THE LEVEL OF KNOWLEDGE, AWARENESS AND PRACTICE ON SUNSCREEN USAGE AMONG NURSING STUDENTS IN UNIVERSITI SAINS MALAYSIA, KELANTAN

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by

NUR ANIS SYAZANA BINTI JANA

Dissertation submitted in partial fulfillment of

the requirements for the degree

of Bachelor of Nursing (Honours)

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CERTIFICATE

This is to certify that the dissertation entitled “The Level of Knowledge, Awareness and Practice on Sunscreen Usage Among Nursing Students in Universiti Sains Malaysia” is the research work done by Ms. Nur Anis Syazana Binti Jana during the period from October 2022 until August 2023 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as s dissertation to be submitted in partial fulfillment for the degree of Bachelor in Nursing (Honours).

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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

UV	: Ultraviolet
UVB	: Ultraviolet B
UVA	: Ultraviolet A
DNA	: Deoxyribonucleic Acid
BCC	: Basal Cell Carcinoma
SCC	: Squamous Cell Carcinoma
KCs	: Keratinocyte Carcinoma
SPF	: Sun-Protection Factor
FDA	: Food and Drug Administration

Tahap Pengetahuan, Kesedaran dan Praktik Terhadap Penggunaan Pelindung Matahari dalam Kalangan Pelajar Kejururawatan di Universiti Sains Malaysia

ABSTRAK

Pelindung matahari telah terbukti menghalang kulit daripada terkena selaran matahari dan mendapat kanser kulit. Namun begitu, pengaplikasian pelindung matahari dalam kalangan masyarakat masih tidak memuaskan. Oleh itu, ilmu pengetahuan dan praktik yang mengenai penggunaan pelindung matahari yang tinggi sangat penting dalam kalangan pelajar kejururawatan untuk mendidik kepada orang ramai di masa hadapan. Kajian keratan rentas telah dijalankan untuk menilai tahap pengetahuan, kesedaran dan praktik terhadap pengunaan pelindung matahari dalam kalangan pelajar kejururawatan di USM. Soal selidik yang digunakan dalam kajian ini diadaptasikan dari kajian di Indonesia. Seramai 112 orang pelajar kejururawatan di USM yang .memenuhi kriteria kemasukan dan pengecualian telah dipilih secara rawak. Kutipan data telah dianalisis secara statistic menggunakan perisian *Statistical Package Social Sciences* (SPSS) versi 27.0 dan Pearson's Chi-Square digunakan untuk analisis data. Bagi tahap pengetahuan dan praktik, keputusan menunjukkan 53(47.3%) untuk pengetahuan yang tinggi dan 43 (38.4%) untuk praktik yang tinggi masing-masing. Keputusan juga menunjukkan terdapat hubungan antara skor pengetahuan dan skor praktik ($p < 0.05$) terhadap penggunaan pelindung matahari dalam kalangan pelajar kejururawatan. Hasilnya menunjukkan hanya 31.3% daripada responden yang mempunyai pengetahuan dan praktik yang baik.

The Level of Knowledge, Awareness and Practice on Sunscreen Usage Among Nursing Students in University Sains Malaysia

ABSTRACT

Sunscreen has been proven to prevent our skin from sunburn and skin cancer. However, the application of sunscreen among people is still poor. Thus, high knowledge and practice are essential to all nursing students to educate people in the future. A cross-sectional study was carried out to study the knowledge, awareness and practice on sunscreen usage among nursing students in USM. The questionnaire that used in this study was adapted from study in Indonesia. A total of 112 nursing students in USM who fulfilled the inclusion and exclusion criteria were selected by using randomizer tool. Data collected were statistically analyzed using Statistical Package Social Sciences (SPSS) version 27.0 and Pearson's Chi-Square test was used for the data analysis. As for the knowledge and practice score, the results show 53 (47.3%) for good knowledge and 43 (38.4%) for good practice respectively. The result also demonstrated that there was an association between the knowledge and practice score ($p < 0.05$) on sunscreen usage among nursing students. It shows only 31.3% of respondents who have good knowledge and practice score.

CHAPTER 1: INTRODUCTION

1.1 Introduction

This research proposal aims to assess the knowledge and practice on sunscreen usage among nursing students in Universiti Sains Malaysia. The first chapter of the dissertation will start with the background of the study, problem statement, research questions, research objectives and hypotheses of the study. Finally, the significance of the study and the operational definition of key terms used in this study are described.

