# KNOWLEDGE REGARDING ALZHEIMER'S DISEASE AMONG UNDERGRADUATE STUDENTS IN USM HEALTH CAMPUS

**SITI NURSYAHIRA BINTI MOHD TARMIZI**

**BACHELOR IN NURSING**
**SCHOOL OF HEALTH SCIENCES**
**UNIVERSITI SAINS MALAYSIA**

**2025**

# KNOWLEDGE REGARDING ALZHEIMER'S DISEASE AMONG UNDERGRADUATE STUDENTS IN USM HEALTH CAMPUS

**by**

**SITI NURSYAHIRA BINTI MOHD TARMIZI**

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

**August 2025**

## DECLARATION

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

Siti Nursyahira Binti Mohd Tarmizi,
Student,
Degree of Bachelor of Nursing (Honours),
School of Health Sciences,
Health Campus,
Universiti Sains Malaysia,
16150 Kubang Kerian,
Kelantan, Malaysia.

Date: 01st August 2025

## ACKNOWLEDGEMENT

First and foremost, I would like to express my heartfelt appreciation to my supervisor, Dr. Intan Idiana Binti Hassan, for her constant support, invaluable guidance, and encouragement throughout this final year project. I am deeply thankful for her willingness to assist me at all times, always resolving my doubts and motivating me. Her dedication, patience, and sincere commitment to my learning journey have made this experience meaningful and fulfilling. I would also like to extend my sincere gratitude to my co-supervisor, Dr. Wong Weng Kin, for his helpful input, especially in guiding me through the data analysis phase. His knowledge and clear explanations played an important role in helping me understand the research process and draw accurate conclusions from the data. I truly appreciate his promptness and continued support throughout the project.

A special thank you goes to my beloved parents for their unwavering love, prayers, and endless support. Their belief in me has been the greatest source of strength and inspiration during this academic journey. I am also grateful to my dear friends, who stood by me with words of encouragement, moral support, and shared challenges. Their presence helped me stay positive and motivated, especially during difficult moments. To everyone who supported me directly or indirectly in completing this research, I offer my deepest thanks and appreciation.

Last but not least, I wanna thank me. I wanna thank me for believing in me. I wanna thank me for doing all this hard work. I wanna thank me for having no days off. I wanna thank me for never quitting. I wanna thank me for always being a giver and trying to give more than I receive. I wanna thank me for trying do more right than wrong. I wanna thank me for just being me at all times.

## TABLE OF CONTENTS

## LIST OF TABLES

**Page**

## LIST OF FIGURES

**Page**

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AD | Alzheimer's Disease |
| ADKS | Alzheimer's Disease Knowledge Scale |
| HBM | Health Belief Model |
| HREC | Human Research Ethics Committee |
| IMU | International Medical University |
| NMDA | N-methyl-D-asparatte |
| SPSS | Statistical Package Social Sciences |
| USM | Universiti Sains Malaysia |
| WHO | World Health Organization |

## LIST OF APPENDICES

**PENGETAHUAN BERKAITAN PENYAKIT ALZHEIMER DALAM KALANGAN PELAJAR SARJANA MUDA DI KAMPUS KESIHATAN USM**

## ABSTRAK

Penyakit Alzheimer (AD) ialah gangguan neurodegeneratif progresif dan merupakan penyebab utama demensia, yang memberi kesan ketara terhadap ingatan, kognisi, dan tingkah laku. Dengan jangkaan peningkatan warga emas di Malaysia kepada 15% menjelang tahun 2030, pengetahuan tentang penyakit Alzheimer dalam kalangan bakal profesional kesihatan menjadi semakin penting. Kajian ini dijalankan untuk menilai tahap pengetahuan mengenai penyakit Alzheimer dalam kalangan pelajar prasiswazah di Kampus Kesihatan Universiti Sains Malaysia (USM). Kajian keratan rentas ini melibatkan 362 pelajar dari Pusat Pengajian Sains Kesihatan, Pusat Pengajian Sains Perubatan, dan Pusat Pengajian Sains Pergigian menggunakan soal selidik kendiri berasaskan Alzheimer's Disease Knowledge Scale (ADKS). Data dianalisis menggunakan statistik deskriptif, dan ujian Chi-Square Pearson melalui perisian SPSS versi 28.0. Dapatan kajian menunjukkan majoriti peserta (n=256, 70.7%) mempunyai pengetahuan pada tahap sederhana, manakala 29.3% (n=106) menunjukkan pengetahuan yang baik. Terdapat perbezaan yang signifikan dalam tahap pengetahuan antara ketiga-tiga pusat pengajian ($p<0.001$), dan hubungan signifikan juga ditemui antara tahap pengetahuan dengan faktor demografi seperti umur ($p=0.001$), pusat pengajian ($p<0.001$) dan tahun pengajian ($p<0.001$). Kesimpulannya, kajian ini menekankan keperluan untuk memperkenalkan modul khusus berkaitan Alzheimer dalam kurikulum kesihatan prasiswazah bagi meningkatkan literasi demensia dalam kalangan pelajar.

**KNOWLEDGE REGARDING ALZHEIMER'S DISEASE AMONG UNDERGRADUATE STUDENTS IN USM HEALTH CAMPUS**

## ABSTRACT

Alzheimer's disease (AD) is a progressive neurodegenerative disorder and the most common cause of dementia, significantly affecting memory, cognition, and behaviour. With Malaysia's elderly population projected to reach 15% by 2030, knowledge of Alzheimer's disease among future healthcare professionals is becoming increasingly important. This study aims to assess the level of knowledge regarding Alzheimer's disease among undergraduate students at the Health Campus of Universiti Sains Malaysia (USM). A cross-sectional study was conducted among 362 students from the School of Health Sciences, School of Medical Sciences, and School of Dental Sciences using a self-administered questionnaire based on the Alzheimer's Disease Knowledge Scale (ADKS). Data were analysed using descriptive statistics, and Pearson Chi-Square tests via SPSS version 28.0. The findings showed that most participants (n=256, 70.7%) had moderate knowledge, while 29.3% (n=106) had good knowledge. There were significant differences in knowledge levels across the three schools ($p<0.001$), and significant associations were found between knowledge level and demographic factors such as age ($p=0.001$), schools ($p<0.001$) and year of study ($p<0.001$). In conclusion, the study highlights the need to introduce a dedicated module on Alzheimer's disease in undergraduate health curricula to enhance dementia literacy among students.

