KNOWLEDGE AND ATTITUDE TOWARDS STROKE PREVENTION AMONG ADULT COMMUNITY IN SERTING, NEGERI SEMBILAN

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by

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for the degree of
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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.

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LIST OF ABBREVIATIONS

Abbreviation	Full Term
CDC	Centers for Disease Control and Prevention
WHO	World Health Organization
HBM	Health Belief Model
TIA	Transient Ischemic Attack
SPSS	Statistical Package for the Social Sciences
HREC	Human Research Ethics Committee
USM	Universiti Sains Malaysia
SoLLaT	School of Languages, Literacies and Translation
KAP	Knowledge, Attitude, and Practice

LIST OF APPENDICES

PENGETAHUAN DAN SIKAP TERHADAP PENCEGAHAN STROK DALAM KALANGAN KOMUNITI DEWASA DI SERTING, NEGERI SEMBILAN.

ABSTRAK

Kajian ini dijalankan bagi menilai tahap pengetahuan dan sikap terhadap pencegahan strok serta meneliti hubungan antara kedua-dua pemboleh ubah tersebut dalam kalangan komuniti dewasa di Serting, Negeri Sembilan. Seramai 420 responden telah menyertai kajian keratan rentas ini melalui soal selidik berstruktur yang telah disahkan kesahihannya disesuaikan daripada (Alhowaymel et al., 2023). Statistik deskriptif menunjukkan bahawa tahap pengetahuan peserta adalah sederhana, dengan skor min antara 1.69 hingga 1.80 daripada 3, menggambarkan kesedaran umum terhadap faktor risiko, simptom dan komplikasi strok. Tahap sikap juga sederhana positif, di mana 62.9% peserta menunjukkan sikap sederhana dan 29% menunjukkan sikap positif terhadap pencegahan strok. Ujian Chi-square Pearson menunjukkan hubungan yang signifikan antara tahap pengetahuan dan sikap ($\chi^2 = 338.238$, df = 4, $p < 0.001$). Namun, hubungan ini menunjukkan corak songsang, di mana peserta dengan tahap pengetahuan yang lebih tinggi kadangkala menunjukkan sikap yang kurang positif. Dapatan ini mencadangkan bahawa walaupun kesedaran wujud, pengetahuan belum semestinya diterjemah kepada tingkah laku pencegahan yang positif tanpa menangani faktor psikososial yang mendasari. Kajian ini mencadangkan keperluan pelaksanaan program pendidikan kesihatan yang sesuai dengan budaya dan dipimpin oleh jururawat untuk merapatkan jurang antara pengetahuan dan sikap dalam komuniti.

KNOWLEDGE AND ATTITUDE TOWARDS STROKE PREVENTION AMONG ADULT COMMUNITY IN SERTING, NEGERI SEMBILAN

ABSTRACT

This study aimed to assess the level of knowledge and attitudes towards stroke prevention and to examine the association between these variables among adults in Serting, Negeri Sembilan. A total of 420 respondents participated in this cross-sectional study using a structured, validated questionnaire adapted from (Alhowaymel et al., 2023). Descriptive statistics revealed that participants had a moderate level of knowledge, with mean scores ranging from 1.69 to 1.80 out of 3, indicating general awareness of stroke risk factors, symptoms, and complications. Attitude levels were also moderately positive, with 62.9% of participants showing moderate attitudes and 29% demonstrating positive attitudes towards stroke prevention. A significant association was found between knowledge and attitude levels using Pearson's Chi-square test ($\chi^2 = 338.238$, $df = 4$, $p < 0.001$). Interestingly, the association revealed an inverse pattern, where participants with higher knowledge levels sometimes held less favorable attitudes. These findings suggest that while awareness exists, translating knowledge into positive preventive behaviors may require addressing deeper psychosocial factors and tailoring health education interventions. This study highlights the need for culturally appropriate, nurse-led stroke prevention programs to bridge the gap between knowledge and attitude in the community.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Stroke is a leading cause of disability and death globally, resulting in high healthcare expenses and long-term rehabilitation demands. According to the World Health Organization (WHO), stroke is the world's second greatest cause of mortality and a major cause of long-term disability (World Health Organization,2020). Stroke occurs when the blood flow to the brain is disrupted, causing brain tissue damage and subsequent motor, cognitive and emotional deficits (Benjamin et al., 2019).

