATION

All non-diabetic academic staff who agreed and consented to answer the questionnaire during the time of study

3.1.2.3 SAMPLE

The sample is non-diabetic academic staff who meet the inclusion criteria in a university in Sungai Long.

3.2 VARIABLES

3.2.1 INDEPENDENT VARIABLES

There were two independent variables in this study, which were sociodemographic characteristics and knowledge regarding DM. The sociodemographic characteristics, which included gender, age, ethnicity, education level, medical background and family history of DM, were used to assess the third and fourth specific objectives. Knowledge regarding DM was the second independent variable used to assess the fifth research objective, where it may influence the attitude towards DM.

3.2.2 DEPENDENT VARIABLES

There were two dependent variables in this study, which were knowledge and attitude related to DM. The knowledge was used to access third objectives, whereas attitude was used to assess fourth and fifth objectives.

3.3 SAMPLING

3.3.1 SAMPLING TECHNIQUE

Participants were recruited via purposive sampling method, based on the specific inclusion and exclusion criteria. To ensure equal representation across different academic divisions, the total sample size was divided equally among the four faculties. Academic staff members who meet the inclusion criteria were selected equally from each of the four faculties. To gather data, a questionnaire was disseminated to the participants through two methods, which were face-to-face using hard copies and online using Google Forms sent through the university's mail system.

3.3.2 SAMPLE SIZE

The sample size is calculated using the formula (Krejcie and Morgan, 1970), as shown below

$$\begin{aligned} S &= \frac{\chi^2 NP (1 - P)}{d^2 (N - 1) + \chi^2 (1 - P)} \\ &= \frac{(3.841)(650)(0.594)(1-0.594)}{(0.05^2)(650) + (3.841)(1-0.594)} \\ &= 189 \end{aligned}$$

S = Sample size

χ^2 = Chi-square = 3.841 at a 0.95 confidence level

N = Known population size = 650

P = Prevalence = 59.4% = 0.594 (Ikmal Md Bakri, 2022)

d = Degree of accuracy = 5% = 0.05

Using the Krejcie and Morgan (1970) formula and considering the prevalence from previous studies on good knowledge regarding DM, the total sample size was determined to be 189. Including a 20% attrition rate, the final sample size was adjusted to 227 participants.

3.3.3 SAMPLING CRITERIA

3.3.3.1 INCLUSION CRITERIA

1. Academic staff from four faculties: M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS), Faculty of Accountancy and Management (FAM), Faculty of Creative Industries (FCI) and Lee Kong Chian Faculty of Engineering and Science (LKC FES).
2. Non-clinically diagnosed as diabetes / Not known diabetic.
3. Consented and being able to participate in this research.

3.3.3.2 EXCLUSION CRITERIA

1. Clinically diagnosed as diabetes.
2. Refused or not being able to participate in this research.

3.4 INSTRUMENT

The research instrument for this study was originally developed by Kassahun and Mekonen (2017) and was subsequently adapted by Baig, et al. (2023). Both versions of the questionnaire were utilised and adapted, as they contain only minor differences. This approach ensures comprehensive coverage while allowing for slight modifications from Baig's adaptation. The research instrument consists of four parts categorised as part A, part B, part C and part D (as shown in Appendix B).

3.4.1 PART A: SCREENING OF THE PARTICIPANT

Part A consists of a screening question to determine if participants have been diagnosed with DM. The question offers two options: "Yes" and "No." Participants who select "Yes" will not proceed with the rest of the questionnaire, while those who select "No" will continue to the subsequent questions.

3.4.2 PART B: SOCIODEMOGRAPHIC CHARACTERISTIC

Part B consists of 6 questions related to sociodemographic characteristics, including gender, age, ethnicity, highest qualification of study, faculty, and family history of DM.

3.4.3 PART C: KNOWLEDGE REGARDING DIABETES MELLITUS

Part C questionnaire was adapted from Kassahun and Mekonen (2017) and Baig, et al. (2023). It consists of 31 items, divided into 5 subscales, understanding of DM (5 items), the risk factor of DM (6 items), signs and symptoms of DM (8 items), control and management of DM (7 items) and complication of DM (5 items) to assess the knowledge regarding DM among the academic staff. Each item is given three options, which are "True," "False," and "Do not know". All "Yes" responses are considered correct for the 31 items in this Part C of the questionnaire. One point is allocated for each correct answer, and zero points is allocated for each wrong answer and option "Do not know." The total score of each participant was summed for all 31 items and median was calculated to categorise as knowledgeable (if participants scored $\geq$ median) or not knowledgeable (if participants scored $<$ median). A higher total score indicates better knowledge regarding DM.

3.4.4 PART D: ATTITUDE TOWARDS DIABETES MELLITUS

Part D questionnaire was adapted from Kassahun and Mekonen (2017) and Baig, et al. (2023). Part D consists of 8 items assessing the attitude towards DM among the academic staff. Each item is assessed with a three-point Likert scale (agree, neutral and disagree). All “Agree” responses are considered correct for the 8 items in this Part D of the questionnaire. One point is allocated for each positive answer (agree), and zero points is allocated for each negative answer (neutral and disagree). The total score of each participant was summed for all 8 items and mean scores were calculated to categorise as having good attitude (if participants scored $\geq$ mean score) or poor attitude (if participants scored $<$ mean score). The higher the total score, the better the attitude towards DM.

3.4.5 VALIDITY AND RELIABILITY

Validity is concerned with what an instrument measures and how well it measures it, whereas reliability is concerned with the accuracy of the data obtained and the extent to which any measuring tool limits random error (Ahmed and Ishtiaq, 2021). Both are fundamental concepts in research that are used to evaluate research quality (Ahmed and Ishtiaq, 2021). According to the previous study by Baig, et al. (2023), the reliability was 0.75 (Cronbach alpha), indicating that the instrument is acceptable, consistent, and reliable (Alkhadim, 2022).

In the current study, the instrument was given to an external and an internal expert from the university's M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS) for content validations (as shown in Appendix F). Recommendation was received and minor changes such as rewording and removal of repetition statement was done for Part C of the instrument.

A pilot study was conducted to ensure that the questionnaire was easily understood by the participants. The pilot study aims to test the feasibility of the questionnaire and improve the validity and reliability of the research (Lowe, 2019). Pilot study was carried out from 10 July to 19 July 2024. The instrument was disseminated through a face-to-face method by using 10% of the sample size, with 20 participants recruited. To prevent data duplication, these participants were excluded from the main study. A reliability test was conducted for Part C of the pilot study, which included a scale with a Cronbach's alpha coefficient of 0.533, indicating moderate internal consistency (Aithal Architha and Aithal, 2020). There were a few questions that were amended due to grammatical error and lack of clarity during the pilot study in Part C and D.

3.5 DATA COLLECTION PROCEDURE

The data collection procedure was conducted from 22 July to 30 August 2024 (as shown in Appendix H). The questionnaire was disseminated through a face-to-face method, with instruments distributed to academic staff in their offices using hard copies or via Google Forms sent through the university's mail system. Participants must understand and agree to the recruitment process, consent form, and PDPA declaration as outlined in the questionnaire (Appendices C, A, and G). All the items in the online Google Form were compulsory to answer to prevent missing data during data collection. The data collected were analysed using SPSS version 29.0.

3.6 ETHICAL CONSIDERATION

3.6.1 UNIVERSITY ETHICAL BOARD AND COMMITTEE

A letter requesting approval to conduct the research was submitted to the university's ethical board and committee prior to data collection. Approval was granted on 03 July 2024 (refer to Appendix E).

3.6.2 PERMISSION TO USE RESEARCH INSTRUMENT

The questionnaire was obtained from Kassahun and Mekonen (2017) and Baig, et al. (2023), on 11 December 2023 and 5 December 2023, respectively. The permission to use the research instrument is shown in Appendix D.

3.6.3 CONSENT INFORMATION

Consent was obtained from all the participants prior data collection. The identifiable information of participants was kept anonymous and confidential. The hard copy was sealed and locked to protect the privacy and confidentiality of the participants. Data will be kept for 5-7 years before disposal. The consent form is shown in Appendix A.

3.7 SUMMARY

A cross-sectional study was conducted to assess the knowledge and attitude related to Diabetes Mellitus (DM) among non-diabetic academic staff in a university in Sungai Long via purposive sampling method. The collected data were entered into SPSS version 29.0 for analysis, and the detailed results are presented in Chapter 4.