1.2 Background of the Study

Ultraviolet (UV) radiation exposure and artificial UV sources has been well known in causing premature aging and skin cancer (Wang & Dusza, 2009). There are two types of UV which are UVA and UVB. UVA (320 - 400 nm) penetrates radiation deeper into the skin tissue and interacts with endogenous and exogenous photosensitizer and generates reactive oxygen species. UVB (290 – 320 nm) acquires more energy than UVA that responsible for causing sunburn as the direction directly damage the cellular DNA through the formation 6-4 cyclobutane pyrimidine dimers (Drobetsky et al., 1995).

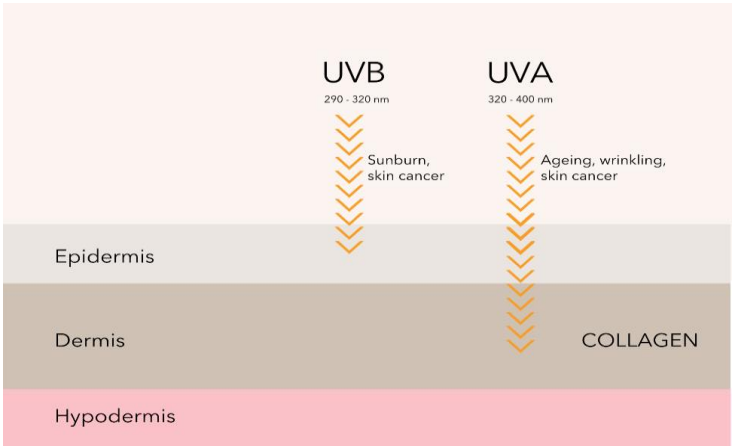

Figure 1.1 UVA and UVB radiation penetrate into the skin layer

UV radiation is associated with the development of most skin cancers as well as the other forms of skin damage, including sunburn and photoaging (Al Robaee, 2010). Skin cancer has been rising steadily over the past four decades and globally accounts for 1 out of 3 cancer cases. The main targeted usually in fair-skinned populations (Alzahrani et al., 2018). The most common skin cancer is basal cell carcinoma (BCC), whereas the mortality rate is either stable or decreasing (Berking et al., 2014). Other most prevalent forms include keratinocyte carcinomas (KCs), squamous cell carcinoma (SCC), and cutaneous melanoma. Although the exact cause of melanoma is still unknown, studies have determined that risk factors include UV rays exposure, family history, sunburn history, fair skin, melanocytic nevi, and certain phenotypic characteristics such as red hair, fair skin, numerous freckles, light eyes, sun sensitivity and an inability to tan (Prieto-Granada et al., 2015).

The Third National Cancer Registry Report (2003-2005) revealed that skin cancer was the 10th most common cancer in Malaysia, accounting for 2.6% of all cases. The data from the Dermatology Clinic in Hospital Kuala Lumpur (2006-2014), demonstrated that basal cell carcinoma is the commonest type of skin cancer in Malaysia, accounting for 34.9% of cases. This was followed by cutaneous lymphoma in 25.7% and squamous cell carcinoma in 20.6% of cases (Affandi, 2015).

Sunscreens are able to delay sunburns and reduce some UV-induced skin lesions. Therefore, sunscreen has become an alternative to be one of the sun-protection methods, and that protection is deemed to increase with increasing sun-protection factor (SPF) (Sambandan & Ratner, 2011). The SPF refer to the measurement that used to identify a sunscreen ability to protect one from sunburn which is primarily caused by UVB (Diffey, 2000). Evidence from an observational studies (Boyd et al., 1995), a large randomized controlled trial (RCT) (Hughes et al., 2013) and smaller, nonrandomized experimental

studies (Iannacone et al., 2014; Phillips et al., 2000) support the effectiveness of sunscreens in preventing the signs of photoaging, including wrinkles, telangiectasia and pigmentary alterations induced by ultraviolet radiation as well as skin cancer.

1.3 Problem Statement

According to World Health Organization, the occurrence of both non-melanoma and melanoma skin cancers has been rising over the past decades. Globally, around 2 to 3 million non-melanoma skin cancers and 132,000 melanoma skin cancers happen every year (WHO, 2017). In United States, almost 5 million people are treated for skin cancer at a cost of approximately $8.1 billion (Guy et al., 2015) and more than 9000 people in the United States die of melanoma (CDC, 2011). In July 2014, the US Surgeon General released the Call to Action to Prevent Skin Cancer to increase awareness about and call for actions to reduce skin cancer risk at a population level. In order to prevent skin cancer, experts has recommended various strategies and ways such as staying out of the sun when the ray are the strongest (between 10 am to 4 pm), wearing protective clothing and applying sunscreen with a sun protective factor (SPF) of 15 or higher when expose to the sun (Ar, 2002).