In Malaysia, stroke has emerged as one of the top five causes of death, accounting for 6.95% of total mortality based on the Department of Statistics Malaysia (DOSM, 2021). Hospital admissions due to stroke have shown an increasing trend, particularly among adults aged 35 and above. A national health survey revealed that stroke risk factors such as hypertension, diabetes, obesity, and sedentary lifestyles are prevalent in Malaysian communities (Institute for Public Health, 2020). In Negeri Sembilan, local health authorities have reported that cases of stroke-related hospitalizations are steadily increasing, with Serting being one of the rural areas where awareness and access to preventive care may be limited due to geographical and educational barriers (Jabatan Kesihatan Negeri Sembilan, 2022).

Preventing stroke requires timely public awareness and community-level engagement in identifying risk factors and modifying unhealthy behaviours. Knowledge of stroke symptoms such as sudden numbness, slurred speech, and vision problems—along with awareness of its risk factors—can promote early recognition and reduce delays in seeking treatment (Mensah & Norrving, 2019). However, in rural areas like Serting,

limited exposure to health education may affect the community's understanding and attitude toward stroke prevention, making them more vulnerable to poor outcomes. This study is therefore timely and important, as it explores the knowledge and attitudes toward stroke prevention specifically among adults in Serting, Negeri Sembilan. The findings will help identify knowledge gaps, misconceptions, and attitude patterns, which can guide the development of targeted community-based interventions by health authorities and nurse educators. Ultimately, the study contributes to improving stroke prevention efforts at the grassroots level in line with Malaysia's National Strategic Plan for Non-Communicable Diseases (NSP-NCD, 2021–2025).

1.2 Problem Statement

Despite the expansion of public health campaigns on stroke prevention, many individuals in rural communities like Serting, Negeri Sembilan remain unaware of key stroke risk factors such as hypertension, diabetes, and obesity, as well as early warning signs like sudden numbness or speech difficulties. Misconceptions and inadequate awareness about stroke prevention can result in delayed recognition of symptoms and late treatment-seeking behavior, significantly worsening recovery outcomes and increasing the burden on the healthcare system. This reflects a critical gap in current community health education that must be addressed. Therefore, analyzing the current level of knowledge and attitudes toward stroke prevention among the adult community in Serting is essential. By determining these levels and exploring their relationship this study aims to provide evidence-based insight to guide the development of targeted, culturally appropriate health education initiatives that can improve preventive practices, reduce stroke incidence, and ultimately enhance health outcomes in rural Malaysian communities.

1.3 Research Questions

The research questions for this study are as follows:

i. What is the level of knowledge regarding stroke prevention in the adult community in Serting, Negeri Sembilan?

ii. What are the attitudes regarding stroke prevention in the adult community in Serting, Negeri Sembilan?

iii. Is there a relationship between the knowledge and level of attitudes towards stroke prevention in the adult community in Serting, Negeri Sembilan?

1.4 Research Objectives

1.4.1 General Objective

The general objective of this study is to assess the knowledge and attitudes towards stroke prevention among the adult community in Serting, Negeri Sembilan.

1.4.2 Specific Objectives

The specific objectives for this study are as follows:

i. To determine the level of knowledge regarding stroke prevention in the adult community in Serting, Negeri Sembilan.

ii. To determine the level of attitudes regarding stroke prevention in the adult community in Serting, Negeri Sembilan.

iii. To identify the association between the level of knowledge and the level of attitudes towards stroke prevention in the adult community in Serting, Negeri Sembilan.

1.5 Research Hypothesis

Hypothesis (H_0): There is no association between the level of knowledge and the level of attitude regarding stroke prevention among the adult community in Serting, Negeri Sembilan.

(H_1): There is an association between the level of knowledge and attitude regarding stroke prevention among the Serting, Negeri Sembilan adult community.

1.6 Significance of the Study

The findings from this study will determine the level of knowledge and attitudes towards stroke prevention among the adult community in Serting, Negeri Sembilan. It is hoped that the study findings may help local healthcare officials, such as Malaysia's Ministry of Health, implement public health initiatives to increase stroke awareness. Furthermore, by focusing on adults, the study may encourage positive health behaviours and a proactive approach to stroke prevention, particularly in detecting early warning symptoms and treating risk factors such as hypertension and diabetes.