# CHAPTER 1

# INTRODUCTION

## 1.1 Introduction

The first chapter of the dissertation started with the background of the study, problem statement, research questions and objectives, as well as hypotheses of the study. Finally, the significance of the study and the operational definition of key terms used in the study were discussed.

## 1.2 Background of Study

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that primarily affects older adults and is characterised by gradual memory loss, cognitive impairment, and behavioural changes. It is the most common cause of dementia, accounting for 60–80% of cases globally (Alzheimer's Association, 2024). AD results in the destruction of brain cells, thereby affecting a person's ability to perform daily activities and ultimately leading to death. Although there is currently no cure for the disease, various pharmacological and non-pharmacological interventions can help slow its progression and improve patients' quality of life (Ballard et al., 2011; Winblad et al., 2016).

Globally, Alzheimer's disease affects approximately 55 million people, with this number projected to rise to 78 million by 2030 and 139 million by 2050 due to the ageing population (World Health Organization [WHO], 2021). Although more prevalent in high-income countries, the incidence of AD is rising in low- and middle-income countries due to increased life expectancy. In Malaysia, a study conducted in 2015 estimated that 123,000 individuals were living with dementia. This number is expected to rise to 261,000 by 2030 and reach 590,000 by 2050 (Chan et al., 2022). With the elderly population

projected to make up 15% of Malaysia's total population by 2030, Alzheimer's disease presents a growing public health concern.

The aetiology of Alzheimer's disease remains not fully understood, but several risk factors have been identified. Increasing age is the most significant risk factor, particularly beyond 65 years (Rajan et al., 2021). Other contributing factors include genetic predisposition (e.g., APOE ε4 allele), family history, cardiovascular conditions, diabetes, hypertension, and lifestyle habits such as physical inactivity, smoking, and poor diet (Livingston et al., 2020). Management strategies include pharmacological treatments such as acetylcholinesterase inhibitors (e.g., donepezil, rivastigmine) and NMDA receptor antagonists (e.g., memantine), alongside non-pharmacological approaches such as cognitive stimulation, physical activity, and caregiver support (Singh et al., 2024).

In the Malaysian context, awareness about Alzheimer's disease has gradually increased. However, knowledge gaps remain significant, particularly concerning the recognition of early symptoms and understanding of risk factors (Chan et al., 2022). Cultural perceptions of ageing and mental health often lead to delayed diagnosis and treatment, placing an emotional and financial burden on families and the healthcare system. A study conducted by the International Medical University (IMU) in 2017 revealed that many Malaysians have insufficient understanding of dementia, which may hinder early detection and appropriate care provision.

Given this trend and the importance of early intervention, it is essential that future healthcare providers, especially those currently enrolled in health-related undergraduate programmes, possess adequate knowledge of Alzheimer's disease. University students in medical, health, and dental fields are expected to play a frontline role in diagnosis, management, and patient education. Thus, assessing their level of understanding is critical to identifying gaps and informing future curriculum development. With Malaysia's

ageing population is increasing and dementia is becoming a leading cause of disability and dependency, equipping students with comprehensive knowledge is vital to ensuring readiness and improving care outcomes in clinical practice.

## 1.3 Problem Statement

Alzheimer's disease (AD) is a growing global health concern due to its progressive nature and the increasing prevalence associated with population ageing. Globally, over 55 million people are affected, with projections estimating that this number will rise to 139 million by 2050 (WHO, 2021). Despite its high burden, studies have consistently reported low levels of knowledge and awareness about Alzheimer's disease among both healthcare professionals and university students. Research by Baral et al. (2020) found that many college students had only a vague understanding of AD, while Ozpulat et al. (2023) and Kada (2015) highlighted that even students and professionals in health and social care fields exhibited knowledge gaps and misconceptions, despite increasing exposure to dementia cases. This lack of understanding is particularly concerning as it can hinder early recognition, timely diagnosis, and the provision of appropriate care.

In Malaysia, Alzheimer's disease has emerged as a major public health issue, currently ranked among the top ten causes of death (WHO, 2024). However, local research on knowledge and awareness of AD, particularly among health sciences students, remains limited. Preliminary evidence suggests that awareness levels are low and formal dementia education is often lacking in undergraduate curricula (Chan et al., 2022; IMU, 2017). The absence of such foundational knowledge may leave future healthcare professionals inadequately prepared to manage the growing burden of dementia in Malaysia.

Therefore, this study seeks to address this gap by assessing the level of knowledge regarding Alzheimer's disease among undergraduate students at the Health Campus of Universiti Sains Malaysia (USM). The findings aim to inform the development of targeted educational interventions and curriculum improvements to enhance dementia literacy and preparedness among future healthcare providers.

## 1.4 Research Questions

The research questions for this study are as follows:

i. What is the level of knowledge regarding Alzheimer's disease among undergraduate students at the Health Campus of Universiti Sains Malaysia?
ii. How does the knowledge of Alzheimer's disease differ among undergraduate students from the School of Health Sciences, School of Medical Sciences, and School of Dental Sciences at the Health Campus of USM?
iii. Is there a relationship between demographic and the level of knowledge on Alzheimer's disease among undergraduate students in USM Health Campus?

## 1.5 Research Objectives

### 1.5.1 General Objective

The general objective of this study is to assess the knowledge regarding Alzheimer's disease among undergraduate students at the Health Campus of Universiti Sains Malaysia (USM).

### 1.5.2 Specific Objectives

The specific objectives for this study are as follows:

i. To identify the level of knowledge about Alzheimer's disease among undergraduate students at USM Health Campus.

ii. To compare the knowledge of Alzheimer's disease among undergraduate students from the School of Health Sciences, School of Medical Sciences, and School of Dental Sciences at the Health Campus of Universiti Sains Malaysia.

iii. To determine the relationship between demographic and the knowledge level on Alzheimer's disease among undergraduate students in USM Health Campus.