Approximately, 80% of skin cancer cases are preventable with the correct use of sun protection measures and appropriate behavior (Ahmed Al-Naggar, 2012). Sunscreen, in any type of presentation such as creams, oils, gels, and sprays are intended to be use in contact with human skin with the main goal to protect skin from solar UV radiation by consuming, dispersing, or reflecting sunlight. Thus, sunscreen plays a crucial role in the prevention of skin cancer as it provides barriers against DNA damage and illness by inhibiting the transmission of UV radiation to the skin by reflecting, absorbing, or scattering the radiation (Khamsiah et al., 2012; Zul et al., 2018). Therefore, sunscreens

have been recommended as a form of protection against sunlight with a higher sun protection factor (Al Robaee, 2010).

However, various studies provided evidences that the usage of sunscreen still poor in term of their basic knowledge regarding sunscreen, time of application, area of application, and amount that needed per use (Agarwal et al., 2018; Alsudairy et al., 2019; Dlova et al., 2018; Gao et al., 2022; Low et al., 2021; Wang & Dusza, 2009). The superficial understanding regarding SPF, UVA and UVB also may be attributed to the lack of clear guideline from FDA for testing and labeling UVA protection in sunscreen products (Wang & Dusza, 2009). The understanding of sunscreen label should be gain first as it provides the information regarding the sunscreen broad spectrum, SPF, and ingredients (FDA, 2021). Furthermore, it can be observed in few studies that, even though vast majority presented intermediate knowledge and generally acceptable attitude, they present inadequate practices of sunscreen use (Aliaga-echevarría & Soto-cáceres, 2018).

1.4 Research Question

1.4.1 What is the level of knowledge of sunscreen usage among nursing students in USM?

1.4.2 What is the level of practice on sunscreen usage among nursing students in USM?

1.4.3 Is there any association between knowledge and practice on sunscreen usage among nursing students in USM?

1.5 Research Objective

1.5.1 General Objective

To determine the level of knowledge and practice on sunscreen usage among nursing students in USM.

1.5.2 Specific Objective

i. To identify the level of knowledge on sunscreen usage among nursing students in USM.

ii. To identify the level of practice on sunscreen usage among nursing students in USM.

iii. To identify the association between knowledge and practice on sunscreen usage among nursing students in USM.

1.6 Research Hypothesis

1.6.1 Null Hypothesis

H_0 : There is no significant association between knowledge and practice on sunscreen usage among nursing students in USM.

1.6.2 Alternative Hypothesis

H_A : There is a significant association between knowledge and practice on sunscreen usage among nursing students in USM.

1.7 Conceptual and Operational Definitions

Table 1.1 Definitions for the conceptual and operational terms used in this research

Knowledge	Knowledge is defined as is justified true belief is shown to have the limitations given by the justification condition and the truth nature (Bolisani, 2018). In this study, it refers to the understanding of sunscreen usage and measured by using the questionnaire of sunscreen knowledge developed by Novitasari et al, (2020)
Practice	Practice is defined as the act of doing something regularly or repeatedly to improve our skill at doing it (Cambridge Dictionary, 2023). In this study, it refers to the use of sunscreen usage and measured by using the questionnaire of sunscreen practice developed by Novitasari et al, (2020)
Sunscreen	Sunscreens are ultraviolet radiation (UVR)-absorbing chemicals that function to attenuate the amount and nature of UVR reaching viable cells in the skin. They are used for their ability to prevent erythema (Gasparro, 2000). In this study, sunscreen usage is used to assess the respondent's sun protection behavior as self-care measure.
Nursing student	Nursing student is an individual who is enrolled in a school for professional nurses or a school for licensed practical nurses that meets standards established by the Board of Nursing (Insider, 2015). In this study, the target population are nursing students from degree and diploma programs.
USM	University is a modern higher education that organized tertiary learning and training activities and institutions (Alemu, 2018). The research of this study will be conduct at health campus of University Sains Malaysia.

1.8 Significance of the Study

The findings from this study will determine the level of knowledge and practice regarding sunscreen usage among nursing students in USM. It also aims to raise awareness of sunscreen benefits and importance among nursing students. Besides, as future nurses, they should know and be aware of the prevention of skin cancer to guide the people. Providing accurate knowledge and information regarding sunscreens and UV exposure is a crucial step to changing photoprotection and sunscreen behaviors.