1.7 Conceptual and Operational Definitions

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

	Conceptual Definition	Operational Definition
Knowledge	Understanding of or information about a subject gained through experience or study, specifically regarding stroke prevention (Cambridge Dictionary, 2023).	In this study, the knowledge of stroke prevention among the adult community in Serting, Negeri Sembilan, will be assessed using a questionnaire from (Alhowaymel et al., 2023)
Attitude	In this context, a feeling or opinion about something or a way of behaving that reflects this refers to attitudes towards stroke prevention (Cambridge Dictionary, 2023).	In this study, the attitudes towards stroke prevention among the adult community in Serting, Negeri Sembilan, will be assessed using a questionnaire from (Alhowaymel et al., 2023)
Stroke Prevention	Measures are taken to avoid the occurrence of stroke through the management of risk factors like high	In this study, stroke prevention refers to practices and awareness related to reducing risk factors for stroke, such

	blood pressure and unhealthy lifestyle (Mensah & Norrving, 2019).	as controlling hypertension and managing diabetes, as assessed by the survey.
Knowledge of Stroke Prevention	Awareness and comprehension of the factors that can lead to stroke and how to prevent it (World Health Organization, 2020).	In this study, knowledge of stroke prevention includes understanding stroke risk factors, symptoms, and prevention strategies, which are assessed through a questionnaire.
Attitudes Towards Stroke Prevention	Opinions or behaviours towards stroke prevention reflect personal views on how important it is to engage in preventive measures (Benjamin et al., 2019)	In this study, attitudes towards stroke prevention include beliefs and perceptions about the importance of stroke prevention practices, evaluated through a Likert-scale questionnaire
Adult Community	A group of individuals who have reached full maturity are typically involved in societal and health-related activities (Cambridge Dictionary, 2023).	In this study, the adult community refers to individuals aged 18 and above living in Serting, Negeri Sembilan, who participate in the study by completing a questionnaire.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter will review the literature on knowledge and attitudes towards stroke prevention among the Serting, Negeri Sembilan adult community. This chapter will explore topics such as stroke epidemiology, stroke prevention, knowledge and level towards stroke prevention. The final section of this chapter will describe the theoretical and conceptual framework used in this study.

2.1 Stroke

A stroke, often known as a "brain attack", happens when blood flow to a portion of the brain is disrupted or a brain blood artery ruptures. This causes brain cell death within minutes due to a lack of oxygen, which may result in long-term brain damage, disability, or death (Centers for Disease Control and Prevention (CDC), 2023). Strokes are classified into two types: ischemic, caused by blood clots or plaques impeding blood flow, and hemorrhagic, which occurs when blood vessels bleed or rupture under pressure. A transient ischemic attack (TIA), sometimes known as a "mini-stroke", is a brief blockage that serves as a warning sign for future strokes and requires prompt medical attention due to the high risk of escalating to a major stroke if left untreated (CDC, 2023).

2.2 Epidemiology of Stroke

According to stroke epidemiology, ageing populations and lifestyle factors are contributing to the rising prevalence of stroke, which continues to be a significant global

public health concern. The study emphasizes regional differences in stroke incidence and outcomes, showing that low and middle-income nations had greater rates of stroke than high-income countries. Smoking, physical inactivity, diabetes, and hypertension are important risk factors that are common around the world. These results highlight the necessity of focused efforts to address these risk factors, especially in areas where the prevalence of stroke is rising (Feigin et al., 2020).

2.3 Stroke prevention

Stroke is a severe public health issue that severely affects individuals and society. While advances in medical care have lowered stroke mortality, the incidence of stroke-related disability is expected to rise (Sacco et al., 2012). Effective stroke prevention measures are critical for reducing the burden of the disorder.

Addressing modifiable risk factors, such as diabetes, hypertension, and unhealthy lifestyle choices, is a crucial part of preventing strokes. Hypertension, in particular, is a primary target for intervention because it is the most critical risk factor for stroke and affects a significant proportion of the population, particularly the elderly. Improved approaches to patient self-management, including telehealth technologies, have been recognized as viable strategies for treating hypertension and other chronic illnesses (Hovey et al., 2011).

In addition to addressing individual risk factors, community-based activities can help prevent strokes. The Million Hearts Initiative, a public-private partnership, is one such example, intending to significantly reduce cardiovascular disease, including stroke (Sacco et al., 2012). While effective stroke preventive measures are available, enhanced implementation and accountability are required to maximize the effectiveness of these strategies. Comprehensive support mechanisms that combine different tactics and

account for cultural and geographic diversity are required to promote long-term adherence to primary and primordial preventive regimens. These support mechanisms should include education for providers and patients and practice tools tailored to health literacy and linguistic needs. A holistic approach to stroke prevention can be achieved by addressing both individual and community-level issues, thereby lowering the terrible impact of this disease on individuals and their families.

