KNOWLEDGE AND ATTITUDE TOWARD PROVIDING ORAL HEALTHCARE FOR OLDER ADULTS AMONG DEGREE NURSING STUDENTS AT SCHOOL OF HEALTH SCIENCE, UNIVERSITI SAINS MALAYSIA

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SCHOOL OF HEALTH SCIENCES
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2025

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by

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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.

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Nur Fatin Fatihah binti Kamarul Sham

Date: 2nd August 2025

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

DOSM	Department of Statistics Malaysia
KAP	Knowledge, Attitude, and Practice
USM	Universiti Sains Malaysia

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SIKAP PELAJAR KEJURURAWATAN IJAZAH TERHADAP PENYEDIAAN PENJAGAAN KESIHATAN MULUT BAGI WARGA EMAS DI PUSAT PENGAJIAN SAINS KESIHATAN, UNIVERSITI SAINS MALAYSIA

ABSTRAK

Kajian ini menyiasat tahap pengetahuan dan sikap pelajar kejururawatan ijazah terhadap penyediaan penjagaan kesihatan mulut bagi warga emas di Pusat Pengajian Sains Kesihatan, Universiti Sains Malaysia. Penjagaan kesihatan mulut merupakan aspek penting dalam kesihatan menyeluruh, khususnya bagi warga emas. Namun, aspek ini masih kurang diberi penekanan dalam pendidikan kejururawatan. Objektif kajian ini adalah untuk menentukan tahap pengetahuan dan sikap terhadap penyediaan penjagaan kesihatan mulut bagi warga emas serta meneliti hubungan antara kedua-dua faktor tersebut dalam kalangan pelajar kejururawatan. Kajian keratan rentas telah dijalankan menggunakan persampelan mudah. Seramai 107 pelajar kejururawatan ijazah telah menyertai kajian ini melalui soal selidik berstruktur yang diedarkan dalam talian. Data dikumpulkan melalui soal selidik berstruktur yang diadaptasi daripada Bhagat et al. (2023), yang memfokuskan kepada pengetahuan, sikap, pengalaman dalam memberikan penjagaan kesihatan mulut kepada warga emas, dan tingkah laku kesihatan mulut peribadi. Analisis menunjukkan terdapat korelasi positif yang lemah ($r = 0.017$, $p = 0.068$) antara tahap pengetahuan dan sikap pelajar, yang menunjukkan tiada hubungan yang signifikan dari segi statistik. Penemuan ini menunjukkan perlunya modul khas dan latihan praktikal berkaitan penjagaan kesihatan mulut dalam kurikulum kejururawatan bagi meningkatkan pengetahuan, sikap positif dan penjagaan holistik kepada warga emas.

KNOWLEDGE AND ATTITUDES OF DEGREE NURSING STUDENTS TOWARD PROVIDING ORAL HEALTHCARE FOR OLDER ADULTS AT THE SCHOOL OF HEALTH SCIENCE, UNIVERSITI SAINS MALAYSIA.

ABSTRACT

This study investigates the knowledge and attitudes of degree nursing students toward providing oral healthcare for older adults at the School of Health Science, Universiti Sains Malaysia. Oral healthcare is an important aspect of overall health, especially for older adults. However, this aspect is still underemphasised in nursing education. The objectives were to determine the levels of knowledge and attitude toward oral healthcare provision for older adults and to examine the correlation between these two factors among nursing students. A cross-sectional study was conducted using convenience sampling. A total of 107 degree nursing students participated in this study through a structured questionnaire distributed online. Data were collected through a structured questionnaire adapted from Bhagat et al. (2023), focusing on knowledge, attitude, experience in providing oral healthcare to older adults, and personal oral health behaviours. Analysis revealed a weak positive correlation ($r = 0.017$, $p = 0.068$) between students' knowledge and attitude levels, indicating no statistically significant correlation. These findings indicate the need for specialised modules and practical training on oral healthcare in the nursing curriculum to enhance knowledge, positive attitudes, and holistic care for older adults.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This study aims to determine the level of knowledge and level of attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains. This chapter will discuss the background of the study, problem statement, research questions and objectives, the hypothesis of the study, the conceptual and operational definition of the key terms used in the study and the significance of the study.

1.2 Background of Study

According to the United Nations, any person aged 60 or over is considered an elderly person. By 2030, it is estimated that one in six people worldwide will be in this age group. This represents a significant increase, from one billion people in 2020 to approximately 1.4 billion. With this change, we face new challenges, especially as older adults often must deal with various health problems, including oral health problems (World Health Organization, 2024).