Even though numerous studies have assessed the behavioral patterns related to sunscreen use and sun protection practices, sunscreen use among the public are still in poor condition. In public health perspective, this study is important as behavioral patterns are partially influenced by knowledge. Individuals who lack knowledge may be less motivated to use sunscreen. This study will help to motivate them to use sunscreen appropriately.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter will present a review of the literature related to knowledge and practice on sunscreen usage. It also presents the association between knowledge and practice of sunscreen usage . Lastly, it describes the theoretical framework chosen for this study. Health Belief Model (HBM) will be guiding this study.

2.2 Knowledge on Sunscreen Use

Over the times, numerous responsible parties and authorities including government, health community as well as non-profit agencies have worked endlessly to educate the public regarding excessive UV exposure. In the meantime, various photoprotection practices such as sunscreen usage through health campaigns have been conducted. Despite years of education, the public still does not have the knowledge and information to fully understand the importance of photoprotection. Furthermore, there may also be a lack of understanding regarding how to properly execute the photoprotective actions. Second, the public may have the knowledge, but lack the motivation to change their behaviors. (Wang & Dusza, 2009).

The studies in USA regarding the assessment of sunscreen knowledge among the public demonstrated a strong basic knowledge of sunscreen. Majority of the subjects were able to identify the major benefits that are associated with the usage of sunscreen, which are preventing sunburn and skin cancer. Majority of respondents also answered that sunscreens prevent signs of aging, and 54% felt that sunscreens could not reverse the signs of aging. However, 40% of the subjects thought that sunscreen can enhance a tan and 15% believed that sunscreens can reverse signs of aging. They also lack knowledge regarding the appropriate timing and frequency of sunscreen application as only 32% of

respondents reported the need to apply sunscreen 30 min before going outdoors, and likewise only 30% knew that the products needed to be reapplied every 2 hours. In addition, only 18 of subjects knew the correct amount of sunscreen needed for each application (Wang & Dusza, 2009). When evaluating SPF value of sunscreen products in laboratory, a 2 mg cm concentration of sunscreen will be applied. However, most people use around 0.5–1 mg cm in a daily basis (Faurschou & Wulf, 2007).

Study among India community showed that around 61% of the subjects did not know about sunscreen (Agarwal et al., 2018). However, in the age group of 20-29, 54% of them had knowledge about sunscreen whereas where as 93% of the subjects of more than 60 years of age did not know about sunscreens which was consistent with a study done in China (Yan et al., 2015). Almost half or percentage of the subjects had a weekly sun exposure of two to five hours, and 81% did not experience any episode of sunburn in their lifetime. These data showed that although the practice and knowledge about sunscreens was less, the volunteers avoided going in the direct sun, due to the heat. Majority of the subjects also strongly agreed that sunscreens gave protection against UV (84%), sun damage (85%), tanning (79%), and sunburn (77%). The others data shows that the frequency of using sunscreen daily was 63%, application in the morning was done by 66%, and 78% applied sunscreen only on the face (Agarwal et al., 2018).

The knowledge on sunscreen also was assessed among medical community, specifically among doctors and pharmacists in Hospital Sultanah Nora Ismail, Johor. The data suggested that majority of the respondents were aware of the correct timing to apply sunscreen before sun exposure and the need to apply sunscreen even when working indoors. They also were well aware of the fact that sunscreen is effective in preventing sunburn, skin cancer and skin aging. However, majority of the them (56.3% doctors and 57.0% pharmacists) were unable to identify that UVB is responsible for more skin cancers

than UVA (Low et al., 2021). According to the study by (Wang & Dusza, 2009), it was reported that the participants in New Jersey did not understand the subtle but crucial differences between UVA claim for a product and the sun protection factor (SPF) value listed on the product. In terms of SPF, majority of respondents (67.2% doctors and 66.0% pharmacists) were aware of the meaning of it and chose a sunscreen based on its SPF value (Low et al., 2021).

2.3 Practice on Sunscreen Use

The sun emits harmful UV rays throughout the year. Even in cloudy weather, around 80% of UV rays can penetrate into the deep layers of the skin (Gies et al., 2018). Therefore, sunscreen needs to be used every day. Consistent use of photoprotection against sunlight is important to prevent photoaging and mainly to avoid the impact of ultraviolet (UV) rays. Photoprotection is a must-do for people, especially student who often engage with outdoor activities. The use of photoprotection in students is highly recommended as they sometimes required to always actively participate in various activities such as following social service events that require to go to the field, as well as activities that are carried out in the context of community service (Novitasari et al., 2020). However, sunscreens are often used in the wrong way or in less doses, and this behavior will allow significant DNA damage to occur (Krutmann et al., 2017). Mistakes in the practice of sunscreen usage will makes the aim of using sunscreen not optimal and not in accordance with the expected protection (Novitasari et al., 2020).