2.3.1 Knowledge of stroke prevention

The knowledge of stroke prevention is essential, as it enables individuals to recognize modifiable risk factors and adopt healthier lifestyle choices that reduce the likelihood of stroke. Public awareness programs have been highlighted as critical in educating people on the importance of managing blood pressure, cholesterol levels, and diabetes, as well as the dangers of smoking and excessive alcohol consumption. Additionally, understanding the role of physical activity and a balanced diet in stroke prevention helps people make informed decisions about their health behaviours. However, despite increased efforts, there are still gaps in public knowledge, emphasizing the need for targeted education, particularly for high-risk groups and within community health frameworks (Alhowaymel et al., 2023).

2.3.2 Attitude towards stroke prevention

Attitudes towards stroke prevention involve a variety of dispositions that determine whether or not people are inclined to engage in stroke-risk-reducing behaviours. These attitudes have three primary components: cognitive, emotionnal and behavioural. The cognitive component includes an individual's ideas and knowledge about stroke prevention, such as risk factor awareness and preventive measure

effectiveness (Ajzen,1991). The affective component reflects emotions and feelings linked with stroke prevention, such as anxiety or dread, which can either motivate or deter preventative behaviour (Rosenstock et al.,1988). Finally, the behavioural component represents the willingness or intention to engage in preventative activities such as frequent physical activity, eating a healthy diet and quitting smoking (Ajzen & Fishbein,1980). The affective component reflects emotions and feelings linked with stroke prevention, such as anxiety or dread, which can either motivate or deter preventative behaviour (Rosenstock et al.,1988). Finally, the behavioural component represents the willingness or intention to engage in preventative activities such as frequent physical activity, eating a healthy diet and quitting smoking (Ajzen & Fishbein,1980). Understanding these components gives us vital insight into how people process and act on stroke prevention information, ultimately influencing prevention programs' success.

In Malaysia and other Southeast Asian countries, research has found that a variety of sociodemographic, cultural and perceived risk factors influence attitudes towards stroke prevention. Age and education are important sociodemographic factors. For example, younger persons and those with higher educational levels have more positive views towards prevention (Tan et al., 2021; Lee et al., 2019). Cultural beliefs can also influence attitudes; traditional health practices and ideas on ageing among Malaysian ethnic groups may influence perceptions of store prevention (Rahman et al., 2017). Furthermore, perceived stroke risk and numerous barriers, such as restricted access to healthcare, financial restrictions, and societal norms, influence the adoption of preventive behaviours (Abdullah et al., 2019; Lim et al., 2020). According to studies, people more knowledgeable about stroke risk factors have more positive attitudes towards prevention, emphasizing the significance of targeted education to remove

misunderstandings and promote proactive health behaviours (Aljunid et al., 2018; Ng & Tan, 2020).

2.4 Association between level of knowledge and attitude

The relationship between knowledge and attitude plays a vital role in shaping health behaviors, particularly in stroke prevention. Knowledge provides essential insights into risk factors and preventive measures, while attitudes influence individuals' likelihood of adopting proactive health actions. Studies, including Alhowaymel et al. (2023), have identified a significant but weak correlation, indicating that greater knowledge often corresponds to more favorable attitudes.

Factors such as education level, exposure to stroke-related information, and the duration of hypertension treatment are significant predictors of improved knowledge and attitudes. Research from Uganda and Saudi Arabia has reported similar findings, where enhanced knowledge directly improved attitudes and practices related to stroke prevention (Knowledge, Attitudes, and Practices Towards Stroke Prevention, 2023). This interplay highlights the importance of integrated health education programs that address both knowledge and attitudes, fostering positive health behaviors and reducing stroke risks.