Oral health is very important for overall well-being. For the elderly, dental problems such as tooth decay, gum disease, and tooth loss can have a serious impact on their quality of life. These problems can prevent them from eating the foods they like and can affect their social interactions. Many seniors also take medications that can lead to dry mouth, making it even more difficult to maintain a healthy mouth. According to the Department of Statistics Malaysia (DOSM), in Malaysia, where more than 17% of the population is expected to be 60 years or older in 2040, it is clear that we need to focus on

effective oral care. Unfortunately, many elderly Malaysians report that they are dissatisfied with their oral health and the rate of tooth loss is still quite high (Mail, 2024).

Nurses play an essential role in supporting oral healthcare for older adults, especially in clinical and institutional settings where older patients may rely on others for daily oral hygiene (Lay et al., 2023). Despite this, nursing students often report feeling underprepared to meet these needs, largely due to limited emphasis on geriatric oral care within the nursing curriculum. This educational gap hinders the ability of future nurses to deliver comprehensive, person-centred care.

Oral healthcare for older adults is an important yet often overlooked area in nursing education. This study focuses on assessing nursing students' knowledge and attitudes toward this essential care component. Understanding their level of preparedness is vital, as students who are confident and well-informed are more likely to integrate oral health practices into routine nursing care. Accordingly, this study investigates the knowledge and attitudes of degree nursing students at Universiti Sains Malaysia regarding oral healthcare for older adults, providing insights to inform future nursing education and curriculum development.

1.3   Problem Statement

The global ageing population is increasing rapidly, bringing new healthcare challenges, particularly in oral healthcare. Nurses are expected to play a central role in addressing these needs, starting from their undergraduate training. However, several international studies from the USA, Turkey, Japan, New Zealand, and Australia have revealed that nursing students generally possess poor knowledge regarding oral healthcare for older adults. For instance, in Australia, early investigations did not even assess the knowledge and attitudes of nursing students toward elderly oral care (Bhagat

et al., 2023). Other studies have highlighted inadequate oral hygiene practices among nurses and a significant correlation between attitudes and knowledge in this area (Aboalizm et al., 2016). Curriculum improvements have been recommended to address this gap (Marquès-Pellejà et al., 2023).

Oral healthcare for older adults is an essential aspect of nursing care, yet it receives limited emphasis within the Bachelor of Nursing programme at Universiti Sains Malaysia (USM). Due to this lack of curricular focus, it remains uncertain whether nursing students at USM possess adequate knowledge or hold positive attitudes toward providing oral healthcare to the ageing population. This raises concerns about their preparedness to address the oral health needs of older adults in clinical practice.

This study aims to address this gap by providing baseline data on the level of knowledge and attitudes regarding oral healthcare for older adults among degree nursing students at USM. The findings are expected to inform the development of more effective curricular strategies to better equip future nurses in delivering comprehensive and age-appropriate care.

1.4 Research Questions

The research questions for this study are as follows:

i.   What is the level of knowledge toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia?

ii. What is the level of attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia?

iii.   Is there any correlation between knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia?

1.5   Research Objectives

1.5.1   General Objective

The general objective of this study is to determine the level of knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at School of Health Science, Universiti Sains Malaysia

1.5.2   Specific Objectives

The specific objectives for this study are as follows:

i.   To determine the level of knowledge toward providing oral healthcare for older adults among degree nursing students at School of Health Science, Universiti Sains Malaysia.

ii.   To determine the level of attitude toward providing oral healthcare for older adults among degree nursing students at School of Health Science, Universiti Sains Malaysia.

iii.   To identify the correlation between knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia.

1.6 Research Hypothesis

Hypothesis 1 (H$_0$): There is no correlation between knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia.

(H$_1$): There is a correlation between knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia.

1.7 Significance of study

The findings from this study will address the level of knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia. The importance of this study is to help improve nursing education at Universiti Sains Malaysia (USM) in the future by increasing the content of oral healthcare for the elderly. These improvements can help students be more confident in handling elderly people regarding oral healthcare. At the same time, this study can also improve the quality of care for older adults, particularly in oral healthcare. This is because, when we focus on oral healthcare for the elderly, we can reduce the risk of infection around the mouth area that is easily caused by a low immune system in the elderly. The immune system in older adults will decrease and become slower to respond Medline Plus (2022). Therefore, this study can produce quality nurses skilled in elderly care that involves hygiene, especially in the mouth.