CHAPTER 4

DATA ANALYSIS

AND RESULT

4.0 CHAPTER OVERVIEW

This chapter focuses on the statistical analysis, including both descriptive and inferential analysis, along with the presentation of the study's results.

4.1 DESCRIPTIVE AND INFERENTIAL ANALYSIS

4.1.1 DESCRIPTIVE ANALYSIS

In this study, sociodemographic characteristics are categorised and presented using frequency and percentage. Whereas knowledge and attitudes related to DM are also presented as categorical data with frequency, percentage, median, mean, standard deviation, minimum and maximum score to address the first and second research objectives, which is to determine knowledge regarding DM and to determine the attitudes towards DM.

4.1.2 INFERENTIAL ANALYSIS

Chi-square test was used to analyse the third, fourth, and fifth specific research objective. This involved analysing the association between sociodemographic characteristics and knowledge regarding DM. It also included analysing the association between sociodemographic characteristics and attitude towards DM, as well as analysing the association between knowledge and attitude related to DM. The output of the Chi-square test will include a table summarizing the Chi-square statistic and the p-value, which indicate the associations between the categorical variables.

4.2 STATISTICAL DATA PROCESSING AND ANALYSIS

All collected data were manually entered into SPSS version 29 by the researcher. Out of 227 respondents, the response rate was 92.1%, with 18 instances of missing data reported. Both descriptive and inferential analyses were conducted using a 95% confidence interval, and statistical significance was set at a p-value of less than 0.05.

4.3 RESULTS

4.3.1 SOCIODEMOGRAPHIC CHARACTERISTICS

The sociodemographic characteristics examined in this study include gender, age, ethnicity, education level, medical background, and family history. The collected data are presented as frequencies and percentages.

Table 4.1 Frequency and percentage distribution of participants based on sociodemographic characteristics, (N=209)

Sociodemographic characteristics	Frequency (n)	Percentage (%)
Gender		
Male	88	42.1
Female	121	57.9
Age		
Below 30	6	2.9
31-40	80	38.3
41-50	89	42.5
51 and above	34	16.3
Ethnicity		
Chinese	135	64.6
Non-Chinese	74	35.4
Education level		
Bachelor's degree	11	5.3

Master's degree	98	46.9
Doctor of Philosophy (PhD)	100	47.8
Medical background		
Yes	55	26.3
No	154	73.7
Family history of DM		
Yes	103	49.3
No	106	50.7

Table 4.1 displays the sociodemographic characteristics of the participants in frequency and percentage. A higher percentage of participants were female (57.9%), aged 41-50 (42.5%), of Chinese ethnicity (64.6%), PhD holders (47.7%), without a medical background (73.7%) and without a family history (50.7%).

4.3.2 KNOWLEDGE REGARDING DM

The first research question, ‘What is the knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long?’ was assessed using descriptive analysis. The collected data are presented as frequency, percentage, median, minimum and maximum score.

Table 4.2 Frequency and percentage distribution of the participants based on knowledge regarding DM, (N=209)

Knowledge questions	Frequency (percentage) n (%)		
	Yes	No	Do not know
What is/are DM?			
1. DM is a condition of insufficient insulin production.	161 (77)	18 (8.6)	30 (14.4)
2. DM is a condition when the body does not respond to insulin.	149(71.3)	38 (18.2)	22 (10.5)
3. DM is a condition of high levels of sugar in the blood.	192 (91.9)	12 (5.7)	5 (2.4)
4. DM is not curable.	113 (54.1)	64 (30.6)	32 (15.3)
5. DM is a disease that can affect any part of the body.	168 (80.4)	17 (8.1)	24 (11.5)
What are the risk factors of DM?			
1. Older age (Age of 45 or older)	144 (68.8)	58 (27.8)	7 (3.3)
2. Family history of diabetes mellitus	206 (98.6)	2 (1.0)	1 (0.5)
3. Being overweight/obesity	205 (98.1)	3 (1.4)	1 (0.5)
4. Pregnancy	152 (72.7)	35 (16.7)	22 (10.5)
5. Sedentary lifestyle (E.g. Lack of physical activity)	183 (87.6)	19 (9.1)	7 (3.3)
6. Poor dietary habits	205 (98.1)	3 (1.4)	1 (0.5)
What are the signs and symptoms of DM?			
1. Frequent urination	163 (78)	12 (5.7)	34 (16.3)
2. Excessive thirst	183 (87.6)	4 (1.9)	22 (10.5)
3. Excessive hunger	126 (60.3)	37 (17.7)	46 (22)
4. Weight loss	129 (61.7)	40 (19.1)	40 (19.1)
5. High blood sugar (Random sugar level ≥ 11.1 mmol/L)	203 (97.1)	1 (0.5)	5 (2.4)
6. Blurred vision	177 (84.7)	7 (3.3)	25 (12.0)
7. Slow healing of cuts and wounds	196 (93.8)	5 (2.4)	8 (3.8)
8. Feeling of weakness	175 (83.7)	11 (5.3)	23 (11)

Control and management of DM is possible by:			
1. Insulin injection	202 (96.7)	3 (1.4)	4 (1.9)
2. Oral medication (tablets & capsule)	194 (92.8)	6 (2.9)	9 (4.3)
3. Regular exercise	191 (91.4)	7 (3.3)	11 (5.3)
4. Practise healthy diet	203 (97.1)	5 (2.4)	1 (0.5)
5. Yearly medical eye checkup	146 (69.9)	36 (17.2)	27 (12.9)
6. Foot care	153 (73.2)	27 (12.9)	29 (13.9)
7. Weight reduction	187 (89.5)	11 (5.3)	11 (5.3)
DM can cause:			
1. Eye problem leading to blindness	180 (86.1)	8 (3.8)	21 (10.0)
2. Kidney failure	188 (90)	11 (5.3)	10 (4.8)
3. Heart failure	165 (78.9)	22 (10.5)	22 (10.5)
4. Stroke leading to paralysis	159 (76.6)	23 (11)	27 (12.9)
5. Amputation of limb	191 (91.4)	8 (3.8)	10 (4.8)

Table 4.2 displays the knowledge regarding DM of the participants in frequency and percentage. In the domain of understanding DM, the highest correct response was for the statement ‘DM is a condition of high levels of sugar in the blood,’ with 192 participants (91.9%) answering correctly. The lowest correct response was for ‘DM is not curable,’ with 113 participants (54.1%) answering correctly. For the risk factors of DM, nearly all participants (n=206, 98.6%) correctly identified ‘Family history of diabetes mellitus’ as a risk factor, making it the highest correct response. The lowest correct response was for ‘Older age (Age of 45 or older),’ with 144 participants (68.8%) answering correctly. In the domain of signs and symptoms of DM, ‘High blood sugar (Random sugar level ≥ 11.1 mmol/L)’ had the highest correct response, with 203 participants (97.1%) answering correctly. The lowest was ‘Excessive hunger,’ with 126 participants (60.3%) answering correctly. Regarding the control and management of DM, ‘Practise healthy diet’ received the highest correct response, with 203 participants (97.1%) answering correctly. The lowest correct response was for ‘Yearly medical eye checkup,’ with 146 participants (69.9%) answering correctly. Lastly, in the domain of DM complications, ‘Kidney failure’ was

identified correctly by 188 participants (90%), while ‘Stroke leading to paralysis’ had the lowest correct response, with 159 participants (76.6%) answering correctly.

Table 4.3 Median, minimum and maximum of the overall knowledge score regarding DM, (N=209)

Variable	Median	Minimum	Maximum
Overall knowledge score on DM	27	5	31

Table 4.3 displays the median of overall knowledge score regarding DM is 27, with scores ranging from a minimum of 5 to a maximum of 31. Further classification based on the median score indicated that a score of 27 and above was categorized as knowledgeable, while a score below 27 was classified as not knowledgeable.