2.5 Theoretical and Conceptual Framework

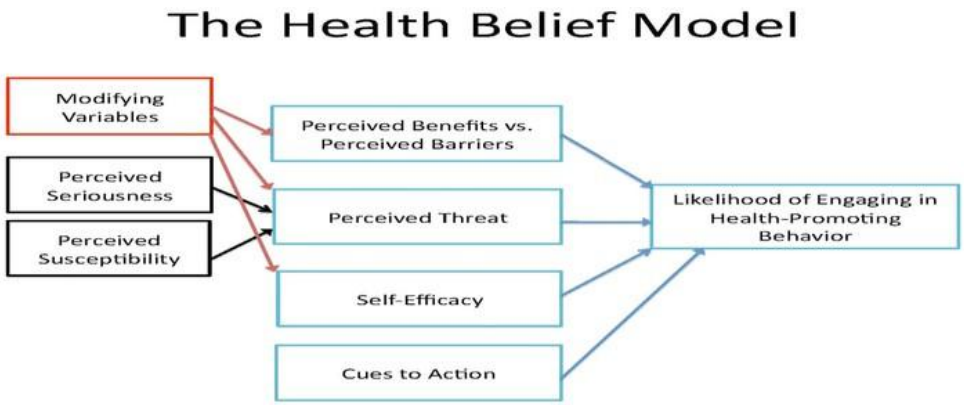


Figure 1: Health Belief Model (Rosenstock, 1974

Figure 1 is the structure of the Health Belief Model (HBM), developed by Rosenstock in 1974, is a psychological framework designed to explain and predict health-related behaviours, particularly concerning the uptake of health services. The HBM is grounded in six key constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. These components interact to shape individuals' decisions to engage in preventive health behaviours, emphasizing the importance of perceived risks, rewards, and confidence in overcoming obstacles. The Health Belief Model (HBM) serves as the theoretical framework for this study, providing insight into how individual beliefs and perceptions influence health behaviours, particularly in the context of stroke prevention. According to HBM, numerous key factors influence health-related behaviours (Rosenstock, 1974).

Perceived Susceptibility is a person's belief about their stroke risk. Understanding how Serting's adult population feels about their vulnerability to stroke is critical. Individuals who perceive they are in high danger are more inclined to engage in preventative behaviours (Rosenstock, 1974). This perspective is critical for inspiring

people to take proactive steps for their health. Perceived Severity refers to the belief about the seriousness of a stroke and its potential repercussions. The study will look into how the community perceives the impact of stroke on health and quality of life, which may inspire preventive measures (Becker, 1974). Strong beliefs about stroke severity can improve motivation to take preventive actions.

Perceived Benefits refer to one's perception of the efficacy of taking specific activities to minimize the risk of stroke. The study will determine whether the community understands the benefits of lifestyle changes such as diet and exercise in avoiding strokes (Champion & Skinner, 2008). Recognizing these benefits can motivate people to make healthier decisions. Perceived Barriers investigates the challenges that people perceive when adopting preventive behaviours. The study will investigate impediments to stroke prevention measures, such as financial constraints, limited access to healthcare, and cultural attitudes (Glanz et al., 2008). Understanding these constraints is crucial for designing effective solutions.

Cues to Action are triggers that encourage people to engage in health-promoting behaviours. The study will examine how health campaigns and community activities inspire Serting's adult population to participate in stroke prevention (Rosenstock, 1974). Identifying these cues can aid with the development of effective public health campaigns. Self-efficacy refers to a person's belief in their ability to take action. The study will examine how self-efficacy affects the community's willingness to implement stroke prevention measures (Bandura, 1977). Higher self-efficacy can lead to increased participation in health-promoting behaviours.

This study's conceptual framework uses the Health Belief Model (HBM) to assess knowledge and attitudes regarding stroke prevention in Serting's adult population as shown in Figure 2. It implies that a better understanding of stroke risk factors and

preventative approaches will improve people's perceived susceptibility and severity, resulting in higher perceived benefits and fewer perceived barriers to prevention (Champion & Skinner, 2008). Positive attitudes towards stroke prevention are also influenced by cues to action and self-efficacy, which encourage proactive health behaviours (Bandura, 1977). This framework will guide the research approach and data analysis to identify knowledge and attitude gaps that targeted health education activities can bridge.