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	According to the Cambridge Dictionary, knowledge can be defined as awareness, understanding, or information that has been obtained by experience or study, and that is either in a person's mind or possessed by people generally (Cambridge Dictionary, 2024).	This study will assess the knowledge level toward providing oral healthcare for older adults among degree nursing students. Regarding the factors affecting the oral healthcare of older people, knowledge of making timely and appropriate referrals, and knowledge about the connection of oral health with general health (Bhagat et al., 2023).
Attitude	According to the Cambridge Dictionary, attitude can be defined as a feeling or opinion about something, especially when this shows in your behaviour (Cambridge Dictionary, 2019).	This study will assess the level of attitude toward providing oral healthcare for older adults among degree nursing students focusing on the importance of the roles of nurses in providing oral health care to older adults

		and student's interest in learning about providing effective oral healthcare. (Bhagat et al., 2023).
Oral Healthcare	Oral health is characterized by various aspects, including the ability to express emotions, communicate confidently, and use facial expressions without pain or discomfort. This includes speaking, smiling, tasting, chewing, and swallowing (FDI World Dental Federation, 2016).	In this study, specific actions and knowledge nursing students possess regarding the provision of oral hygiene care to older individuals.
Degree Nursing Students	Degree nursing students are individuals enrolled in a nursing program at a university who are pursuing an academic qualification that prepares them to become registered nurses.	In this study refers to an individual who is currently enrolled in an accredited Bachelor of Nursing program at Universiti Sains Malaysia. In their year 1, year 2, year 3, and year 4 of study.
Older Adult	According to the United Nations, an older person is a person over 60 years of age. (UNHCR, 2020).	Refers to people aged 60 years and older.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a general review of the literature about knowledge and attitudes toward providing oral healthcare for older adults among degree nursing students. This literature review consists of oral healthcare for older adults, nursing students' knowledge of oral healthcare in older adults, nursing students' attitude toward oral healthcare in older adults, and the correlation between the level of knowledge and attitude toward providing oral healthcare for older people

2.2 Oral Healthcare for Older Adults

According to the United Nations, an older person is a person over 60 years of age. However, families and communities often use other socio-cultural references to define age, including family status (grandparents), physical appearance, or age-related health problems (UNHCR, 2020). According to the World Health Organization, most people can live longer around their sixties and beyond worldwide. Moreover, every country in the world has a different size and proportion of elderly population. By 2030, 1 in 6 people in the world will be 60 or older. From 2020 onwards, the population of individuals aged 60 and above will be 1 billion, with an increase to 1.4 billion by then. The global population of people aged 60 and above will increase twofold by 2050, with a total of 2.1 billion. Between 2020 and 2050, the population of individuals aged 80 and over is predicted to triple, resulting in a total of 426 million. (World Health Organization, 2024). According to the Department of Statistics Malaysia (DOSM), Over 17% of Malaysia's population is expected to be 60 years old or older by 2040, indicating that the country is

moving towards becoming an aging nation. Therefore, an older adult in Malaysia needs to take care now to prevent any complications specifically in oral healthcare.

Oral health refers to the health of the teeth, gums, and the entire oral-facial system. It allows us to smile, speak, and chew. Thus, good oral health can improve the nutritional status of patients. The Global Oral Health Report showed that there was a relationship between oral health and general health, as poor oral health can worsen general health problems, especially in an aging society, there will be more people suffering from medical problems and often infected (Lay et al., 2023). According to the summary from Blog (2019), older adults are more prone to oral and dental infections, which can be very harmful and lead to complications. Tooth loss, mainly caused by infection, not only causes changes in our appearance but can also make it more difficult to chew certain foods. This can make it harder to get the nutrients that required body needs. According to Dental Care for Older People (2017), older adults' gums can recede (shrink) as age increases and the teeth can become a little more sensitive.

Also, older adults have more difficulty brushing their teeth properly if they have problems with their weakness of muscles hands, or arms, or if their vision is poor to see clearly due to the aging process. Some individuals regularly consume drugs that dry their mouths. Saliva helps protect your teeth from decay. If you have less saliva than usual, it can lead to infections. From previous studies, the elderly is exposed to a significant amount of medication-related adverse effects due to the high comorbidity and polypharmacy burden. Older adults frequently experience dry mouth as a side effect of medications. This includes salivary gland hypofunction (objectively measured decrease in saliva) and xerostomia (subjective sensation of dry mouth), (Tan et al., 2017).