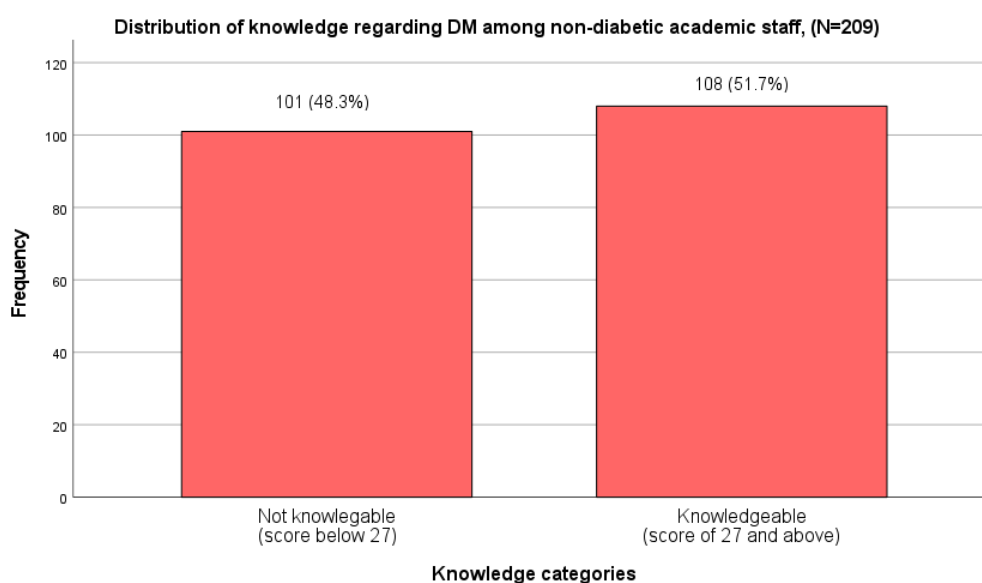


Figure 4.1 Distribution of knowledge regarding DM among non-diabetic academic staff, (N=209)

Figure 4.1 shows the distribution of knowledge regarding DM among non-diabetic academic staff, with a total of 209 participants. There are 108 (51.7%) participants who are categorised as knowledgeable about DM. In contrast, 101 (48.3%) participants are categorised as not knowledgeable.

4.3.3 ATTITUDE TOWARDS DM

The attitude towards DM among non-diabetic academic staff was evaluated using a 3-point Likert scale, addressing the second research question: "What is the attitude towards DM among non-diabetic academic staff at a university in Sungai Long?" This was conducted through descriptive analysis, and the data were presented as frequency, percentage, mean, standard deviation, minimum, and maximum scores.

Table 4.4 Frequency and percentage distribution of the participants based on attitude towards DM, (N=209)

Attitude questions	Likert scale scoring frequency (percentage) n (%)		
	Agree	Neutral	Disagree
1. Do you agree that you should be screened for DM?	184 (88)	23 (11)	2 (1.0)
2. Do you agree that family members should be screened for DM?	179 (85.6)	28 (13.4)	2 (1.0)
3. Do you agree that we should avoid consuming too much sugar to control DM?	198 (94.7)	9 (4.3)	2 (1.0)
4. Do you agree that DM affects marital relationships.	98 (46.9)	69 (33)	42 (20.1)
5. Do you agree that DM seriously affect daily activities.	160 (76.6)	36 (17.2)	13 (6.2)
6. Do you agree that physical activity can prevent the risk of DM?	185 (88.5)	17 (8.1)	7 (3.3)

7. Do you agree that maintaining a healthy weight is important in the management of diabetes?	200 (95.7)	8 (3.8)	1 (0.5)
8. Do you agree that DM complications can be prevented if the blood glucose level is well controlled?	202 (96.7)	5 (2.4)	2 (1.0)

Table 4.4 displays the attitude towards DM of the participants in frequency and percentage. The majority of participants agreed with the several statements regarding DM. Specifically, 92.7% (n=202) believed that DM complications can be prevented if the blood glucose level is well controlled. 95.7% (n=200) emphasized the importance of maintaining a healthy weight in the management of diabetes. Additionally, 94.7% (n=198) agreed that they should avoid consuming too much sugar to control DM. A significant portion, 88.5% (n=185), recognized that physical activity can prevent the risk of DM, while 88% (n=184) stated that they should be screened for DM. Moreover, 85.6% (n=179) felt that family members should also be screened for DM. Furthermore, 76.6% (n=160) acknowledged that DM seriously affects daily activities, and 46.9% (n=98) noted the impact of DM on marital relationships.

On the other hand, a notable proportion of participants were neutral about the impact of DM on marital relationships (n=69, 33.0%) and its effect on daily activities (n=36, 17.2%). This was followed by a statement that family members should be screened for DM, with 13.4% (n=28) agreeing. Additionally, 11.0% (n=23) agreed with the need for their own screening for DM. Regarding the role of physical activity in preventing DM, 8.1% (n=17) supported the statement. Furthermore, 4.3% (n=9) agreed with the importance of avoiding excessive

sugar consumption, while only 3.8% (n=8) emphasized maintaining a healthy weight. Lastly, 2.4% (n=5) believed that DM complications can be prevented if blood glucose levels are well controlled.

The highest level of disagreement was noticed in the statement regarding DM affecting marital relationships (n=42, 20.1%). This was followed by the statement that DM seriously affects daily activities (n=13, 6.2%) and physical activity can prevent the risk of DM (n=7, 3.3%). A smaller number of participants also disagreed (n=2, 1.0%) with the importance of avoiding excessive sugar consumption, that they should be screened for DM, that family members should be screened for DM and that DM complications can be prevented if blood glucose levels are well controlled. Lastly, only 1 participant (0.5%) disagreed that maintaining a healthy weight is important in the management of diabetes.

Table 4.5 Mean, minimum and maximum score of the overall attitude score towards DM, (N=209)

Variable	Mean	Standard deviation (SD)	Minimum	Maximum
Overall attitude score towards DM	6.73	1.243	3	8

Table 4.5 displays the mean of overall attitude score towards DM is 6.73 (SD=1.243), with scores ranging from a minimum of 3 to a maximum of 8. Further classification based on the mean score indicated that a score of 6.73 and

above was categorized as reflecting a good attitude, while a score below 6.73 was classified as reflecting a poor attitude.

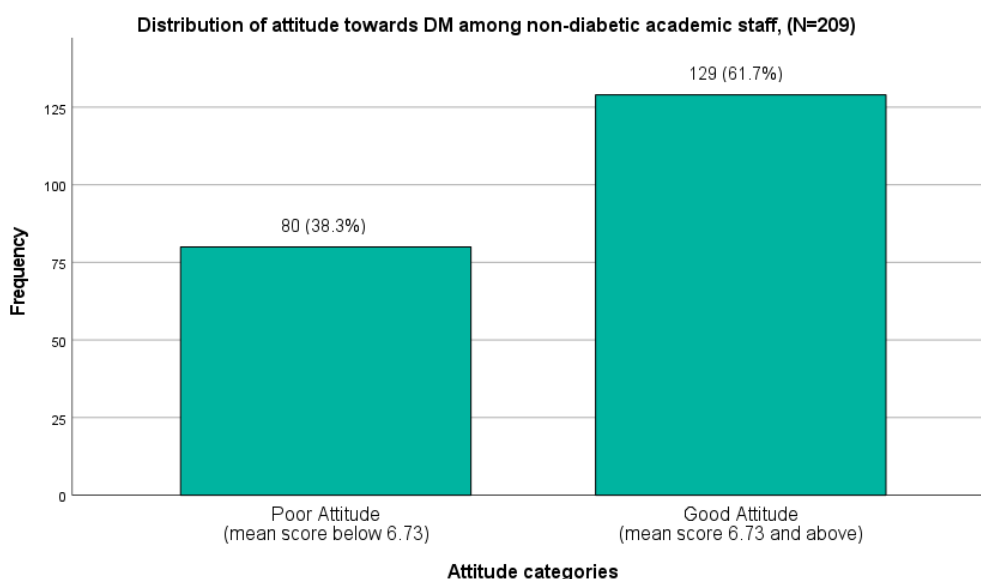


Figure 4.2 Distribution of attitude towards DM among non-diabetic academic staff, (N=209)

Figure 4.2 shows the distribution of attitude towards DM among non-diabetic academic staff, with a total of 209 participants. The majority of respondents, 129 (61.7%) were categorised as having a good attitude towards DM. In contrast, 80 (38.3%) participants are considered to have a poor attitude.

4.3.4 ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE REGARDING DM

The third research question, ‘What is the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and knowledge regarding DM among the non-diabetic academic staff in a university in Sungai Long?’ was analysed by using Chi-square test. The results were then presented in cross-tabulation.