In a study conducted on 408 people in Al-Jouf region, Saudi Arabia, it was found that 64% were using sunscreen with various frequencies, whereas 36% never used sunscreen. Most of the participants preferred to use creamy sunscreens, however most of them (85.8%) use only one tube per month. Moreover, most of them think the price of

sunscreen is not affordable and do not know its type or its role in protection from UV rays. In terms of sunscreen application, almost half of the participants (49.8%) apply sunscreen before going out in less than 10 minutes and 53.6% use less than a quarter of a teaspoon and apply it to their face and hand only (47.5%). Besides using sunscreen as an alternative, they also use other methods for sun protection such as the niqab and staying in shade, avoiding going out during times with high sun intensity, and wearing sunglasses (Alshaalan et al., 2022).

A study assessed the behavior of sunscreen usage among medical students, noticed that majority of respondents have applied the right type of sunscreen but only a small proportion of respondents use the appropriate amount of it. The use of inadequate sunscreen which is less than one teaspoon for the face only, which is not enough to produce maximum protection that can be achieved by sunscreen. However, they have used sunscreen with the right frequency, which is every day. In addition, all respondents have used broad spectrum sunscreen. However, some of the respondents believe that non-broad-spectrum sunscreens are better used in daily activities. Thus, it can be indicated that most of the sunscreens scattered in the market have provided the benefits of protection against UVA and UVB (broad spectrum) radiation. Most respondents knew that sunscreens need to be reapplied once every 2 hours while outdoors, but 89.31% respondents still make mistakes in reapplying sunscreens. In fact, 50.94% of respondents said they had never re-applied sunscreen (Novitasari et al., 2020). This behavior indicates that the practice of reusing sunscreen is also influenced by the dislike of the texture of sunscreen, constraints on costs, and constraints on time (Weig et al., 2019).

Another study in Peru has evaluated the 6th Year Students' sunscreen usage. Their results indicate a poor practice of sunscreen use. Only 29.13% of the total students had adequate practices regarding the use of sunscreen. Only minority of students applied

sunscreen on cloudy days or when practicing outdoor sports. Up to 77.2% of respondents know the importance of putting on sunscreen. However, as a poor attitude, 59.84% considered sunscreen very expensive and do not have time to apply it. A qualitative local study remarked in a similar way that despite an apparent good knowledge and attitude toward SPF, its actual use is not broad and apply in their daily life. (Aliaga-echevarría & Soto-cáceres, 2018).

2.4 Sunscreen Usage

Sunscreen lotion is a type of topical preparation which contains filters that reflect or absorb radiation in the UV wavelength. It can be categorized into organic or inorganic filters. Organic filter is an aromatic compound that absorbs UV radiation and converts it to a negligible amount of heat. Example of organic filters are cinnamates and salicylates. (Sambandan & Ratner, 2011). Inorganic filters such as zinc oxide and titanium dioxide reflect and scatter UV light over a wide range of wavelengths (Al-Naggar et al., 2011; Sambandan & Ratner, 2011). A broad-spectrum sunscreen combines filters of different ultraviolet absorption spectra and functioning in UVA and UVB radiation absorption (Sambandan & Ratner, 2011). Sunscreen use is functional in preventing sunburn (Cripps & Hegedus, 1974). Evidence from randomized controlled trials suggests that sunscreen use can prevent squamous cell carcinoma (Green et al., 1999) and reduce the number of acquired nevi, which are associated with sun exposure and are a risk marker for melanoma (Gallagher et al., 2000). WHO has suggested the people to use sunscreen as simple precaution in the sun by applying a broad-spectrum sunscreen of SPF 15+ liberally and re-apply every two hours, or after working, swimming, playing or exercising outdoors (WHO, 2017). Even though numerous public health campaigns have promote the use of

sunscreen during activities in the daylight, many people are still not consistently using sunscreen as an adjunct measure for sun measure (Neale & Williams, 2022).

Studies among medical undergraduates found that the usage of sunscreen was low. Only 48.08% of subjects were using sunscreens and it was more common in females (66.6%) as compared to males (28.57%). The use of sunscreens is more in females as compared males might be due females are more concerned about their appearance and are cosmetically more aware of its usage. In addition, 41.48% of males and 13.5% females even didn't find sunscreen usage was necessary and the reason mentioned was sunlight is necessary for Vitamin D production.