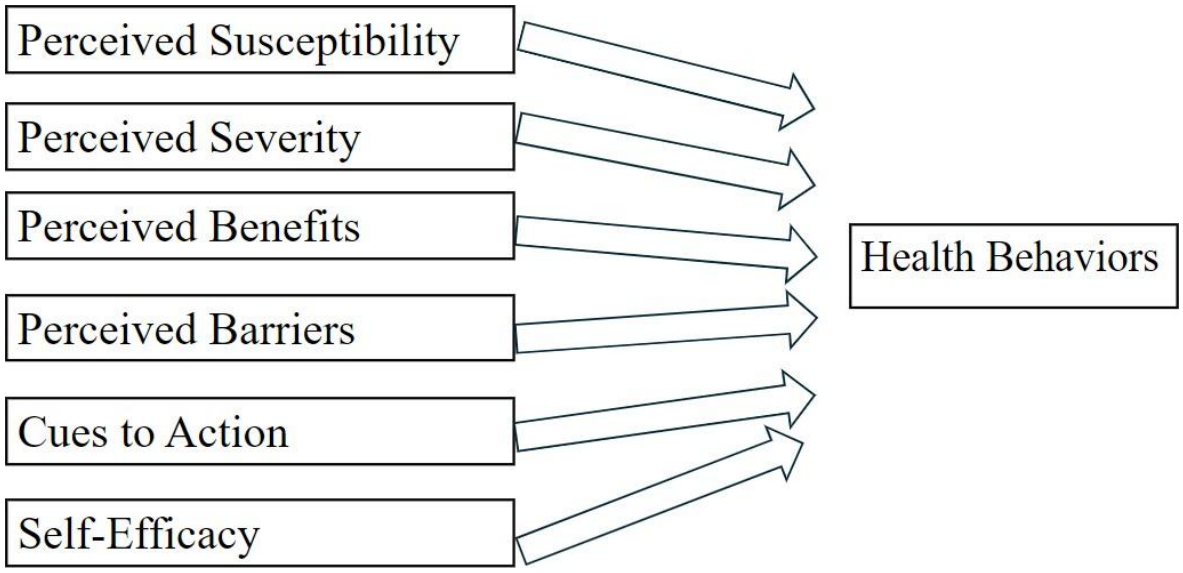


Figure 2: Conceptual Framework of Study (Adapted from (Rosenstock, 1974)

CHAPTER 3

METHODOLOGY

3.1 Research Design

A cross-sectional study design will be used to assess the knowledge and attitude of the Serting, Negeri Sembilan adult community regarding stroke prevention.

3.2 Research Location

The study setting will be conducted in Serting, Negeri Sembilan. Serting is a hamle in the Jempol District of Negeri Sembilan. Bandar Baru Serting and Ulu Serting are two of the neighbourhoods in the area. The town is known for its stunning landscapes. It has easy access to adjacent natural attractions such as the Ulu Serting Recreational Park, which includes swimming rivers and picnic spots, making it perfect for day trips and family vacations (CityPopulation.de, 2020; Gokayu, 2024).

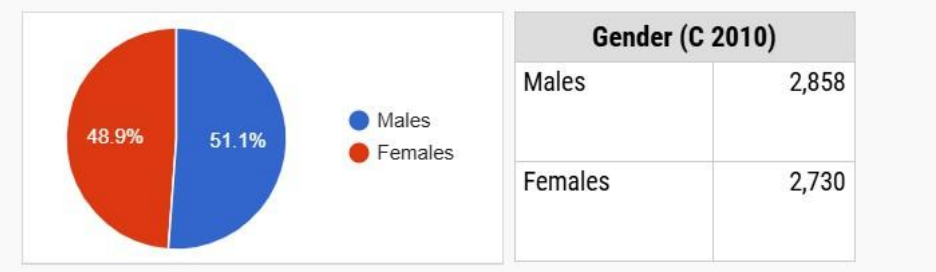
Figure 3: The map of the Serting, Negeri Sembilan

3.3 Research Duration

The study will be conducted for one year, from October 2024 to August 2025. Data will be collected over three months, from January to March 2025.

3.4 Population

The target population in this cross-sectional study is the adult community in Serting, Negeri Sembilan. According to the 2021 census, Serting has a population of 5588. The male population is 2858 while the number of females is 2730.



Gender (C 2010)	
Males	2,858
Females	2,730

Figure 4: The population of Serting, Negeri Sembilan

3.4.1 Inclusion Criteria

The specific eligibility requirements for inclusion in this study required that each participant must be:

- Adult age 18 and above.
- Individuals who live in Serting, Negeri Sembilan.
- Individuals who can understand and respond in Malay or English.

3.4.2 Exclusion Criteria

Subjects are excluded from this study if they:

- Individuals with mental disability.

3.5 Sampling Plan

3.5.1 Sample Size Estimation

The sample size was determined according to each specific objective of this study. The calculation was conducted using a sample size calculator developed by Wan Nor Ariffin, available on the websites (Arifin, 2023).

Objective 1 is to determine the level of knowledge about stroke prevention among the adult community in Serting, Negeri Sembilan.

$$n = [\frac{z}{\Delta}]^2 p\,(1 - p)$$

n = Sample size

p = Anticipated population proportion-0.46 (level of good knowledge) (Alhowaymel et al., 2023)

z = Value of standard normal distribution = 1.96

Δ = Precision = 0.05

The prevalence of the level of knowledge about stroke prevention among the adult community in Serting, Negeri Sembilan. The single proportion formula and the population proportion taken based on a previous study conducted by (Alhowaymel et al., 2023)

$$n = [\frac{1.96}{0.05}]^2\ 0.46\ (1 - 0.46)$$ (Alhowaymel et al., 2023)

$$n = 382$$

Therefore, the total sample size for objective 1 will be 420 samples. After considering a 10% dropout, the sample size is:

$$n = 382 + 10\ \%$$

$$n = 420\ participants$$

Objective 2 is to assess the attitudes of the adult community in Serting, Negeri Sembilan, towards stroke prevention practices.

$$n = [\frac{z}{\Delta}]^2 p\ (1 - p)$$

n = Sample size

p = Anticipated population proportion -0.7 (level of good attitude) (Das et al., 2016).

z = Value of standard normal distribution = 1.96

Δ = Precision = 0.05

The prevalence of the level of attitude about stroke prevention among the adult community in Serting, Negeri Sembilan. The single proportion formula and the population proportion taken based on a previous study conducted by (Das et al., 2016).