## 1.6 Research Hypothesis

**(H0):** There is no significant difference in the knowledge of Alzheimer's disease among undergraduate students from the School of Health Sciences, the School of Medical Sciences, and the School of Dental Sciences at the Health Campus of Universiti Sains Malaysia

**(HA):** There is a significant difference in the knowledge of Alzheimer's disease among undergraduate students from the School of Health Sciences, the School of Medical Sciences, and the School of Dental Sciences at the Health Campus of Universiti Sains Malaysia.

## 1.7 Significance of study

The findings of this study will provide a comprehensive assessment of the level of knowledge regarding Alzheimer's disease among students at the Health Campus of Universiti Sains Malaysia (USM). By targeting future healthcare providers, this study highlights the importance of enhancing awareness and understanding of Alzheimer's disease among young professionals in the field, a demographic that is often overlooked

in Alzheimer's education. Improved knowledge among healthcare students has the potential to translate into higher quality care for future patients, promoting earlier detection, effective management, and compassionate support for individuals affected by Alzheimer's, as well as their families (Eshbaugh, 2014).

Moreover, increased awareness and knowledge among healthcare students benefit not only individual patients but also strengthen the healthcare system (Paul et al., 2023), particularly in Malaysia, where an aging population is leading to a higher prevalence of Alzheimer's disease. Educating students on Alzheimer's can contribute to reducing the societal and economic burden of the disease by fostering a workforce better prepared to address the needs of this growing patient population (Skaria, 2022).

In addition, the insights gained from this study may serve as a valuable reference for healthcare educators and providers, offering a foundation for developing educational guidelines and interventions that support Alzheimer's care within the community and healthcare settings. By enhancing the knowledge base of future healthcare providers, this study ultimately contributes to the long-term goal of improving Alzheimer's management and outcomes in Malaysia.

## 1.8 Definitions of Operational Terms

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

Table 1.1 Conceptual and operational definition

| | Conceptual Definition | Operational Definition |
|---|---|---|
| Knowledge | Understanding an information regarding a subject acquired through study or experience that is shared by a single person or an entire community of | This study will assess knowledge of Alzheimer's disease among undergraduate students at USM Health Campus regarding life impact, risk factors, course, caregiving, treatment and management, symptoms, |

| | | |
|---|---|---|
| | people (Cambridge Dictionary, 2024a). | assessment and diagnosis using a self-administered questionnaire from Carpenter et al. (2009). |
| Alzheimer's Disease | A brain disorder primarily affecting the elderly that causes progressive loss of speech, memory, movement, and coherent thinking Cambridge Dictionary (2024b). | In this study, Alzheimer's disease (AD) is a progressive neurodegenerative disease characterized by memory loss, cognitive decline, and behavioral changes. |
| Undergraduate Students | A student enrolled in a college or university to pursue their first degree (Cambridge Dictionary, 2024c). | In this study, undergraduate students are those in three schools at USM Health Campus: School of Health Sciences, School of Medical Sciences, and School of Dental Sciences. |

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

This chapter provides a general review of the literature on knowledge regarding Alzheimer's disease, gaps in Alzheimer's disease knowledge, and comparisons of knowledge among students from different health-related programs. The general findings of the literature review presented in several sections, organised by the key terms of the research. Recent articles and related issues are included in this chapter. The selected conceptual framework to guide this proposed study is also discussed.

## 2.2 Alzheimer's Disease

Alzheimer's disease was first discovered at the meeting of the Southwest German Psychiatrists in Tübingen, Germany, on November 3, 1906, by Alois Alzheimer, a German psychiatrist and neuropathologist (Hippius & Neundörfer, 2003). According to the National Institute on Aging (2023), Alzheimer's disease is a brain illness that gradually impairs thinking and memory, making it harder to carry out daily tasks. It is the most frequent cause of dementia, a generic term for cognitive decline and memory loss severe enough to interfere with normal daily activities.

Alzheimer's disease primarily affects older persons, most of whom are 65 years of age or older, aging is the biggest risk factor for Alzheimer's disease. As the disease progresses, cell death causes the brain to lose function. It involves abnormal protein accumulation in the brain, these proteins called amyloid plaques and tau tangles, interfere with normal cellular communication in the brain, leading to neuronal damage and death (National Institute on Aging, 2023). Though the exact cause remains unknown, genetic mutations and lifestyle factors, such as cardiovascular health, are thought to contribute.

Family history and genetics also play a role, including inherited genetic variants such as APOE-e4. Other factors include a history of cardiovascular problems (eg, high blood pressure, diabetes), smoking, poor diet, and lack of physical or mental activity. Head trauma, such as repetitive strain injuries, can also increase the risk. Alzheimer's disease usually begins with subtle memory loss and difficulty remembering recent events or information. As the disease progresses, symptoms worsen, affecting thinking, problem solving and language. Patients may have difficulty doing tasks such as managing finances or remembering familiar faces. Behavioural changes, such as mood swings, agitation and withdrawal from social activities, become more evident in later stages. Eventually, people lose the ability to communicate, perform daily tasks, and require full-time care. The final stage is characterized by severe cognitive decline and loss of control over body functions. Currently, there is no known cure for Alzheimer's disease.

Alzheimer’s disease advances through three main stages, each affecting the brain progressively (National Institute on Aging, 2023). In the mild (early) stage, individuals may experience minor memory problems, such as forgetting recent events or familiar names, while still maintaining independence. The moderate (middle) stage brings more severe memory loss, confusion, and mood swings, making it harder to perform daily activities like cooking or managing finances. In the severe (late) stage, individuals lose the ability to communicate and require full-time care as they become entirely dependent on others for basic tasks such as eating and dressing.

As Sheikh (2022) mentions, Alzheimer's disease causes many complications that significantly impact patients and caregivers. Behavioural and psychological changes, such as anxiety and depression, can cause agitation and social withdrawal, making treatment difficult. In addition, patients are at greater risk of infections, especially pneumonia, due to a weakened immune system and reduced mobility. Sleep problems,

including insomnia and night time confusion, also worsening cognitive decline and increasing caregiver fatigue. The risk of falls and injuries increases because cognitive impairment affects balance and coordination. Bladder and bowel problems can lead to incontinence, while malnutrition and dehydration are often the result of difficulty swallowing and loss of appetite. Finally, dental problems due to poor oral hygiene can lead to infections, complicating general health.