In 2018, a considerable proportion of the elderly reported having bad teeth, with sensitivity levels of 28.8%. In 2019, 74.2% of the elderly in the district of Kuala Pilah,

Malaysia, is said to have one negative perception of their oral health. The prevalence of poor oral health among elderly Malaysians remains extremely high, requiring immediate action by healthcare providers. In developed countries, the prevalence of edentulism, or complete loss of teeth, has decreased by 50-60% in the last 20 years. However, in developing countries, its prevalence remains high. In Malaysia, edentulism in the elderly was 62.3% (Elias et al., 2024).

2.3   Nursing Student's Knowledge of Oral Healthcare in Older Adults

During each year of study, most nursing students will interact with the elderly in healthcare settings such as medical wards which are often full of elderly patients who have suffered a stroke and are unable to perform oral hygiene on their own and properly. Based on the previous study in Malaysia, mentions that older people have more hospitalizations (157 admissions per 1,000 compared to 86 admissions per 1,000 for the average population) and longer lengths of stay than all other age groups (Yunus et al., 2021).

As stated in Veerasamy et al. (2022) older adults in hospitals in New Zealand or care facilities need help with oral health care because of the impact of oral diseases on overall health and quality of life. As indicated by (Lay et al., 2023) in Indonesia, good oral care requires collaboration between health professionals because each of them can help assess the oral condition of patients to prevent more serious complications and initiate interprofessional consultations for the appropriate treatment. It is important to emphasize oral health education not only for dental students and dental professionals but also for other individuals and health professionals who have a direct relationship with patients, such as nurses or doctors, to promote collaborative oral care.

From the previous study, most nursing students in Universitas Indonesia felt they needed more knowledge of geriatrics than general medicine to practice dental and oral care. This was related to their response to who should receive oral care, with more than half of respondents in Universitas Indonesia saying that older people need oral care. However, older adults are among the groups that most need nurses' assistance in providing oral healthcare. Recent European guidelines have underlined health professionals' critical role in promoting oral health for older adults (Lay et al., 2023)

2.4 Nursing Student's Attitude towards Oral Healthcare in Older Adults

Based on a previous study by Elias et al. (2024), the attitude toward oral health can be defined as self-assessment of dental health, awareness of the importance of maintaining good oral health, and preference for routine oral health examinations. As stated by (Bhagat et al., 2023), nursing students in Australia's attitudes toward oral care for older adults were favorable, with more than 90% of participants agreeing or strongly agreeing with most of the items on the attitude scale statement. Almost all (99%) believed that providing oral care to older adults was an important part of nursing care. Similarly, most participants (>90%) expressed an interest in learning more about providing this oral care and how nurses can work in collaboration with other healthcare professionals to provide this care. In addition, almost 90% of the participants felt comfortable looking into the mouths of older adults and helping them with daily oral hygiene

2.5 Correlation Between the Level of Knowledge and Attitude Towards Providing Oral Healthcare for Older People

As a student nurse are often exposed to clinical areas such as medical wards, there are a lot of chances to give oral healthcare to geriatric patients. Their knowledge and attitudes towards oral healthcare can significantly impact the quality of care to patients.

According to Aboalizm et al. (2016), nurses' attitude was positively and significantly correlated with their oral health knowledge. Therefore, to improve their manners and perform oral hygiene, the nurses in this study required extensive continuing education. The result shows positive correlation between knowledge and attitude with P values is 0.018.

Based on a previous study by Tahani and Manesh (2021), for another healthcare profession, the mean scores of the dentists' knowledge and attitude also showed a significant correlation; as a result, the dentists with higher knowledge scores also had more favourable attitudes towards the elderly. The study shows roughly 3% of them had good knowledge, and the majority of them had a somewhat favourable opinion of older people. Which is their knowledge and attitude had a noticeably weak positive correlation. Therefore, greater care for one's oral health is correlated with a higher level of knowledge and attitudes about oral health care (Šapurić & Tozja, 2015)