Table 4.6 Association between sociodemographic characteristics and knowledge regarding DM among the participant, as analysed by using Chi-square test, (N=209)

Socio-demographic characteristics	Knowledge regarding DM n (%)		χ^2 (p-value)
	Knowledgeable	Not knowledgeable	
Gender			1.573 (0.262)
Male	41 (46.6)	47 (53.4)	
Female	67 (55.4)	54 (44.6)	
Age			1.681 (0.649)
Below 30	3 (50.0)	3 (50.0)	
31-40	37 (46.3)	43 (53.8)	
41-50	49 (55.1)	40 (44.9)	
51 and above	19 (55.9)	15 (44.1)	
Ethnicity			2.780 (0.112)
Chinese	64 (47.4)	71 (52.6)	
Non-Chinese	44 (59.5)	30 (40.5)	
Education level			14.452 (<0.001) *
Bachelor’s degree	10 (90.9)	1 (9.1)	
Master’s degree	58 (59.2)	40 (40.8)	
Doctor of Philosophy (PhD)	40 (40.0)	60 (60.0)	
Medical background			41.846 (<0.001) *
Yes	49 (89.1)	6 (10.9)	
No	59 (38.3)	95 (61.7)	
Family history of DM			5.903 (0.015) *
Yes	62 (60.2)	41 (39.8)	
No	46 (43.4)	60 (56.6)	

*Significant level at $p < 0.05$

Table 4.6 displays the association between sociodemographic characteristics and knowledge regarding DM among the participants, analysed by using Chi-square test. Significant associations ($p\text{-value}<0.05$) were found for the education level, medical background and family history of DM.

Participants with bachelor's degree ($n=10$, 90.0%) are more likely to be knowledgeable about DM, followed by participants with master's degree ($n=58$, 59.2%) and Doctor of Philosophy ($n=40$, 40.0%) and with a significant association ($\chi^2=14.452$, $p\text{-value}<0.001$). Medical background variables also showed a significant association ($\chi^2=55.146$, $p\text{-value}<0.001$). Those with medical background ($n=49$, 89.1%) being more knowledgeable compared to those without medical background ($n=59$, 38.3%). Additionally, having a family history of DM was significantly associated with higher knowledge levels ($\chi^2=5.903$, $p\text{-value}=0.015$), with 62 (60.2%) of participants with a family history of DM being knowledgeable compared to those who do not have family history of DM ($n=46$, 43.4%).

However, no significant associations ($p\text{-value}>0.05$) were found between the gender ($\chi^2 =1.573$, $p\text{-value}=0.262$), age ($\chi^2=1.681$, $p\text{-value}=0.649$), ethnicity ($\chi^2 =2.780$, $p\text{-value}=0.112$) and participant's knowledge regarding DM.

4.3.5 ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND ATTITUDE TOWARDS DM

The fourth research question: ‘What is the association between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitude towards DM among the non-diabetic academic staff in a university in Sungai Long? was analysed by using Chi-square test. The results were then presented in cross-tabulation.

Table 4.7 The association between sociodemographic characteristics and attitude towards DM among the participant, as analysed by using Chi-square test, (N=209)

Socio-demographic characteristics	Attitude towards DM n (%)		χ^2 (p-value)
	Good	Poor	
Gender			3.314 (0.084)
Male	48 (54.5)	40 (45.5)	
Female	81 (66.9)	40 (33.1)	
Age			4.253 (0.240)
Below 30	2 (33.3)	4 (66.7)	
31-40	54 (67.5)	26 (32.5)	
41-50	55 (61.8)	34 (38.2)	
51 and above	18 (52.9)	16 (47.1)	
Ethnicity			1.156 (0.767)
Chinese	82 (60.7)	53 (39.3)	
Non-Chinese	47 (63.5)	27 (36.5)	
Education level			0.361 (0.841)
Bachelor’s degree	6 (54.5)	5 (45.5)	
Master’s degree	62 (63.3)	36 (36.7)	
Doctor of Philosophy (PhD)	61 (61.0)	39 (39.0)	
Medical background			0.440 (0.507)
Yes	36 (65.5)	19 (34.5)	
No	93 (60.4)	61 (39.6)	
Family history of DM			0.477 (0.569)
Yes	66 (64.1)	37 (35.9)	
No	63 (59.4)	43 (40.6)	

*Significant level at $p < 0.05$

Table 4.7 displays the association between sociodemographic characteristics and attitude towards DM among the participants, analysed by using Chi-square test. There were no significant association for gender ($\chi^2=3.314$, p-value=0.084), age ($\chi^2=4.253$, p-value=0.240), ethnicity ($\chi^2=1.156$, p-value=0.767), education level ($\chi^2=0.361$, p-value=0.841), medical background ($\chi^2=0.458$, p-value=0.930), and family history of DM ($\chi^2=0.477$, p-value=0.569). All the p-values are above the 0.05 significance threshold, indicating no significant associations between these sociodemographic characteristics and attitudes towards DM.

4.3.6 ASSOCIATION BETWEEN KNOWLEDGE AND ATTITUDE RELATED TO DM

The fifth research question: ‘What is the association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long?’ was analysed by using Chi-square test. The results were then presented in cross-tabulation.

Table 4.8 The association between knowledge and attitude related to DM, (N=209)

Knowledge regarding DM	Attitude towards DM		χ^2 (p-value)
	n (%)		
	Good	Poor	
Knowledgeable	68 (63.0)	40 (37.0)	1.146 (0.776)
Not Knowledgeable	61 (60.4)	40 (39.6)	

**Significant level at $p < 0.05$*

Table 4.8 displays the association between knowledge and attitude related to DM. There is no significant association found between knowledge and attitude related to DM ($\chi^2=1.146$, $p\text{-value}=0.776$). The p -value exceeds the 0.05 threshold, indicating no statistically significant association between the knowledge regarding DM and the attitude towards DM among the participants.

4.4 SUMMARY

In conclusion, among 209 non-diabetic academic staff, 51.7% are knowledgeable about DM, and 61.7% of participants exhibit a good attitude. A statistically significant association was found between knowledge of DM and education level, medical background, and family history of DM. However, no significant relationships were observed between sociodemographic characteristics and attitudes towards DM, nor between knowledge and attitudes towards DM.

CHAPTER 5

DISCUSSION

5.0 OVERVIEW

This chapter discusses the findings related to research specific objectives and the implication in context of relevant past literatures. The discussion begins with determining the knowledge regarding DM, followed by determining the attitudes towards DM. It then explores the analysis the association between sociodemographic characteristics and knowledge regarding DM, and the association between sociodemographic characteristics and attitudes towards DM. Last, it also to determines the association between knowledge and attitudes related to DM.

5.1 DISCUSSION OF MAJOR FINDINGS

5.1.1 KNOWLEDGE REGARDING DM

Findings from the current study demonstrated the majority of the participants (n=108, 51.7%) are knowledgeable about DM. However, it is important to note that a significant portion (n=101, 48.3%) are not knowledgeable. In current study, participants displayed strong knowledge in several areas, such as understanding DM as a condition of high blood sugar (91.9%), recognizing major risk factors (family history, overweight, poor dietary habits) with over 98% accuracy, and identifying signs and symptoms like high blood sugar (97.1%) and slow wound healing (93.8%). Control and management of DM, including insulin injections (96.7%), oral medications (92.8%), regular exercise (91.4%) and healthy diet (97.1%) were also well known, along with the risk of limb amputation (91.4%). There was a misconception identified where only 54.1% of participants knew that DM is not curable, conversely indicating that 45.9% of participants do not

know that DM is not curable. This suggests that despite the overall tendency towards knowledgeability, nearly half of the participants still have misunderstandings about DM, which cannot be overlooked.

The findings were similar to Ikmal Md Bakri, et al. (2022), who reported 59.4% of Malay villagers had good knowledge about DM and over 90% of participants had knowledge of DM causes (92.5%), diagnostic tests (97.3%), delayed wound healing as a symptom (97.3%), and obesity as a risk factor (93.0%). These findings align with Baig, et al. (2023) who reported 66.86% of non-diabetic residents demonstrated good knowledge of DM. Additionally, the study by Alqahtani, et al. (2020) found that 48.6% of participants were aware that diabetes is not curable, which is consistent with the findings of the current study. In contrast, the current study differs from the findings of Al-Mutawaa, et al. (2022), which revealed that 69% of non-diabetic Qatar nationals and long-term residents had the lowest knowledge score regarding DM.

The lower results in comparison may be due to different cultural exposure to DM, variations in the target population, and differences in the instruments and scoring systems used in the study (Alsous, et al., 2019). However, the level of knowledge regarding DM has been linked to socio-demographic factors such as educational status, family history of DM, previous exposure, and sources of information related to DM (Alemayehu, Dagne, and Dagnew, 2020). These factors may contribute to the observed differences in knowledge levels, highlighting how both personal and external factors shape DM awareness and understanding.