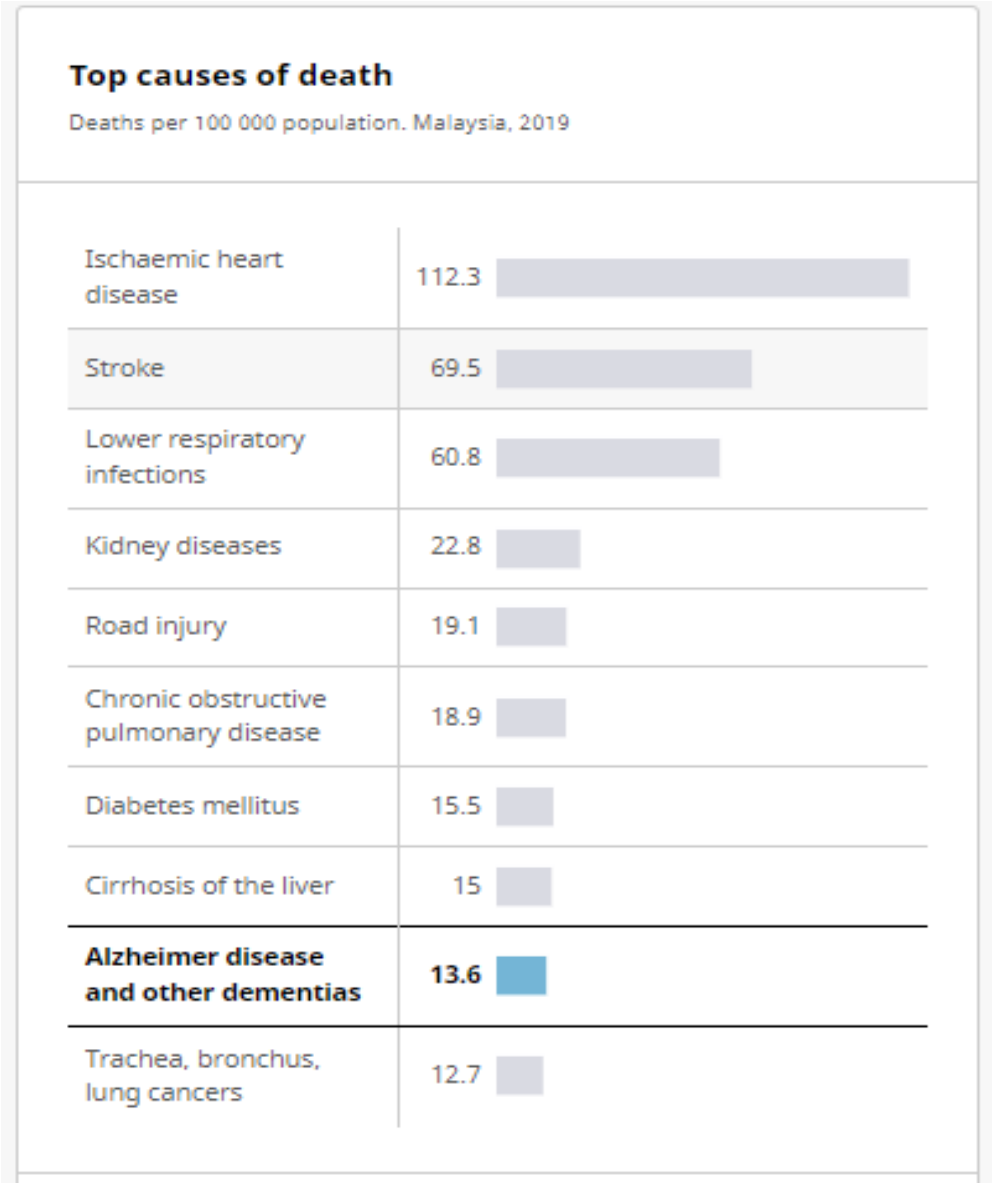


Figure 2.1 Top 10 causes of Death in Malaysia (World Health Organization, 2024)

By 2050, the number of people living with Alzheimer's is projected to triple from 50 million to 152 million, posing severe challenges to healthcare systems worldwide (WHO, 2017). In Malaysia, this trend is particularly worrying due to the country's rapidly aging population. Alzheimer's is already a leading cause of death, with the disease ranking fifth in mortality among older adults globally in 2021 (Alzheimer's Association, 2024). Based on figure 2.1, according to World Health Organization (2024), Alzheimer's disease is in the top 10 causes of death in Malaysia as of 2019. As the disease progresses, it leads to a decline in cognitive function, which severely impacts the quality of life for both patients and their families. According to Alzheimer's Disease Foundation Malaysia (2022), Alzheimer's disease is becoming far more common in Malaysia. Between 204,000 and 264,000 elderly Malaysians, or 8.5% to 11% of the country's senior population, had Alzheimer's disease as of 2020. It is anticipated that this number will rise significantly, with projections indicating that between 637,500 and 825,000 persons will be impacted by 2050, a projected 312% increase.

## 2.3 Knowledge of Alzheimer's Disease among Healthcare Students

According to the Cambridge Dictionary (2024a), knowledge refers to information about a subject that can be gained through study or experience and is shared by individuals or groups of people. In this study, it refers to healthcare student's knowledge regarding Alzheimer's disease.

The same study was conducted in a Saudi university by Al Arifi (2020) shows that 70.1% of the students have good knowledge about Alzheimer's disease and had studied it during their university studies. The majority of students (73.5%) correctly identified it as a neurodegenerative disease, although there were many misconceptions, such as 48.6% who thought it was a genetic disease. About 69% of students knew that the diagnosis of

Alzheimer's disease included a mental status test, and 68% correctly identified confusion with time or place as a major symptom. However, only 26.8% correctly identified the drug used for medicine. In general, health care students showed a moderate level of knowledge about Alzheimer's disease. The study found that medical and pharmacy students had better knowledge of Alzheimer's disease compared to dental students. This is likely because their curriculum covers more topics related to Alzheimer's and its pharmacology.