2.6   Theoretical and Conceptual Framework

The suiap theoretical framework used in this study is the Knowledge, Attitude, and Practice (KAP) survey model by Médicins du Monde (2015) to evaluate nursing students' knowledge and attitudes toward older adults and impact preparedness to provide oral healthcare as a nurse. This model is typically applied in healthcare studies to understand how knowledge influences attitudes. This theoretical framework will provide access to quantitative data in declarative statements using the 5-point Likert scale rating system. Moreover, the KAP survey model targets are used for specific populations such as degree nursing students in USM. Other than that, it can establish the baseline data for future use in the Nursing Program at USM for developing curricular improvements to

ensure the students are knowledgeable and have positive attitudes toward providing oral
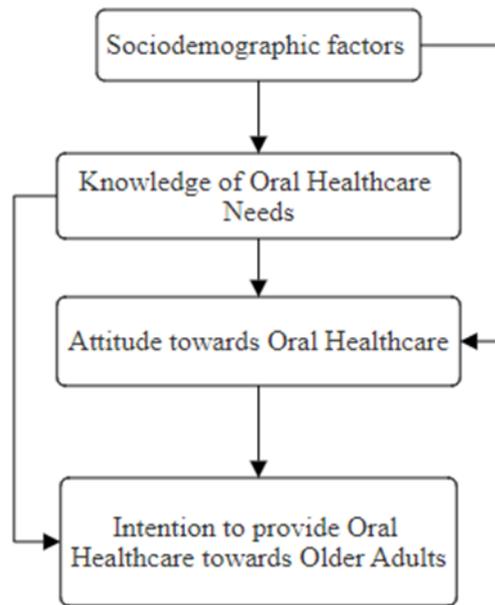
healthcare for older adults.

Figure 2.1 Conceptual Framework of Study: Knowledge, Attitude, and Practice Survey Model

CHAPTER 3

METHODOLOGY

3.1   Introduction

This chapter consist of the research design, research location, research duration, research population, subject criteria, sampling plan, research instrument, validity and reliability, variables, and data collection plans

3.2   Research Design

In this study, the research design used is a cross-sectional study using a questionnaire. This will determine the level of knowledge and attitude degree nursing students at Universiti Sains Malaysia (USM) towards older adults. This research design is very flexible and low cost is required

3.3   Study Setting and Population

The study setting was in the Health Campus of Universiti Sains Malaysia, Kubang Kerian, Kelantan to achieve the level of knowledge and attitude of oral healthcare degree nursing students at Universiti Sains Malaysia (USM) towards older adults.

The target population in this cross-sectional study is degree nursing students in the School of Health Science at Universiti Sains Malaysia who fulfill the study criteria. The School of Health Science students include Biomedicine, Nursing, Environmental and Occupational Health, Dietetics, Nutrition, Forensic Science, Medical Radiation, Exercise and Sports Science, Audiology, and Speech Pathology but this study only focuses on degree nursing students. The study population for this study is degree nursing students in year 1, year 2, year 3, and year 4 of study. All degree nursing student is selected to identify whether years of study and clinical experience will correlate with knowledge and attitudes

towards oral healthcare towards older adults among degree nursing students. The total number of students is as follows;

Table 3.1 Total number of students

Year of Study	Total of students
Year 1 (bachelor's degree in nursing)	34
Year 2 (Bachelor's degree in nursing)	29
Year 3 (Bachelor's degree in nursing)	32
Year 4 (Bachelor's degree in nursing)	32
Total	**127**

3.3.1 Sample criteria

Several criteria were specified and set to ensure that the subject's data were suitable for research purposes and could attain the targeted goals at the end of the study to meet the research objective.

3.3.1(a) Inclusion criteria

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

• Currently studying for a full-time bachelor's degree in nursing at Universiti Sains Malaysia.

3.3.1(b) Exclusion criteria

Subjects are excluded from this study if they:

• Degree nursing student who has work experience as a registered nurse over one year

3.4   Sampling Plan

The sample size estimation for this study is based on a sample size calculator by Raosoft (2004) and a correlation sample size calculation by Kohn (2024). These two sample size estimation calculations are used for convenience sampling methods in selecting participants (Nikolopoulou, 2022).

3.4.1   Sample Size Estimation

iv.   **Objective 1:** to determine the level of knowledge toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia.

Figure 3.1 Sample size calculator from Raosoft

The sample size estimation for objective 1 is calculated using a sample size calculator by Raosoft from http://www.raosoft.com/samplesize.html (Raosoft, 2004). The margin of error is 5%, the confidence level is 95%, and the expected response distribution is 50%. The 10% dropout rate is acceptable to use in this study because the questionnaire will be distributed online, and the researcher expected that not all

participants would fully focus on answering the questionnaire (Edwards, 2024). Therefore, the minimum size of the recommended participants is 106 participants.

    i.   **Objective 2:** to determine the level of attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia.