5.1.2 ATTITUDE TOWARDS DM

Findings from the current study demonstrated 61.7% (n=129) of participants have good attitude towards DM and 38.3% (n=80) participants have a poor attitude. Most agreed that it is crucial to avoid consuming too much sugar to control DM (94.7%), maintain a healthy weight for effective DM management (95.7%) and that DM complications can be prevented if blood glucose levels are well controlled (96.7%). However, there was less agreement on the impact of DM, where 46.9% agreed that DM affects marital relationships, and 76.7% felt that DM seriously affects daily activities.

The findings were similar to Soo, Dali and Shakar (2021), who revealed 98.4% of the public members had good score on attitude towards DM. This finding was supported by Al-Mutawaa, et al. (2022), who revealed that 32% and 55% of 2400 non-diabetic participants had high and intermediate scores of attitudes towards DM. In contrast, the current study differs from the findings of Baig, et al. (2023), which revealed 52.2% of non-diabetic residents had negative attitudes towards DM, only 47.8% had positive attitudes towards DM.

In general, the majority of studies have demonstrated a wide range in attitudes towards DM. This variation could be due to existing misconceptions about DM. The comparison of attitude results in this study to others may be influenced by differences in the target population or variations in the scoring systems used to determine knowledge categories (Alsous, et al., 2019).

5.1.3 ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE REGARDING TO DM

The findings from current study demonstrated significant associations between education level, medical background and family history of DM with knowledge regarding DM. However, no significant associations were found between gender, age, ethnicity and knowledge regarding DM.

Ikmal Md Bakri, et al. (2022) and Baig, et al. (2023) found no significant association ($p\text{-value} > 0.05$) between gender and knowledge regarding DM. In contrast, Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019) reported significant association ($p\text{-value} < 0.05$) between gender and knowledge regarding DM among 104 non-diabetic outpatients, where females had higher knowledge score compared to males. This finding was consistent with Gazzaz (2020) and Al-Mutawaa, et al. (2022), who found females have a higher percentage of knowledge score compared to males. This could be due to females being generally more aware of health issues and more likely to consult doctors than males (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019)).

Baig, et al (2023) revealed no association ($p\text{-value} > 0.817$) between age and knowledge regarding DM among 1207 non-diabetic residents. In contrast, Aljofan, Altebainawi and Alrashidi (2019) revealed significant association between age and knowledge regarding DM among 738 public members, where

older people (aged 35 and above) had higher knowledge score regarding DM compared to younger ones (aged 18 to 34). This finding was supported by Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019), who reported older participants had better knowledge regarding DM. These varying findings across studies suggest that the association between age and DM-related knowledge may be influenced by cultural, educational, or regional factors.

Yeow, et al. (2024) revealed no association ($p\text{-value}=0.317$) between ethnicity and knowledge regarding DM among 121 diabetic patients. In contrast, Yasir Faraz Abbasia, et al. (2018) reported that there is a significant association ($p\text{-value}<0.001$) between ethnicity and knowledge towards DM among 386 patients with T2DM, where Chinese (23.66%) had good attitude level, followed by Malay (16.56%) and Indian (3.85%). The findings of the current study were consistent with Sasikala Chinnappan, et al. (2017), which found Chinese participants demonstrated the highest level of knowledge, with a mean of 61.42. The variation in findings may be due to differences in study populations, cultural exposure, and access to diabetes education, suggesting that factors beyond ethnicity, such as education and healthcare access, could influence DM knowledge.

Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019) revealed significant association between education level and knowledge regarding DM, where participants with tertiary education demonstrated better knowledge about

DM compared to lower level of education (informal, primary and secondary education. In contrast, Baig, et al. (2023) revealed no significant association between education level and knowledge regarding DM. This could be attributed to the fact that people with higher educational attainment tend to have a greater interest in various issues, including health-related ones. This can be explained by the fact that as education levels increase, so does exposure to information (Orok, et al., 2024).

Alqahtani, et al. (2020) revealed significant association between education related to the medical field and knowledge regarding DM, with participants who received medical education were more prevalent in a good knowledge group. This finding was consistent with Orok, et al. (2024), who also revealed significant association between course of study and knowledge regarding DM, showing that students in healthcare courses had better knowledge scores compared to students in non-healthcare fields. This consistency findings suggests that individuals with education related to the medical field are more likely to be knowledgeable about the DM. This finding is expected as healthcare students receive specific education related to medical topics, including in-depth training of DM care and management. In contrast, those from non-healthcare may have basic understanding about DM but are unlikely to process in-depth knowledge. However, their DM-related knowledge can vary based on personal interest, self-exposure to healthcare topics and specific coursework (Orok, et al., 2024).

Baig, et al. (2023) revealed a significant association between family history of DM and knowledge regarding DM, where those with a family history of DM were more likely to be knowledgeable than those without a family history of DM. This finding was consistent with Alsous, et al. (2019) and Gazzaz (2020), who reported those who had close relatives with DM were more knowledgeable compared to those who had no relative with DM. This consistency findings suggests that individuals with a family history of DM are more likely to be knowledgeable about the disease related to DM. This could be attributed to their direct involvement in caring for family members with DM, the education provided to the family about the disease, and their engagement in practising a healthy lifestyle (Orok, et al., 2024).

5.1.4 ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND ATTITUDE TOWARDS DM

The fourth research objective was to determine the association between sociodemographic characteristics and attitude towards DM. The results from the current study demonstrated no significant associations between sociodemographic characteristics (gender, age, ethnicity, education level, medical background and family history of DM) and attitudes towards DM.

Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019), Ikmal Md Bakri, et al. (2022) and Baig, et al. (2023) found no significant association between gender and attitude towards DM. In contrast, Gazzaz (2020) found

significant association between gender and attitude, where females had better attitudes compared to male. This may be because females are generally more aware of health issues and are more likely to consult doctors than males (Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque, 2019).

Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019) found that there was no significant association between age and attitude towards DM among 204 non-diabetic outpatients. In contrast, Baig, et al. (2023) revealed significant association between age and attitude towards DM, where aged 30 and below had high attitude scores compared to aged 30 and above. Aljofan, Altebainawi, Alrashid (2019) also revealed the similar finding, where younger (aged 18 to 34) shows higher positive attitude towards therapeutic management of DM compared to older group (aged 35 and above). These varying findings across studies suggest that the association between age and DM-related attitude may be influenced by greater access to modern health information, proactive health behaviours, and increased exposure to wellness trends and education.

Yeow, et al. (2024) revealed no significant association ($p\text{-value}=0.177$) between ethnicity and attitude towards DM. In contrast, Yasir Faraz Abbasia, et al. (2018) reported that there is a significant association ($p\text{-value}=0.002$) between ethnicity and attitude towards DM among 386 patients with T2DM, where Chinese (48.85%) had good attitude level, followed by Malay (42.38%) and Indian (24.04%). The variation may arise from differences in study populations, cultural

factors, and exposure to diabetes education, indicating that attitudes towards DM could be shaped by a combination of ethnic backgrounds and individual experiences rather than ethnicity alone.

Baig, et al. (2023) and Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019) revealed no association between education level and attitude. However, despite the overall lack of significant association, it was observed that participants with master's and PhD degree holders were more likely to have a positive attitude towards DM. In contrast, Alsous, et al. (2019) revealed that significant association between level of education and attitude related to DM, where participants with university level education or higher (Master and PhD) had higher level of attitude score than participants with education up to secondary school and college. This could be contributing as people with higher qualifications of study have more awareness and access to knowledge due to their education. Whereas those with lower qualifications may be less able to read and comprehend the information they encounter (Baig, et al., 2023).

Alsous, et al. (2019) revealed significant association between education related to the medical field and attitude towards DM, where participants with medical education had more positive attitude towards DM. This association was further supported by Alqahtani, et al. (2020), who reported students who received medical education related to the medical field are more prevalent in positive attitude groups. This consistency in findings suggests that individuals educated

in the medical field are more likely to have positive attitudes towards DM, as their training emphasises effective management of chronic conditions. In contrast, non-healthcare individuals may have a basic understanding but are less likely to adopt informed attitudes. However, personal interest, exposure to healthcare topics, and relevant coursework can still influence the attitudes of those from non-healthcare backgrounds (Orok, et al., 2024).

Baig, et al. (2023) revealed significant association between family history of DM and attitude, where those who have family history of DM had more positive attitudes than those without a family history DM. This finding was supported by Gazzaz (2020), where those who had DM close relatives had a positive attitude compared to those who do not have relatives with DM. This consistency suggests that individuals with a family history of DM are more likely to exhibit positive attitudes towards DM. This could be contributing as people with a family history of chronic disease may become more concerned about it and thus become aware of the disease (Alsous, et al., 2019).