Additionally, the study in Turkey by Ozpulat et al. (2023) found that knowledge of Alzheimer's disease was moderate, with geriatric care and nursing students, as well as nurses, showing insufficient knowledge. Furthermore, in a study of Norwegian health and social care students (Kada, 2015), participants showed moderate knowledge of Alzheimer's disease, with an average score of 23.51 out of 30 (78.4% correct answers). Nursing, medical and physical therapy students had the highest scores, while radiography students had the lowest scores. The results highlight knowledge gaps and misconceptions, as well as significant differences between student groups.

Based on the previous study knowledge regarding Alzheimer's disease among college students of Kathmandu, Nepal from Baral et al. (2020) shows that the level of knowledge of the students about Alzheimer's disease is below average. A few students were unaware of Alzheimer's disease. And those who had heard about it have a low level of knowledge about the disease. The study noted that science students had better knowledge of Alzheimer's disease compared to management students. This shows that students in health-related fields tend to have more awareness and understanding of Alzheimer's.

Studies highlight the importance of including Alzheimer's disease (AD) in academic curricula to provide students with essential knowledge. Baral et al. (2020)

suggest that the integration of AD content into health care programs, as well as the use of mass media and social organizations, can increase community awareness. Al Arifi (2020) supports this idea, emphasizing the need for additional lessons and educational initiatives in health care schools to improve students' knowledge of AD, especially in relation to risk factors. They also recommend further studies to assess the impact of educational programs on AD. Ozpulat et al. (2023) and Jefferson et al. (2012) indicate that the expansion of education on Alzheimer's disease, devoting more time to theory and clinical practice, and a growing awareness among students and health professionals, especially nurses, would have a positive impact on the care of patients and the quality of life with Alzheimer's disease.

Despite these findings from international studies, there is a notable lack of research focused on Alzheimer’s disease knowledge among healthcare students in Malaysia. The absence of studies in Malaysia creates a significant gap in the literature, preventing a clear assessment of whether Malaysian healthcare students are adequately equipped with the knowledge required to address the challenges of AD care.

## 2.4 Factor Influencing Knowledge of Alzheimer’s Disease.

According to Eshbaugh (2014), there is a positive correlation between the number of years of college completed and knowledge of Alzheimer's disease, with students with more years of college doing better in scoring higher on the ADKS. Age was also positively associated with knowledge of Alzheimer's disease, indicating that older students tend to have a better understanding. Similarly, Musoke et al. (2021) found that fourth and fifth grade students had significantly higher knowledge about dementia, with older students also shows better understanding.

There is also another factor influencing knowledge of AD which is gender. The study in Turkey by Ozpulat et al. (2023) found that although women, who made up the majority of participants (78.1%), scored slightly more knowledgeable about Alzheimer's disease, the gender difference was not statistically significant. In addition, some studies, such as Kada (2015) and Liu et al. (2019), reported higher scores of knowledge of Alzheimer's disease in women, while Kada (2015) and Baral et al. (2020) found no significant gender difference. These results suggest that gender may not be an important factor in the recognition of Alzheimer's disease. Future studies may provide a better understanding of the correlation between gender and Alzheimer's disease knowledge levels. In addition, targeted efforts aim to improve the knowledge, skills and experiences of sex with a lower level of knowledge of Alzheimer's disease.

## 2.5 Theoretical and Conceptual Framework

The health belief model (HBM) serves as the conceptual framework for this study. The Health Belief Model (HBM), developed in the 1950s by social scientists in the United States Public Health Service, was originally designed to explain why people do not adopt preventive measures or screening for detection early stage of the disease. It then expanded to understand patient compliance with medical treatments. HBM is based on the idea that health behaviour depends on two main factors, which are the desire to avoid or recover from the disease and the belief that a specific action will prevent or treat the disease (LaMorte, 2022).

Six core concepts comprise the HBM framework, each shaping an individual's health behaviour. The first concept, perceived susceptibility, reflects a person's sense of personal risk of contracting a disease, which varies considerably from person to person. Second, perceived severity takes into account the seriousness of the illness, taking into

account the medical consequences (such as disability or death) and social impacts (such as effects on family and relationships). Together, these two concepts determine the level of the perceived threat of a disease. Next, perceived benefits include a person's belief in efficacy of recommended actions to reduce this threat, while perceived barriers reflect perceived barriers to actions, such as cost, inconvenience, or concern. Furthermore, cue to action, either internal symptoms or external influences such as advice from others, prompts health-promoting decisions. Finally, self-efficacy is related to the individual's belief in their ability to perform the behaviour, a concept added to the model in the 1980s (LaMorte, 2022).