Figure 3.2 Sample size calculator from Raosoft for objective 2

The sample size estimation for objective 1 is calculated using a sample size calculator by Raosoft from http://www.raosoft.com/samplesize.html (Raosoft, 2004). The margin of error is 5%, the confidence level is 95%, and the expected response distribution is 50%. The 10% dropout rate is acceptable to use in this study because the questionnaire will be distributed online, and the researcher expected that not all participants would fully focus on answering the questionnaire (Edwards, 2024). Therefore, the minimum size of the recommended participants is 106 participants

iii.   Objective 3: Is there any correlation between knowledge and attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia

The sample size estimation for objective 3 is calculated by using a correlation sample size calculation from https://sample-size.net/correlation-sample-size/ (Kohn, 2024). The α (two-tailed) used in this study is 0.05, the probability of failing to reject null hypothesis (β) is 0.2, and the expectation of Pearson correlation coefficient (r) is set at 0.3 because the researcher expects at least have moderate correlation and no previous study found. The total sample size estimation for this objective is 85 participants.

Correlation sample size

Total sample size required to determine whether a correlation coefficient differs from zero.

Instructions: Enter parameters in the **green** cells. Answers will appear in the **blue** box below.

α (two-tailed) = 0.05 — Threshold probability for rejecting the null hypothesis. Type I error rate.

β = 0.20 — Probability of failing to reject the null hypothesis under the alternative hypothesis. Type II error rate.

r = 0.3 — The expected correlation coefficient.

Calculate

The standard normal deviate for α = Z_α = 1.9600
The standard normal deviate for β = Z_β = 0.8416
C = 0.5 * ln[(1+r)/(1-r)] = 0.3095

Total sample size = N = $[(Z_\alpha + Z_\beta)/C]^2 + 3$ = 85

Figure 3.3 Sample size calculation using correlation sample size calculation

The total of 85 participants will be adding 20% drop out of the participants. Thus, the minimum of participants in this objective is:

$n = 85 \times 120\%$

$n = 102$ participants

Thus, 102 out of 127 degree nursing students is the minimum sample size for this objective.

Then, the final sample size needs to be selected by the largest sample size number among all objectives, which is in objectives 1 and 2 as many as 106 participants. This approach ensures that the findings are representative of the entire population within this institution.

3.4.2   Sampling Methods

The best sampling method that used in this study is the convenience sampling method. The convenience sampling method allows the researcher to collect data in a flexible time as follows as the participant's time due to most of the degree nursing students will be involved in clinical placement during the data collection time. Thus, the participants can answer the questionnaire when ready. This method is also suitable for use in small-scale populations such as in this study with 127 participants and no cost needs to be used in selecting participants. Moreover, all degree nursing students in USM session 2024/2025 are welcoming to participants and following inclusion criteria in this study

3.5   Instrumentation

The data collection instrument used in this research is based on a previous study (Bhagat et al., 2023). Only some questionnaire in the instrument was selected to achieve the research objective. The selected survey items are knowledge, attitude, experience providing oral healthcare to older adults, and personal oral behaviour.

3.5.1 Instrument

The questionnaire utilized in this study focuses on knowledge and attitudes among nursing students toward oral healthcare of older people. The questionnaire is divided to three sections which are Section A: the sociodemographic, Section B: knowledge of oral healthcare of older adults, and Section C: attitudes towards oral healthcare provision to older people. (appendix A).

Section A: Socio-demographic Information and Oral Healthcare Behaviour

This section includes age, gender, year of study, education about oral health care for older adults, and source of education about oral healthcare for older adults. The concern by asking the participant whether the participant received any knowledge about oral health care for older adults to avoid any confounding variable and distort the correlation between knowledge and attitude.

Section B: Knowledge of Oral Healthcare of Older Adult

This section consists of 15 items to assess the level of knowledge toward providing oral healthcare for older adults among degree nursing students at the School of Health Science, Universiti Sains Malaysia. The response for each statement needs to choose either strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree (Bhagat et al., 2023).