$n = [\frac{1.96}{0.05}]^2\ 0.7\ (1 - 0.7)$ (Das et al., 2016).

$$n = 323$$

Therefore, the total sample size for objective 2 will be 355 samples. After considering a 10% dropout, the sample size is:

$$n = 323 + 10\ \%$$

$$n = 355\ participants$$

Objective 3 is to determine the association between the level of knowledge and the level of attitudes towards stroke prevention among the adult community in Serting, Negeri Sembilan. The sample size was calculated using Pearson's Correlation from Wan Ariffin sample size calculation. The correlation was 0.296, according to the study (Alhowaymel et al., 2023).

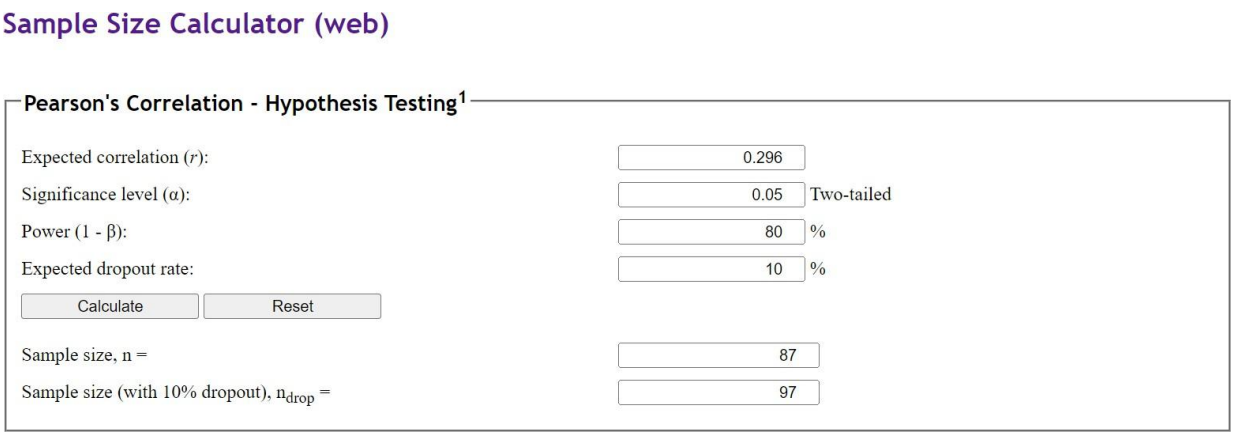


Figure 5: Sample size calculator by (Wan Arrifin, 2017)

Therefore, total sample size for objective 3 will be 97 samples. After considering a 10% drop out, the sample size is:

$$n = 87 + 10\ \%$$

$$n = 97\ participants$$

Based on the sample size calculation for all three objectives, the sample size for this study was based on the largest sample size, which was 420 participants.

3.5.2 Sampling Method

A convenience sampling method will be used to recruit participants for this study. Convenience sampling gathered samples by selecting ones conveniently near a facility or online service. A convenience sample simply asked friends, relatives, colleagues in

the workplace, or people on the street to take part in answering the questionnaire of this research through Google Form or paper.

3.6 Research Instrument

The instrument used will be a self-administered questionnaire adapted from (Alhowaymel et al., 2023) will be using this study. The original questionnaires include socio-demographic data, knowledge level, and attitude towards stroke prevention.

3.6.1 Questionnaire

The questionnaire utilized in this study focuses on knowledge and attitude level of stroke prevention among the adult community in Serting, Negeri Sembilan. The permission to use the questionnaire was obtained from the original authors (Alhowaymel et al., 2023) (Appendix C). The instrument is divided into three sections. The questionnaire comprises of three sections.

Section A: Socio-demographic Information

This section includes gender, age, marital status, highest educational level, and employment status, as well as two questions regarding stroke (6 questions).

Section B: Knowledge towards Stroke Prevention

This section has a total of 11 questions that assess the level of knowledge towards stroke prevention. The items were adapted from the validated questionnaire developed by Alhowaymel et al. (2023). The questions are divided into three domains which are stroke definition and symptoms, risk factors and stroke complications. Each question uses a **3-point Likert scale** (True = 3, Neutral = 2, False = 1) to evaluate the depth of understanding. The total score is used to classify knowledge levels as **Poor (<50%)**, **Moderate (50%–75%)**, or **Good (>75%)**.