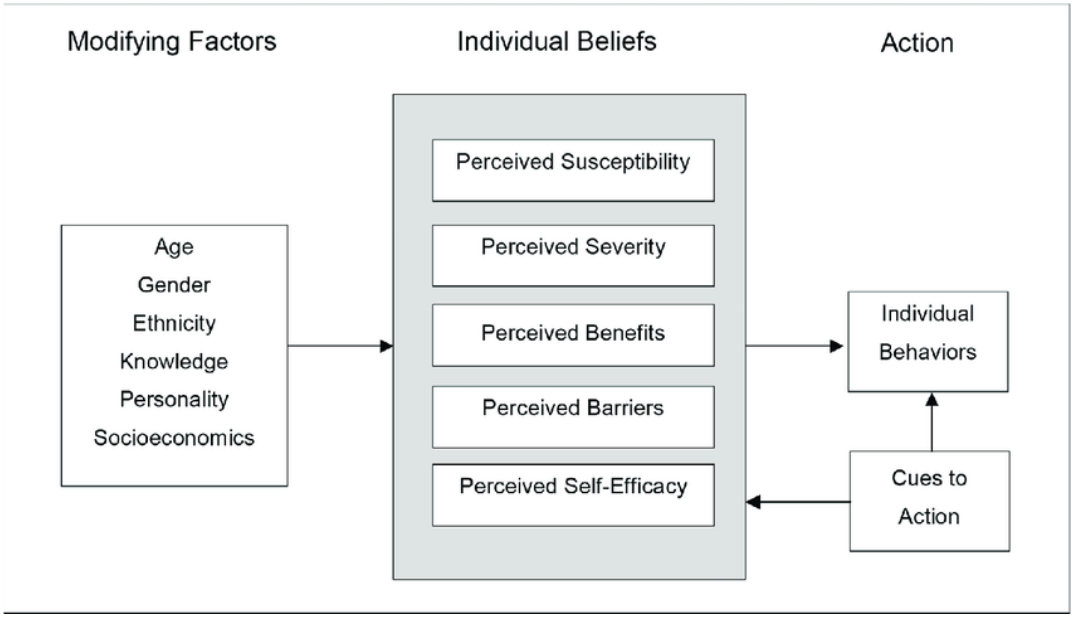


Figure 2.2 Structure of the Health Belief Model (LaMorte, 2022)

The Health Belief Model (HBM) helps to explain how different factors can influence the levels of knowledge about Alzheimer's disease among USM Health Campus students in this study. According to HBM, the vulnerability perceived by students and the severity of Alzheimer's affect their motivation to learn, as those who feel personal or family risk or recognise its serious effects may seek more knowledge. Perceived benefits, such as understanding symptoms or support for those affected, also play a role, while perceived

barriers such as time constraints or program requirements can limit engagement. External cues, such as lectures or media coverage, can arouse interest, and self-efficacy affects students' confidence in their understanding. These constructions collectively highlight why some students may have more or less knowledge, guiding strategies to improve awareness of Alzheimer's disease in different programs. Figure 2.3 depicts the HBM theory used in this study.

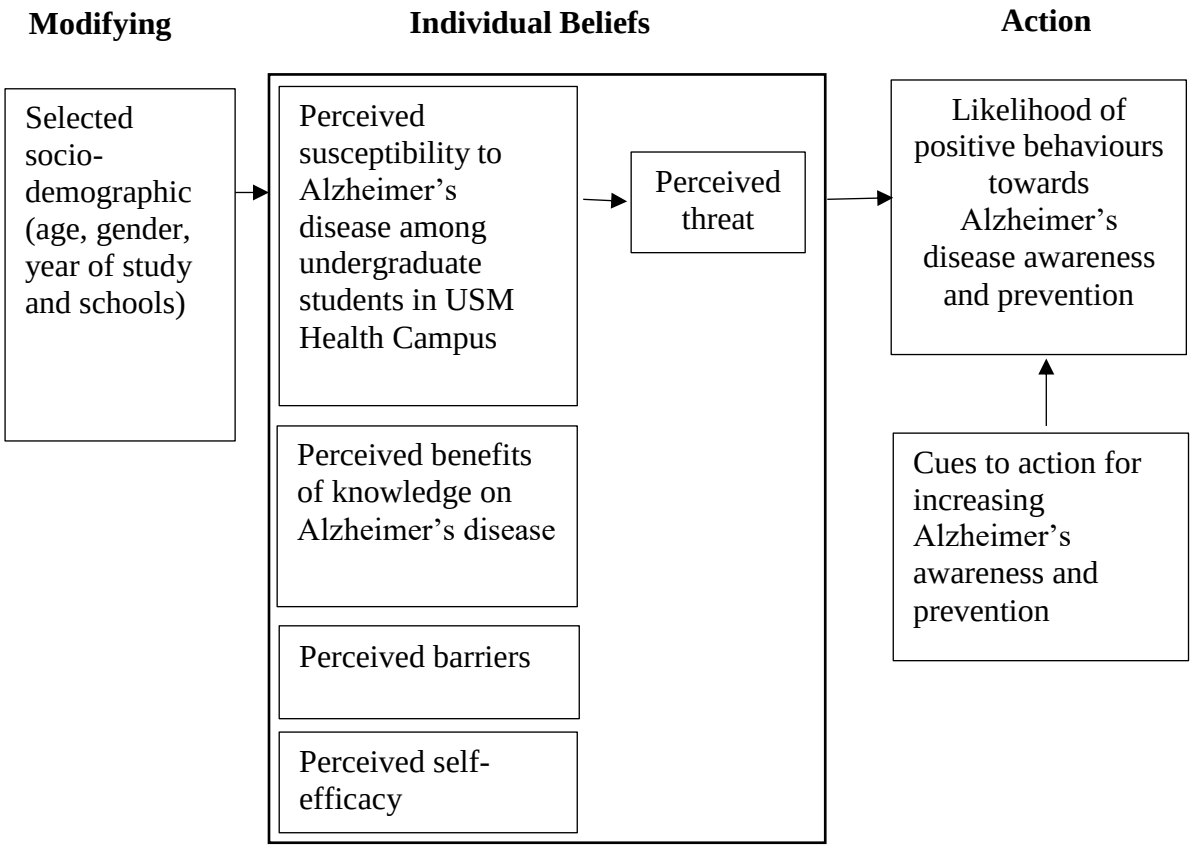


Figure 2.3 The adopted theory of Health Belief Model (HBM)

# CHAPTER 3

# METHODOLOGY

## 3.1 Introduction

This chapter outlines the approach and rationale behind the chosen research methodology, focusing on how the selected methods align with the study's objectives of assessing knowledge of Alzheimer's disease among USM Health Campus students. It begins with an overview and justification of the cross-sectional study design, followed by descriptions of the study setting, population, sample criteria, sampling plan, sampling method, instruments used, and variables. Ethical considerations, data collection procedures, and the proposed statistical analyses for evaluating the quantitative data are also discussed to support the study's aims comprehensively.

## 3.2 Research Design

This study employs a descriptive cross-sectional design using quantitative methods to assess the knowledge regarding Alzheimer's disease among students at the Health Campus of Universiti Sains Malaysia (USM). A structured questionnaire was used to collect data from participants at a single point in time.

## 3.3 Study Setting and Population

This study was conducted in three schools, namely the School of Health Sciences, the School of Medical Sciences, and the School of Dental Sciences at the Health Campus of Universiti Sains Malaysia (USM), located in Kubang Kerian, Kelantan.