Section C: Attitude of Oral Healthcare of Older Adult

This section has a total of 5 items to assess the level of attitude toward providing oral healthcare for older adults among degree nursing students at the School of Health

Science, Universiti Sains Malaysia. The response for each statement needs to choose either strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree. The five statements related to providing oral healthcare to the elderly focus on the importance of the role of nurses in providing oral healthcare to older adults and student's interest in learning providing effective oral healthcare (Bhagat et al., 2023).

3.5.2   Validation and reliability of instrument

According to Jansen (2023), the validity and reliability of the instrument are very important to achieve the satisfaction and quality of the study. The reliability of knowledge and attitude instruments is fully adopted by (Bhagat et al., 2023). Cronbach's alpha is a measure of the reliability of the instrument, which is the higher the value of Cronbach's alpha, the higher of reliability of the instrument. The researcher from the previous study in Australia did the reliability and validity of the questionnaires with a total of 26 nursing students and 11 recent graduate nurses to answer the survey. The Cronbach's alpha for the knowledge instrument is 0.77 which is a high category of reliability and the Cronbach's alpha for the attitude instrument is 0.61 which is moderate reliability. These two values of Cronbach's alpha are acceptable in this study (Bhagat et al., 2023). Therefore, the validity of the instruments is not necessary to validate again due to the instrument was adopted from the original article. Additionally, a pilot study is not required since previous research using the same questionnaire with the same population showed high Cronbach's alpha values, indicating good 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 shown in Table 3.2

Table 3.2 Independent and dependent variables

Independent variable	Knowledge toward providing oral healthcare for older adults among degree nursing students at School of Health Science, Universiti Sains Malaysia.
Dependent variable	Attitude toward providing oral healthcare for older adults among degree nursing students at School of Health Science, Universiti Sains Malaysia.older adults among degree nursing students

3.6.1   Measurement of Variables and Variable Scoring

Knowledge

The variables of the study are measured using a self-administered questionnaire to assess the level of knowledge of oral healthcare degree nursing students at Universiti Sains Malaysia (USM) towards older adults. The questionnaire will be scored on a 5-points Likert scale of 15 statements which are 4= strongly agree, 3= agree, 2= neither agree or disagree, 1 = disagree, and 0 = strongly disagree. The score was reversed for negative items. The highest score it can be is 48 and the lowest score it can be 0. However, the mean score is used to determine the level of the student's knowledge. A mean score of four or above 3.2 (agree or strongly agree to positive statements) is considered good knowledge in providing oral healthcare for older adults. A mean score below 3.2 is considered limited of knowledge.

Table 3.3 Types of statement for knowledge instrument

Types of statements	Statement Numbers
Positive statements	9,13,14,15
Negative statements	1,2,3,4,5,6,7,8,10,11,12

Table 3.4 Mean score of level of knowledge

Mean Score	Level of Knowledge
≥ 3.2	Good knowledge
< 3.2	Limited knowledge

Attitude

 The variables of the study are measured using a self-administered questionnaire to assess the level attitude of oral healthcare degree nursing students at Universiti Sains Malaysia (USM) towards older adults. The questionnaire will be scored on 5-points Likert scale of 5 statements which are 4= strongly agree, 3= agree, 2= neither agree or disagree, 1 = disagree, and 0 = strongly disagree. The score was reversed for negative items. The highest score it can be is 20, and the lowest score it can be 0. However, the mean score is used to determine the level of the student's attitude. A mean score of 3.2 or above four (agree or strongly agreed) is considered favourable attitude in providing oral healthcare for older adults. Meanwhile, a mean score below 3.2 is considered unfavourable.

Table 3.5 Mean Score and level of attitude

Mean Score	Level of Attitude
$\geqslant 3.2$	Favourable attitude
< 3.2	Unfavourable attitude

3.7   Data collection methods

The data collection is expected to be started from January to March 2024 after obtaining ethical approval from the Human Research Ethics Committee (HREC), USM and approval permission from the Dean, School of Health Sciences Figure 5 demonstrates the overall flow of the data collection process. The total of 102 participants will be involved in this study. First, the researcher will be advertising the study to all the interested degree nursing students at USM who will be involved in this study. Second, the survey link will be distributed through WhatsApp application to all selected leaders that have been recruited to spread out the study. The researcher will explain the aim of the study and attain consent. The participants will answer the question given by online survey link which is the Google form. The data collection of this study used is convenience sampling method that allowed all the degree students to participate. The participant who agrees to participate will take 15 to 20 minutes to complete the questionnaire. All the data information of participants only can be assessed by the researcher, the supervisor of this study, and a small group of examiners