5.1.5 ASSOCIATION BETWEEN KNOWLEDGE AND ATTITUDE RELATED TO DM

The research objective was to analyse the association between knowledge and attitude related to DM among the non-diabetic academic staff in a university in Sungai Long. Results from current study demonstrated there is no statistically significant association between knowledge and attitude related to DM.

The results were similar with a study by Rawaida Mat Salleh, Nor Azlina A Rahman, and Mainul Haque (2019), which revealed no significant association between knowledge and attitude regarding T2DM ($p\text{-value}=0.070$) among non-diabetic outpatients. This finding was consistent with a study by Baig, et al. (2023), reporting that there was no significant association between knowledge and attitude scores regarding DM ($p\text{-value}>0.05$) among non-diabetic residents. This lack of association could be attributed to the fact that all the participants were non-diabetic. Therefore, their knowledge and attitude related to DM might not have been influenced by personal concerns or worries associated with having DM or perceiving themselves as being at risk for the disease (Baig, et al., 2023).

In contrast, Al-Mutawaa, et al. (2022) revealed significant association between knowledge and attitude regarding DM ($p\text{-value}<0.001$) among 2400 non-diabetic Qatar nationals and long-term residents. This finding indicates that higher knowledge about DM is associated with more positive attitudes, suggesting that educational initiatives can effectively influence attitudes and promote healthier behaviors in non-diabetic populations.

5.2 SUMMARY

With the support of earlier research and literature, the findings and results from the previous studies were thoroughly analysed. These topics included knowledge and attitudes about diabetes mellitus (DM), the relationship between sociodemographic characteristics and DM knowledge and attitudes, and the

relationship between DM knowledge and attitudes. Chapter 6 will provide an explanation of the conclusion and recommendation.

CHAPTER 6:

CONCLUSION AND

RECOMMENDATION

6.0 STRENGTH AND LIMITATION

6.0.1 STRENGTH

A response rate of over 90%, along with the achievement of the calculated sample size, is one of the strengths of the study. There is no selection bias as screening questions were included to exclude diabetic population. The findings could be useful in identifying the misconceptions about DM among non-diabetic academic staff. The correct answers from the instruments and the feedback provided to all participants after the study may positively impact their knowledge and attitudes regarding DM. This also helps determine the specific content related to DM to be considered as the educational materials for future delivery to academic staff.

6.0.2 LIMITATION

The presence of missing data was found, partly due to the use of hard copies for distribution. There was also a selection bias as there was limited ethnic diversity. Sociodemographic characteristics such as ethnicity should be considered as earlier in the proposal stage, given that the setting of the study consisted primarily of Chinese participants, therefore unable to analyse the association between the ethnicity with knowledge and attitude related to DM. Furthermore, participants may tend to choose the “right” answer rather than providing that reflected their real-life knowledge and perspectives. Lastly, the small sample size in pilot study could have contributed to the moderate reliability of the instrument, as reflected by the Cronbach's alpha. Additionally, the limited

sample size reduces the generalizability of the pilot study's findings, making it harder to draw definitive conclusions or make significant refinements to the instrument before the actual study.

6.1 IMPLICATIONS OF STUDY

This study provides an informative insight into the knowledge and attitude related to DM among non-diabetic academic staff, underscoring key areas where misconceptions exist and where knowledge could be improved. These findings highlight the importance of implementing DM-related awareness campaigns aimed at addressing these gaps and promoting a more accurate understanding of DM. Moreover, the study contributes to the broader field of DM education by identifying specific content that could be included in future educational materials. Furthermore, the findings serve as evidence for future research, offering a foundation for enhancing DM education and prevention strategies in similar populations.

6.2 RECOMMENDATION FOR FUTURE RESEARCH

For future research, it is recommended to recruit a more diverse range of ethnicities to enhance the generalizability of the findings across different demographic groups. Additionally, efforts should be made to increase the sample size to improve the reliability and validity of the findings. A comparison between universities would also recommend providing valuable insights into how institutional factors may influence knowledge and attitudes related to DM.

In terms of practical applications for nursing practice, it is essential to focus on health promotion and preventive education through initiatives such as health education workshops and targeted DM screening programs. Implementing these initiatives can enhance the DM related knowledge, such as lifestyle modifications to prevent DM, and can also help identify early-stage DM or prediabetes, allowing for timely intervention. Moreover, DM awareness and knowledge enhancement can be achieved by implementing educational campaigns and ensuring easy access to informational materials, such as brochures and online resources, to stay updated on the latest DM prevention strategies and management.

6.3 CONCLUSION

In conclusion, just over half (51.7%) of the non-diabetic academic staff are knowledgeable about DM, but a significant portion (48.4%) still lacks sufficient knowledge. Majority of non-diabetic academic staff had a good attitude towards DM. Moreover, significant associations were found between education level, medical background and family history of DM with knowledge regarding DM. Specifically, participants with a bachelor's degree, from the medical field background, and with a family history of the DM were significantly more knowledgeable about the disease. Given these findings, awareness programs regarding DM are essential to enhance knowledge and address gaps, ultimately fostering better management and attitudes towards the DM.

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APPENDICES

APPENDIX A: CONSENT DECLARATION FORM

PARTICIPANT CONSENT FORM		
Research title: Knowledge and attitude towards diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long, Selangor, Malaysia.		
1. I have read and understand the information and cover letter of recruitment explaining the above research. 2. I understand my participation is strictly voluntary and I am free to withdraw at any time without consequences. 3. My question about the study have been answered to my satisfaction and I understand that I may ask further question at any point. 4. I understand my identify will be maintained anonymous and my response will be kept private and confidential. 5. I understand I am entitled to ask questions and to receive information and feedback for educational purpose after the study. 6. I hereby give my consent to participate in the above research.		
<u>Participant declaration</u>		
I, _____ have read the consent form and I understand the purpose of the study. I understand my participation is voluntary and I can withdraw at any time without any consequences of any kind. All information will be kept private and confidentially. Hereby, I give my consent to participate in this study by completing the attached survey.		
_____	_____	_____
Name of Participant	Date	Signature
LOW HUAN LE	_____	_____
Name of Researcher	Date	Signature
2		

APPENDIX B: RESEARCH INSTRUMENT

KNOWLEDGE AND ATTITUDE TOWARDS DIABETES MELLITUS (DM) AMONG NON-DIABETIC ACADEMIC STAFF IN A UNIVERSITY IN SUNGAI LONG, SELANGOR, MALAYSIA

This set of questionnaires contains three parts: Part A, Part B, Part C and Part D.
You have to answer **ALL** questions.

Part A: SCREENING OF PARTICIPANT

Tick where applicable:

1. Have you been diagnosed with diabetes?
 - ☐ If YES, please do not proceed with this questionnaire.
 - ☐ If NO, please continue to answer the following questionnaire

PART B: SOCIODEMOGRAPHIC CHARACTERISTICS

Tick where applicable:

- | | |
|---|--|
| <ol style="list-style-type: none">1. What is your gender?<ul style="list-style-type: none">☐ Male☐ Female2. How old are you?
: _____3. What is your race?<ul style="list-style-type: none">☐ Malay☐ Chinese☐ Indian☐ Others | <ol style="list-style-type: none">4. What is your higher qualification of study?<ul style="list-style-type: none">☐ Bachelor's degree☐ Master's degree☐ Doctor of Philosophy (Ph.D.)5. Which faculty do you come from?<ul style="list-style-type: none">☐ M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS)☐ Faculty of Accountancy and Management (FAM)☐ Faculty of Creative Industries (FCI)☐ Lee Kong Chian Faculty of Engineering and Science (LKC FES)6. Do you have a family history of DM?<ul style="list-style-type: none">☐ Yes☐ No |
|---|--|

PART C: KNOWLEDGE REGARDING DIABETES MELLITUS (DM)

Read each statement carefully and mark (/) in the answer box:

What is/are DM?	Yes	No	Do not know
1. DM is a condition of insufficient insulin production.			
2. DM is a condition when the body does not respond to insulin.			
3. DM is a condition of high levels of sugar in the blood.			
4. DM is not curable.			
5. DM is a disease that can affect any part of body.			
What are the risk factors of DM?	Yes	No	Do not know
1. Older age (Age of 45 or older)			
2. Family history of diabetes mellitus			
3. Being overweight/obesity			
4. Pregnancy			
5. Sedentary lifestyle (Eg. Lack of physical activity)			
6. Poor dietary habits			
What are the signs and symptoms of DM?	Yes	No	Do not know
1. Frequent urination			
2. Excessive thirst			
3. Excessive hunger			
4. Weight loss			
5. High blood sugar (Random sugar level ≥ 11.1 mmol/L)			
6. Blurred vision			
7. Slow healing of cuts and wounds			
8. Feeling of weakness			

PART D: ATTITUDE TOWARDS DIABETES MELLITUS (DM)

Read each statement carefully and mark (/) in the answer box:

	Agree	Neutral	Disagree
1. Do you agree that you should be screened for DM?			
2. Do you agree that family members should be screened for DM?			
3. Do you agree that we should avoid consuming too much sugar to control DM?			
4. Do you agree that DM does not affecting the marital relationships.			
5. Do you agree that DM seriously affects daily activities.			
6. Do you agree that physical activity can prevent the risk of DM?			
7. Do you agree that maintaining a healthy weight is important in the management of diabetes?			
8. Do you agree that DM complications can be prevented if the blood glucose level is well controlled?			