The target population of this study is the undergraduate students at the Health Campus of Universiti Sains Malaysia (USM). The population for this study consisted of 2,014 students from the Universiti Sains Malaysia (USM) Health Campus in three

schools. The School of Health Sciences offers programs in nutrition, dietetic, biomedicine, environmental and occupational health, nursing, exercise and sports science, medical radiation, speech pathology, audiology, forensic science, the School of Medical Sciences in medical program, and the School of Dental Sciences in dental program. This diverse student population provides an excellent opportunity to assess the level of knowledge about Alzheimer's disease among future healthcare professionals, allowing insight into their understanding and awareness of this important health issue.

Table 3.1 Number of Undergraduate Students for Each School in USM Health Campus.

| **Schools** | **Total number of students** |
|---|---|
| School of Health Sciences | 1028 |
| School of Medical Sciences | 736 |
| School of Dental Sciences | 250 |
| **Total** | **2014** |

### 3.3.1 Sample Criteria

#### 3.3.1(a) Inclusion Criteria

The inclusion in this study required that each participant must be:

- Undergraduate students currently enrolled in the School of Health Sciences, the School of Medical Sciences, and the School of Dental Sciences in USM Health Campus.

#### 3.3.1(b) Exclusion Criteria

Subjects are excluded from this study if they:

- Student in diploma nursing.
- Postgraduate students.

## 3.4 Sampling Plan

For this study, a convenience sampling method was used to select participants from the USM Health Campus, focusing on students who are available and willing to participate.

### 3.4.1 Sample Size Estimation

The sample size for the **first objective** (to determine the level of knowledge about Alzheimer's disease among students at USM Health Campus) and **second objective** (to compare the knowledge of Alzheimer's disease among students from the School of Health Sciences, School of Medical Sciences, and School of Dental Sciences at the Health Campus of Universiti Sains Malaysia) was determined by using Raosoft sample size calculation http://www.raosoft.com/samplesize.html .

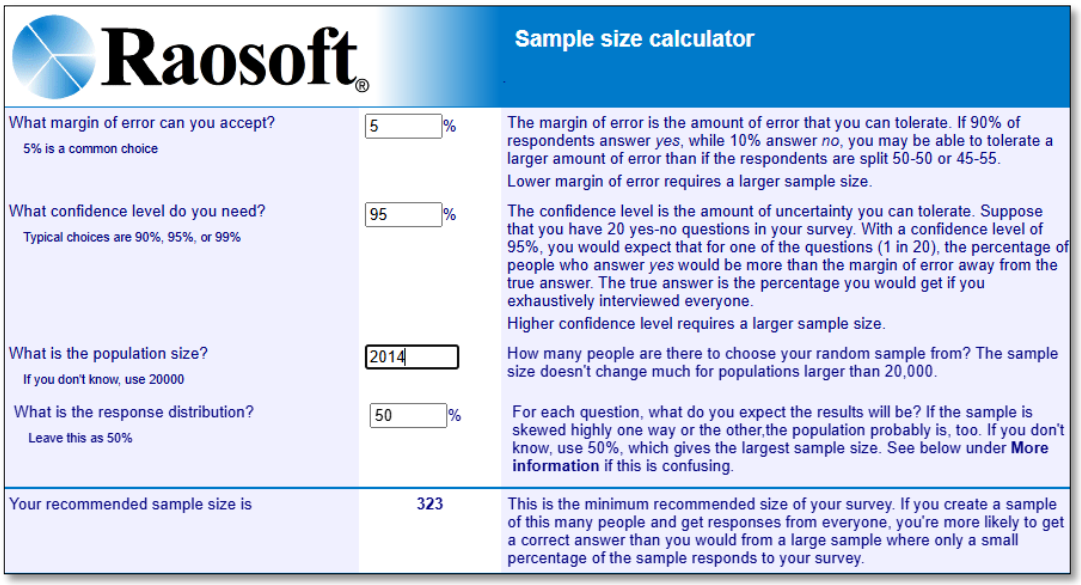


Figure 3.1 Calculation for Sample Size

Considering that 10% drop out of the respondents from the calculated sample size of the study, hence the minimum sample size required is:

$$n = 323 + 10\% \text{ drop out}$$

$$= 323 + 32.3$$

$$= 355.3 \approx 355$$

Therefore, out of 2014 of total undergraduate students in USM Health Campus, a sample size of 323 students was chosen. Considering 10% dropout, the total sample size needed were 355 undergraduate students in USM Health Campus.

For sample size estimation **objective 3** (to determine the association between demographic characteristics with the level of knowledge on Alzheimer's disease) is calculated using web tool from https://sample-size.net/correlation-sample-size/ . For this objective, r value 0.30 from Eshbaugh (2014), α 0.05 and power 0.2 was used to calculate the estimation sample size. The essential sample size is 85 (Figure 3.2).