The studies among pharmacy and medical student in International Islamic University Malaysia demonstrated that most of the students did not know the correct time to apply sunscreen before going out on a sunny day (Awadh et al., 2016). For optimum protection from UV radiation, one must apply sunscreen at least 30 minutes before going outdoors. The consequence of not following the proper guidelines may reduce the efficiency of the application of the sunscreen (Faurschou & Wulf, 2007). The percentage of pharmacy students who were using sunscreen (47.5%) was higher compared to the medical students (36.6%). It is associated with the fact that they had been exposed to information about sunscreen during their second year of study under the subject of nutraceuticals and cosmeceuticals. Most of the sunscreen users among the pharmacy students applied sunscreen 30 min before exposure to the sunlight (36.1%), while the medical students preferred to use sunscreen immediately before exposure to sunlight (23.8%). However, both groups use sunscreen when they are highly exposed to sun light especially at the beach and exercising. This study also found that the majority of the students chose a sunscreen based on the sun protection factor (SPF) value (Awadh et al., 2016).

2.5 Instrumentation

Instrumentation refers to the tools that investigators use to measure variables or items of interest in the data-collection process (HOLT et al., 2007). In this study, there are several instruments related to sunscreen knowledge and awareness that can be used. In a study in USA, the questionnaire was compromised of 22 questions and a total of 12 multiple choice questions were focusing on sunscreen knowledge. The knowledge was subdivided into three categories, which are basic sunscreen knowledge, sunscreen application knowledge and SPF knowledge. Each of these questions had a 'correct' response. Correct responses were coded as one and incorrect responses were coded as zero. The correct responses were summed to create a sunscreen knowledge score that range from 0 to 12 (Wang & Dusza, 2009). This instrumentation was not suitable in my research as it utilized to assess sunscreen knowledge only.

The next instrument that used in a study in Indonesia consists of 18-question that were divided into three parts. First, there were six questions that assessed socio-demographic characteristics including the influence of sunscreen usage in section A. Sections B and C were knowledge regarding the usage of sunscreen and practice of sunscreen usage, respectively. The prevalence of each answer in all questions except section A may be low, moderate or high. The scoring method in knowledge is given as high = 5 – 7; moderate = 3 – 4; low = 0 – 2. For practice, scoring marks used are as high = 5 – 6; moderate = 3 – 4; low = 0 – 2 (Awadh et al., 2016).

In Malaysia, a study regarding sunscreen usage has been conducted. The adopted questionnaire contained 26 questions that were divided into four parts, which A) socio-demographic, B) knowledge of sunscreen usage, C) attitude of sunscreen usage and D) practices of sunscreen usage. Scoring system was implemented in this study as for knowledge, scoring system was conducted for each answer given (no = 0; not sure = 0.5; yes = 1). For attitude, scoring marks used are as follows, which strongly disagree =1; disagree = 2; not sure = 3; agree = 4, strongly agree = 5. For practices, the scoring was mainly divided into no = 0 and yes = 1 (Jufri et al., 2021).

In my study, I would prefer to use the instrumentation that was applied in Indonesia as the questionnaires include the source and influence of sunscreen use that can be linked to the respondent's awareness in this research. Furthermore, the assessment of practice on sunscreen use is considered as an important element in this study as it appropriate use of sunscreen affected by the precise knowledge and awareness.

2.6 Theoretical and Conceptual Framework of the Study

Health Belief Model (HBM) has been one of the most widely used conceptual frameworks in health behavior research since the early 1950s. It was developed by social psychologists in the U.S. Public Health Service to explain the widespread failure of people to participate in programs to prevent and detect disease (Rosenstock & Ph, 1960). Later, the model was extended to study people's responses to symptoms (Kirscht & Ph, 1974) and their behaviors towards a diagnosed illness. The model helps in evaluate the nursing student's knowledge and awareness toward sunscreen usage in prevention of skin cancer as a self-care measure.