----- End of the question -----

APPENDIX C: COVER LETTER FOR RECRUITMENT

COVER LETTER OF RECRUITMENT

Dear Participant:

My name is Low Huan Le. I am a fourth-year nursing student from Universiti Tunku Abdul Rahman, Sungai Long Campus. My research objective is to study knowledge and attitude towards diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long, Selangor, Malaysia.

As you are an academic staff from Kandiah Faculty of Medicine and Health Sciences (MK FMHS), Faculty of Accountancy and Management (FAM), Faculty of Creative Industries (FCI) and Lee Kong Chian Faculty of Engineering and Science (LKC FES), being either diabetic or not known to be diabetic, consent and are able to participate in the study, I am inviting you to complete the attached survey entitled: Knowledge and Attitude towards Diabetes Mellitus (DM) among Non-Diabetic Academic Staff in a University in Sungai Long, Selangor, Malaysia.

The following questionnaire will take about 10 minutes. There are no identified risks or compensation for participating in the research. Your identity will be maintained anonymous. All data collected will be kept private and confidential. Participation is strictly voluntary, you can choose to withdraw at any time without consequence. If you have decided to participate in this survey, please answer all questions as honestly as possible.

Thank you for taking the time to assist me in the research. The data collected will provide useful information for future research related to diabetes mellitus (DM) as well as for the development of appropriate measures for reinforcing or improving the existing knowledge and attitude of diabetes mellitus (DM) among non-diabetic academic staff in a university in Sungai Long. Feedback and information will be provided to all research participants for educational purposes after the study. Your participation is greatly appreciated.

Yours sincerely,

LOW

.....

(LOW HUAN LE)

(huanle0408@utar.my)

APPENDIX D: PERMISSION FOR USE OF INSTRUMENTS FROM AUTHORS

Huan Le <huanle0408@gmail.com>

Request for Research Question Information
5 messages

Huan Le <huanle0408@gmail.com> 9 December 2023 at 20:09
To: "Chanyalew Worku" <chanyalewworku@gmail.com>

Dear Mr Chanyalew Worku Kassahun,

I hope this message finds you well. My name is Low Huan Le, and I am currently a Year 4 nursing student at University Tunku Abdul Rahman (UTAR) in Malaysia. I am reaching out because I have come across your insightful work in the nursing field, particularly your research on "Knowledge, Attitude, Practices and their Associated Factors towards Diabetes Mellitus Among Non-diabetes Community Members of Bale Zone Administrative towns, South-East Ethiopia. A cross-sectional study."

I am in the process of conducting a research project titled "A Study on Knowledge and Practices regarding Diabetes Mellitus (DM) Among Academic Staff in One of the Higher Institutions." and believe that your questionnaire, as used in your insightful work, would be invaluable for my study. Therefore, I am writing to kindly request your permission to use and adapt your questionnaire for my research. I will refine the sentences without altering their meaning. I would need it urgently to proceed with my research process.

I understand that you are likely very busy, and I truly appreciate your time and consideration. Your contribution would undoubtedly enhance the depth and quality of my research.

Thank you for considering my request. I look forward to hearing from you at your earliest convenience.

Best regards,

LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329

Huan Le <huanle0408@gmail.com> 11 December 2023 at 17:22
To: "Chanyalew Worku" <chanyalewworku@gmail.com>

Dear Mr Chanyalew Worku Kassahun,

I hope this email finds you well, I would like to follow up on an email sent on 09 Dec 2023. I would need it urgently to proceed with my research process.

I understand that you are likely very busy, and I truly appreciate your time and consideration. Your contribution would undoubtedly enhance the depth and quality of my research.

Best regards,

LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329
[Quoted text hidden]

Chanyalew Worku <chanyalewworku@gmail.com> 11 December 2023 at 19:04
To: Huan Le <huanle0408@gmail.com>

Yes, of course you can.

Thank you!

Chanyalew Worku Kassahun ,MscN, Assistant Professor
School of Nursing (medical Nursing)
Officer, project management
University of Gondar, Ethiopia (www.uog.edu.et)
Mobile: +251 921252375
Email: chanyalewworku@gmail.com
Institutional email: chanyalew.worku@uog.edu.et
skype: Chanyalewworku

[Quoted text hidden]

Huan Le <huanle0408@gmail.com> 11 December 2023 at 19:35
To: Chanyalew Worku <chanyalewworku@gmail.com>

I would like to obtain your permission to refine the sentences of the questionnaire according to my study. I will refine it without altering its meaning, will that be all right?

Best wishes,
LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329
[Quoted text hidden]

Chanyalew Worku <chanyalewworku@gmail.com> 11 December 2023 at 19:39
To: Huan Le <huanle0408@gmail.com>

Yes, of course you can.

Please, note that you can use it.
[Quoted text hidden]
[Quoted text hidden]



Huan Le <huanle0408@gmail.com>

Request for Research Questionnaire Information

7 messages

Huan Le <huanle0408@gmail.com>

2 December 2023 at 16:51

To: mbbaig@kau.edu.sa

Dear Prof Mukhtiar Baig,

I hope this message finds you well. My name is Low Huan Le, and I am currently a Year 4 nursing student at University Tunku Abdul Rahman (UTAR) in Malaysia. I am reaching out because I have come across your insightful work in the medical field, particularly your research on "Diabetes Mellitus Knowledge, Attitudes, Preventive Practices and Associated Factors Among a Sample of Adult Non-Diabetic Saudi Residents."

I am in the process of conducting a research project titled "Examine the Knowledge and Practices in Managing and Prevention of Diabetes Mellitus (DM) Among the Staff in One of the Higher Learning Institutions in Selangor, Malaysia." and believe that your questionnaire, as used in your insightful work, would be invaluable for my study. Therefore, I am writing to kindly request your permission to use and adapt your questionnaire for my research. I will refine the sentences without altering their meaning.

I understand that you are likely very busy, and I truly appreciate your time and consideration. Your contribution would undoubtedly enhance the depth and quality of my research.

Thank you for considering my request. I look forward to hearing from you at your earliest convenience.

Best regards,

LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329

MUKHTIAR [بين مختار بين <mbbaig@kau.edu.sa>](mailto:mbbaig@kau.edu.sa)

5 December 2023 at 06:36

To: Huan Le <huanle0408@gmail.com>

Thank you for your email. Pls find the attached questionnaire.

(Quoted text hidden)

Disclaimer: The information contained in this message is intended for the addressee only and may contain classified information. If you are not the addressee, please delete this message and notify the sender; you should not copy or distribute this message or disclose its contents to anyone. Any views or opinions expressed in this message are those of the individual(s) and not necessarily of the university. No reliance may be placed on this message without written confirmation from an authorized representative of its contents. No guarantee is implied that this message or any attachment is virus free or has not been intercepted and amended.

إخلاء مسؤولية: إن جميع المعلومات المتضمنة في هذه الرسالة تخص المستلم، وربما تتضمن معلومات سرية، وإذا لم تكن أنت المستلم فالرجاء إلغاء الرسالة وإشعار المرسل، كما يمنع نسخ أو توزيع هذه الرسالة أو إنشاء محتوياتها لآخرين. ويجدر بالعلم أن جميع الآراء وجهات النظر الواردة في هذه الرسالة تعتبر شخصية وليست بالضرورة متسوبة للجامعة. كما لا يمكن أن يعتمد على هذه الرسالة ما لم تحصل على موافقة خطية من المسؤول عن محتوياتها. كما لا يوجد ضمان بأن هذه الرسالة أو مرفقاتها خالية من الفيروسات أو أنها لم يتم اعتراضها وتعديلها.