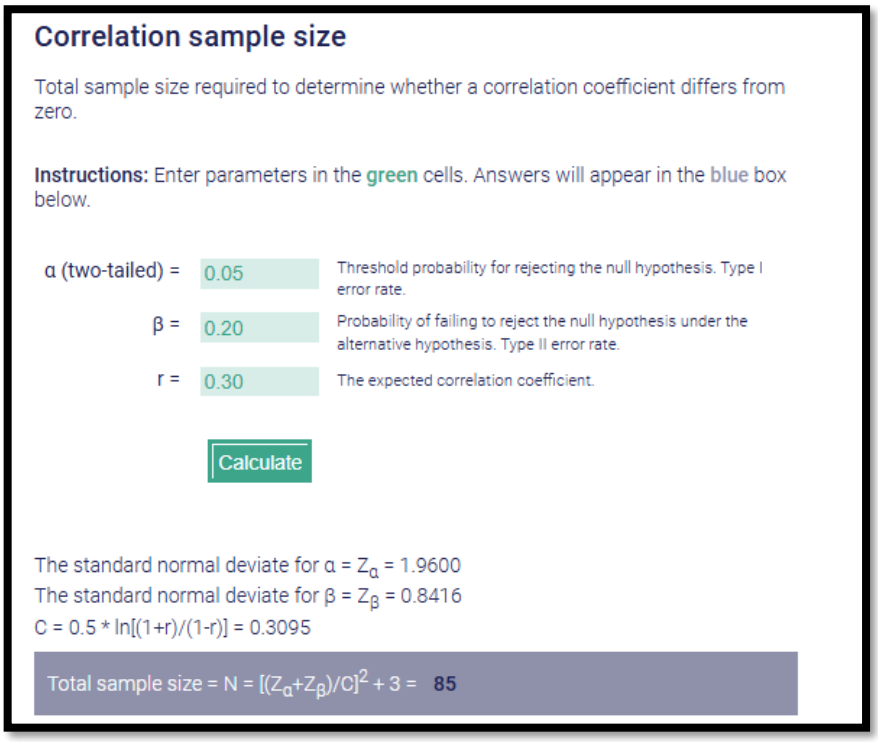


Figure 3.2 Calculation for Sample Size

Considering that 10% drop out of the respondents from the calculated sample size of the study, hence the minimum sample size required is:

$$n = 85 + 10\% \text{ drop out}$$

$$= 85 + 8.5$$

$$= 93.5 \approx 94$$

Therefore, out of 2014 of total undergraduate students in USM Health Campus, a sample size of 85 students was chosen. Considering 10% dropout, the total sample size needed were 94 undergraduate students in USM Health Campus.

The study's sample size was determined by calculating the sample size for each research objective. The final sample size was decided by selecting the largest sample size among all objectives, which was identified in objective one and objective two. Hence, the study's sample size was set to be 355 participants.

### 3.4.2 Sampling Methods

For this study, convenience sampling was implemented due to its practicality and efficiency, especially within the time constraints of a cross-sectional design. This approach enabled the researcher to collect data quickly from a readily accessible group of participants, providing a representative snapshot of students from the USM Health Campus without the need for more complex and time-intensive sampling methods. By including participants who are available and willing to participate, this method allowed for a diverse representation of students across health programs. This approach aligns with the study's objectives, offering valuable insights into Alzheimer's disease knowledge among future healthcare providers within a relevant setting.

## 3.5 Instrumentation

A self-administered questionnaire adapted from Carpenter et al. (2009) was used in this study, divided into two sections. Section I addresses the sociodemographic characteristics of the participants. Section II includes the Alzheimer's Disease Knowledge Scale (ADKS), a validated tool designed to assess knowledge about Alzheimer's disease.

### 3.5.1 Instrument

This study employs a descriptive cross-sectional design using quantitative methods to assess the knowledge regarding Alzheimer's disease among undergraduate students at the Health Campus of Universiti Sains Malaysia (USM) (Appendix A).

**Section A: Socio-demographic Information**

This section addresses the sociodemographic characteristics of the participants, including age, gender, year of study and schools.

**Section B: Knowledge of Alzheimer's disease**

This section has a total of 30 items that assess the knowledge among undergraduate students at USM Health Campus using the Alzheimer's Disease Knowledge Scale (ADKS) from Carpenter et al. (2009). A validated tool that measures knowledge of Alzheimer's disease across several domains, including life impact, risk factors, course, caregiving, treatment and management, symptoms, assessment and diagnosis (Carpenter et al., 2009).

### 3.5.2 Validation and Reliability of Instrument

Reliability and validity are essential to assessing the quality of research because they indicate how well a method, technique or test measures what it is intended to measure. Validity reflects the precision of a measurement, indicating how closely the results correspond to real-world properties and variations. High validity means that the results are an accurate representation of what is being studied. Reliability means the consistency of a measurement; if the same results are obtained repeatedly with the same methods under similar conditions, it is considered reliable. High reliability supports validity because unreliable methods are unlikely to produce valid results (Middleton, 2023).

Al Arifi (2020) conducted a pilot study at King Saud University with a Cronbach's alpha of 0.733, indicating good internal consistency for their knowledge questionnaire. Similarly, the study validated the Turkish version of a similar scale, finding a Cronbach's alpha of 0.71 and a test-retest reliability of 0.81 (Ozpulat et al., 2023). In Eshbaugh's (2014) study at University of Northern Iowa, the ADKS had a Cronbach's alpha of 0.70, confirming reliability. These results across studies suggest that the ADKS questionnaire is reliable and can be confidently used to measure Alzheimer's knowledge in different contexts and populations. The use of the ADKS, a widely recognized scale, strengthens the reliability of the instrument, allowing a precise and consistent assessment of the knowledge of Alzheimer's disease in groups of students.

Thus, validation of the Alzheimer's Disease Knowledge Scale (ADKS) is not required for this study, as it has been adapted from a well-established original tool with demonstrated reliability. Additionally, a pilot study is unnecessary, as previous research using the same questionnaire with a similar population has reported high Cronbach's alpha values, indicating strong reliability.

## 3.6 Variables

Variables are those attributes that are measured or manipulated in a study. The independent and dependent variables in this research study are as shown in Table 3.2.

Table 3.2 Independent and dependent variables

| | |
|---|---|
| **Independent variable** | ● Socio-demographic characteristics (age, gender, year of study and schools). |
| **Dependent variable** | ● Knowledge of Alzheimer's disease among undergraduate students at USM Health Campus |

### 3.6.1 Measurement of Variables and Variable Scoring

**Section A: Socio-demographic Information**

This section consists of four close-ended questions that address the sociodemographic characteristics of the participants, including age, gender, year of study and school. Descriptive data frequency (n), percentage (%), mean and standard deviation were presented.

**Section B: Knowledge of Alzheimer's disease**

This section consists of 30 items that determine the knowledge level among undergraduate students at the health campus USM with true or false options, for the correct answer, get 1 point and for the incorrect answer, get 0 point, with a total score out of 30 was calculated for each respondent. This section covers the Alzheimer's Disease Knowledge Scale (ADKS), a validated tool that measures knowledge of Alzheimer's disease across several domains, including life impact, risk factors, course, caregiving, treatment and management, symptoms, assessment and diagnosis.