Section C: Attitude towards Stroke Prevention

1. This section has a total of 6 questions that assess the level of attitude towards stroke prevention, adapted from Alhowaymel et al. (2023**)**. The items are grouped into two main domains which are beliefs about preventability and health seeking and lifestyle behavior. Responses are captured using a **5-point Likert scale** (Strongly Disagree = 1 to Strongly Agree = 5). The cumulative attitude score is used to classify respondents' attitudes as **Negative (<50%)**, **Moderate (50%–75%)**, or **Positive (>75%)**.

3.6.2 Translation of Instrument

The original version of the questionnaire was established in English. Due to some people not having a high education level, the School of Language, Literacies and Translation (SoLLaT), Health Campus, USM, translated the questionnaire into Bahasa Malaysia. Thus, the instrument was administered in two languages, English and Bahasa Malaysia, for easy understanding among adult community in Serting, Negeri Sembilan communities.

3.6.3 Validity and Reliability of Instrument

Validity indicates how accurately the research instrument measures what it is intended to measure. Content validity ensures the instrument comprehensively covers all relevant aspects of the studied concept. In contrast, construct validity assesses whether the instrument reflects the theoretical components of the phenomenon under investigation. Additionally, face validity is checked by having experts review the items for clarity and relevance (Taherdoost, 2016). Reliability, on the other hand, refers to the consistency and stability of the measurement over time. This study will assess reliability through

Cronbach's alpha to ensure internal consistency and, if possible, by conducting a test-retest to confirm stability across measurements (Taherdoost, 2016).

The reliability of the questionnaire was determined using Cronbach's alpha. The resulting Cronbach's alpha values of 0.85, and 0.92 for the knowledge, and attitude sections, respectively, indicate high reliability, ensuring the questionnaire's consistency in measuring stroke prevention knowledge, and attitudes (Alhowaymel et al., 2023). The validity of the questionnaire was ensured through a pilot study conducted with 40 participants representative of the target population in Serting. The pilot study aimed to assess the clarity, and relevance of the questionnaire. A pilot test was conducted, and the Cronbach's alpha is 0.944 (knowledge) and 0.843 (attitude).

3.7 Variables

Variables are characteristics or attributes measured or manipulated within a study to understand their effects. This study includes independent and dependent variables, as shown below in Table 1.

Table 1:Independent and dependent variables

Independent variable	● Level of knowledge regarding stroke prevention in the adult community in Serting, Negeri Sembilan
Dependent variable	● Level of attitude regarding stroke prevention in the adult community in Serting, Negeri Sembilan

3.7.1 Measurement of Variables and Variable Scoring

Section A: Sociodemographic Characteristics

Data on age, gender, education, and health history will be collected to analyse their association with knowledge and attitudes.

Section B: Knowledge of Stroke Prevention

The knowledge level on stroke prevention will be assessed using a self-administered questionnaire adapted from similar studies (Alhowaymel et al., 2023). This section comprises stroke definitions, risk factors, symptoms, and complications. Responses are scored using a three-point Likert-type scale:

- **Correct answer**: 2 points
- **Neutral**: 1 point
- **Incorrect**: 0 points

The total score will classify knowledge levels as:

- **Good** (>75%–100%)
- **Moderate** (50%–75%)
- **Poor** (<50%)

Section C: Attitudes Towards Stroke Prevention

Attitude levels towards stroke prevention are measured with a 5-point Likert scale:

- **Strongly Agree**: 5 points
- **Agree**: 4 points
- **Neutral**: 3 points
- **Disagree**: 2 points
- **Strongly Disagree**: 1 point

The total mean score categorizes attitudes as:

- **Positive** (>75%)
- **Moderate** (50%–75%)
- **Negative** (<50%)

3.8 Data Collection Plan

The data collection is expected to be started from January to March 2025 after obtaining ethical approval from the Human Research Ethics Committee (HREC), USM. In addition, consent will be obtained from relevant community authorities, including the district officer of Serting in Negeri Sembilan. A official letter will be written to the district officer, outlining the study.

Participants were recruited using a convenience sampling method, and the questionnaire was distributed through both online (Google Forms) and printed paper forms, depending on accessibility and participant preference. Community leaders and volunteers assisted in reaching adult residents across various areas in Serting to ensure wide coverage. Respondents were briefed about the study and provided informed consent before completing the survey. Figure 6 demonstrates the overall flow of the data collection process.