 Questionnaire DM.docx
25K

Huan Le <huanle0408@gmail.com>

5 December 2023 at 12:20

To: MUKHTIAR [بين مختار بين <mbbaig@kau.edu.sa>](mailto:mbbaig@kau.edu.sa)

Dear Prof Mukhtiar Baig,

Thanks for your reply and the questionnaire.

Best regards,

LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329

[Quoted text hidden]

Huan Le <huanle0408@gmail.com>
To: MUKHTIAR [مبايق ممتاز سيق <mbbaig@kau.edu.sa>](mailto:mbbaig@kau.edu.sa)

6 December 2023 at 12:32

Dear Prof Mukhtiar Baig,

I would like to obtain your permission to refine the sentences of the questionnaire according to my study. I will refine it without altering its meaning, will that be all right?

Best wishes,
LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329

On Tue, 5 Dec 2023 at 08:36, مبايق ممتاز سيق <mbbaig@kau.edu.sa> wrote:
[Quoted text hidden]

MUKHTIAR مبايق ممتاز سيق <mbbaig@kau.edu.sa>
To: Huan Le <huanle0408@gmail.com>

6 December 2023 at 13:05

Yes, of course you can.
[Quoted text hidden]

Huan Le <huanle0408@gmail.com>
To: MUKHTIAR مبايق ممتاز سيق <mbbaig@kau.edu.sa>

6 December 2023 at 13:10

Thank you for your reply. Hope u have a nice day.

Best regards,

LOW HUAN LE,
MK FMHS Student, UTAR
Tel: +6018-9883329
[Quoted text hidden]

Huan Le <huanle0408@gmail.com>
To: MUKHTIAR مبايق ممتاز سيق <mbbaig@kau.edu.sa>

10 December 2023 at 23:40

Dear Prof Mukhtiar Baig,

I am writing this email to seek further clarification on the research instrument. Pertaining to the practice question, may I ask how is the marks calculated as it is not indicated in the journal that which of the answer is correct (yes), this I am confused with the calculation of scoring to determine good or poor practice of my respondents.

Best Regard,
LOW HUAN LE,
MK FMHS student, UTAR
Tel: 018-9883329
[Quoted text hidden]

—
Best Regard,
LOW HUAN LE,
Tel: 018-9883329

APPENDIX E: ETHICAL CLEARANCE APPROVAL LETTER



UNIVERSITI TUNKU ABDUL RAHMAN

Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/78-316/2024

3 July 2024

Ms Liew Siew Fun
Head, Department of Nursing
M. Kandiah Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman
Jalan Sungai Long
Bandar Sungai Long
43000 Kajang, Selangor

Dear Ms Liew,

Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your students' research project from Bachelor of Nursing (Honours) programme enrolled in course UMNE4024. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Knowledge and Attitude Towards Diabetes Mellitus (DM) Among Non-Diabetic Academic Staff in A University in Sungai Long, Selangor, Malaysia	Low Huan Le	Ms Jagjit Kaur a/p Najar Singh	3 July 2024 – 2 July 2025
2.	Examining Gen Z's Willingness on Family Presence During Resuscitation (FPDR); in A Private University in Selangor, Malaysia	Jocelyn Low Zi Yeng	Prof Dr Hamidah Binti Hassan	
3.	A Study on the Influences of Social Media Use on Appearance Anxiety Among Undergraduate Students in one of the Private Universities in Kajang	Camie Man Xian Chyi	Prof Dr Hamidah Binti Hassan	
4.	A Study on Knowledge and Attitudes Towards Organ Donation Willingness Among Undergraduate Students in A Private University in Sungai Long	Chai Pei Zi	Ms Choo Peak Yean	
5.	A Study on Knowledge and Attitudes in Menstrual Cup Usage Among Female Undergraduate Students in A Private University in Sungai Long	Lim Jia Hui	Ms Thulasy a/p Perumal	
6.	A Study on the Knowledge and Use of E-cigarettes Among Female Undergraduate Students in A Private University in Kajang	Choh Yong Sheng	Dr Thavamalar a/p Paramasivam	
7.	The Satisfaction Level of Bereaved Caregivers With the Care Received During The End-Of-Life, A Private University in Kajang	Wong Jia Yan		
8.	A Study on Knowledge, Attitude and Preventive Measures Towards Sexually Transmitted Infections Among Undergraduate Students in A Private University in Kajang	Leow Guo An	Ms Liew Siew Fun	

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia

Tel: (605) 468 8888 **Fax:** (605) 466 1313

Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia

Tel: (603) 9086 0288 **Fax:** (603) 9019 8868

Website: www.utar.edu.my



The conduct of this research is subject to the following:

- (1) The participants' informed consent be obtained prior to the commencement of the research;
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.
- (4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ts Dr Faiz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, M. Kandiah Faculty of Medicine and Health Sciences
 Director, Institute of Postgraduate Studies and Research

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
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Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 **Fax:** (603) 9019 8868
Website: www.utar.edu.my



APPENDIX F: RESEARCH INSTRUMENT CONTENT VALIDATION



Wholly owned by UTAR Education Foundation

HUAN LE LOW <huanle0408@1utar.my>

Fwd: Huan Le's questionnaire
3 messages

Jagjit Kaur a/p Najar Singh <jagjitk@utar.edu.my>
To: HUAN LE LOW <huanle0408@1utar.my>

Thu, Jun 13, 2024 at 10:41 AM

Dear Student,
Dr Retna has done the validation despite her tight schedule. Kindly do the changes accordingly.
Regards,
Ms Jagjit Kaur
Lecturer
Department of Nursing
M. Kandiah Faculty of Medicine & Health Sciences
Universiti Tunku Abdul Rahman
Sungai Long Campus
Tel: 6016-209 3689
E-mail: jagjitk@utar.edu.my

----- Forwarded message -----
From: Retneswari a/p S. Masilamani <retneswari@utar.edu.my>
Date: Wed, Jun 12, 2024 at 11:54 PM
Subject: Huan Le's questionnaire
To: Jagjit Kaur a/p Najar Singh <jagjitk@utar.edu.my>



Wholly owned by UTAR Education Foundation

HUAN LE LOW <huanle0408@1utar.my>

Letter Requesting Suggestion of Experts for Establishing Content Validity of the Tool

卡李略略 <woolifong2015@gmail.com>
To: HUAN LE LOW <huanle0408@1utar.my>
Cc: Jagjit Kaur a/p Najar Singh <jagjitk@utar.edu.my>

Fri, May 3, 2024 at 12:08 AM

Dear Ms. Huan Le,
Good dya.
Thanks for your email.
I had reviewed your research project's questionnaires and made some comments for your consideration.

One of the points you may consider why you choose this group of population as their age group is the risk factor of getting DM (more than 35 and above).

I Hope you have a fruitful and wonderful research project.

Thank you.

Best regards,
Ms. Woo.

[Quoted text hidden]

 questionnaire for validation reviewed by woo.docx
30K

APPENDIX G: PERSONAL DATA PROTECTION STATEMENT

PERSONAL DATA PROTECTION NOTICE

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:
 - a. Name
 - b. Identify Card
 - c. Place of Birth
 - d. Address
 - e. Education History
 - f. Employment History
 - g. Medical History
 - h. Blood type
 - i. Race
 - j. Religion
 - k. Photo
 - l. Personal Information and Associated Research Data
2. The purposes for which your personal data may be used are inclusive but not limited to:
 - a. For assessment of any application to UTAR
 - b. For processing and benefits and services
 - c. For communication purposes
 - d. For advertorial and news
 - e. For general administration and record purposes
 - f. For enhancing the value of education
 - g. For educational and related purpose consequential to UTAR
 - h. For replying any responds to complains and enquiries
 - i. For the purpose of our corporate governance
 - j. For the purpose of conducting research/collaboration

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligation to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining, and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and / or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security, and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfil our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

8. You may access and update your personal data by writing in to us at huanle0408@1utar.my.

Acknowledgement of Notice

[] I have been notified and that I hereby understood, consented, and agreed per UTAR above notice.

[] I disagree, my personal data will not be processed.

Name:
Date:

APPENDIX H: GANTT CHART

TASK	2023			2024				
	Oct	Nov	Dec	Jan-May	Jun	July	Aug	Sept
Proposal Writting				Teaching week				
Oral Presentation								
Ethics Approval								
Pilot Study								
Data collection								
Data Analysis								
Interpret Results								
Report Writing								
Presentation and Thesis Submission								

APPENDIX I: TURNITIN ORIGINALITY REPORT

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