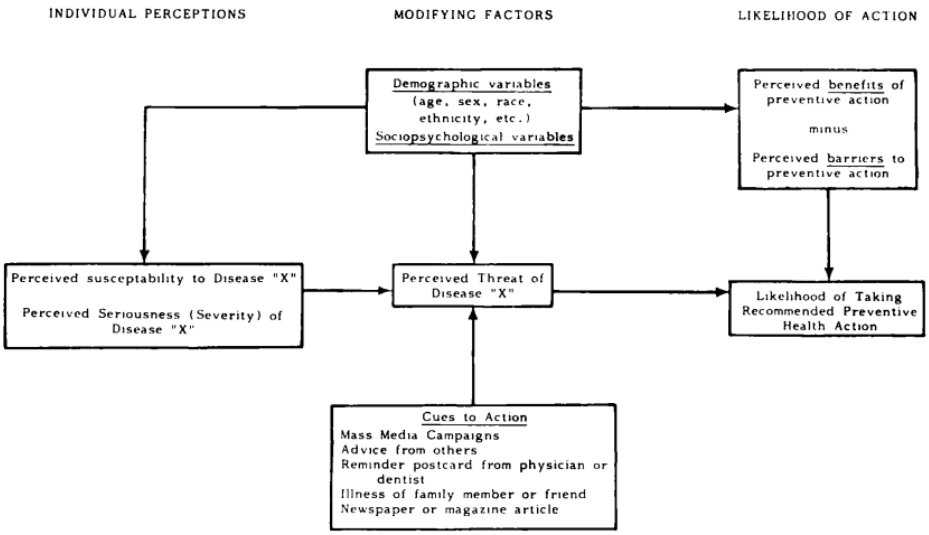

Figure 2.1 Health Belief Model Components and Linkages

The HBM contains several primary concepts that predict the reason people would take an action to prevent, to screen for, or to control illness conditions. The model constructed with perceived susceptibility, perceived severity, perceived benefit, perceived barrier, cues to action, and self-efficacy that focuses on the behavioral changes on individual's belief regarding the disease.

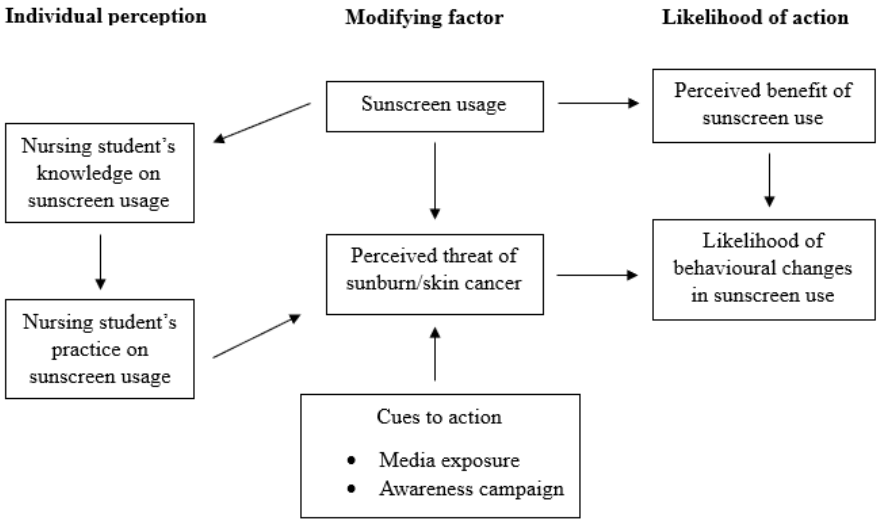

Figure 2.2 Health Belief Model (Adopted from Hochbaum et al, 1950)

CHAPTER 3: METHODOLOGY

3.1 Introduction

The aim of chapter three is to explain the approach and rationale for supporting the research methodology chosen. It is very important to determine and understand the most appropriate research design to ensure the study's purpose is correctly conveyed. This chapter contains an explanation of the design of the study and the purpose of its selection.

3.2 Research Design

The research design selected for this study was a cross-sectional study. This research design is used to investigate the measurement of outcome and the exposure of respondents at the same time based on researcher's objective.

The advantages of cross-sectional study include not costly to perform, does not require a lot of time and can be carried out at a one-time point or over a short period (Levin, 2006).

3.3 Research Location

This study was conducted in health campus of University Sains Malaysia (USM) that situated in Kubang Kerian, Kelantan.

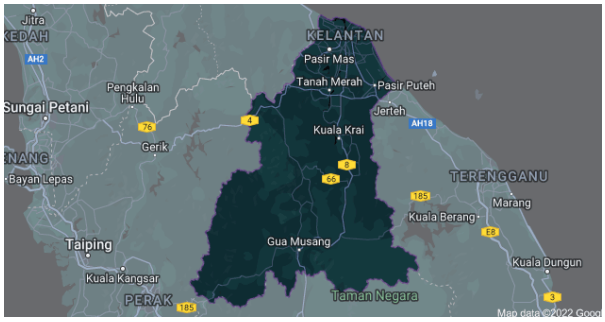

Figure 4.1 Map of study location

3.4 Research Duration

The study was conducted from October 2022 until July 2023. Data collection was from January 2023 until March 2023.

3.5 Research Population

The sample population in this study were nursing students in health campus, USM, that fulfilled the inclusion criteria. There are a total of 285 students in both diploma and bachelor program.

3.6 Subject Criteria

In order to achieve the research's objective, several criteria are set to ensure the subject's data are suitable for the research purposes and hence able to reach the targeted goals at the end of the study.

3.6.1 Inclusion Criteria

Subjects were selected as participants as they are:

- Nursing students of the School of Health Sciences, Universiti Sains Malaysia, who are from diploma (Year 1, Year 2 and Year 3) and degree (Year 1, Year 2, Year 3 and Year 4) programmes.

3.6.2 Exclusion Criteria

Subjects were excluded from this study as they are:

- Students from other programmes in School of Health Sciences, Universiti Sains Malaysia.
- Student who has been diagnosed with skin problems or disease.

3.7 Sampling Plan

3.7.1 Sampling Method

Simple random sampling method was used in this study for the data collection. The participants were selected from those who full fill the inclusion and exclusion criteria. The selection of respondents was decided by using randomizer system, which the researcher randomized the list name of nursing students. The total number of students have obtained from the Dean from School of Health Sciences USM.

3.7.2 Sample Size Estimation

The sample size of this study was determined by calculating the sample size for each research objective. The reasonable sample size was taken as the study sample size. Objective 1 and 2 used single proportion formula and the population proportion taken based on previous study conducted by Low et al., 2021 while objective 3 used double proportion formula.

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

Whereby,

n = Sample size

p = Anticipated population proportion

z = value of the desired confident level, $Z_{0.05}$ = 1.96

Δ = precision = 0.05

Objective 1:

The good knowledge of sunscreen use was 93.5% (Low et al., 2021). Thus,

$$\text{n} = \left[\frac{1.96}{0.05}\right]^2 0.935(1-0.935)$$

n = 93

After considering 20% of drop out,

93 x 20% = 19

n = 112

Therefore, total sample size for objective 1 will be 112 samples.

Objective 2:

The practice on sunscreen use is 29.13% (Aliaga-echevarría & Soto-cáceres, 2018). Thus,

$$n = \left[\frac{1.96}{0.05}\right]^2 0.2913(1 - 0.2913)$$

n = 317

Therefore, sample size from objective 1 (n = 112) was taken as the study sample as total sample size for objective 2 exceeded the total sample population.

For the third objective which, to identify the association between the knowledge of sunscreen use and practice of sunscreen use among nursing students in Universiti Sains Malaysia, the sample size was determined using two proportion formula. The prevalence of sunscreen practices by Aliaga-echevarría & Soto-cáceres, 2018 (inadequate = 70.87% and adequate = 29.13%) was used to represent the sample size population in objective 3.

$$n = \frac{[p_1\,(1-p_1) + p_2(1-p_2)](\,z_\alpha + z_\beta)^2}{(p_1-p_2)^2}$$

Whereby,

n = required sample size

p = anticipated population proportion

p_1: inadequate practice of sunscreen, 0.7087

p_2: adequate practice of sunscreen 0.2913

Zα = Value of the standard normal distribution curve cutting off probability alpha in one tail for one-sided alternatives (Zα = 1.96)

Zβ = Power of study, 80% (Zβ = 0.84)

Objective 4:

$$n = \frac{[0.7087(1-0.7087) + 0.2913(1-0.2913)](1.96+0.84)^2}{(0.7087-0.2913)^2}$$

n = 18.5

n = 19 participants per group

After considering 20% of drop out,

19 + 20% = 4

n = 23

n = 23 participants per group

n= 46 participants per 2 groups

3.8 Research Instrument

3.8.1 Instrument

The questionnaire was adopted from studies that have been carried out previously, conducted by (Awadh et al., 2016; Novitasari et al., 2020) and permission was taken from the author (refer to appendix B). The questionnaires were divided into four parts as explained as follows:

Section A: Socio-demographic data

Section A consists of sociodemographic questions including age, gender, course program and year of study.

Section B: Skin and Sunscreen information

Section B consists of questions of sunburn and skin cancer history as well as sunscreen consideration.

Section C: Knowledge of sunscreen usage

Section C consists of 7 questions for knowledge regarding sunscreen usage. It includes the knowledge on sunscreen type, frequency, amount, reapplication of sunscreen uses as well as the knowledge of SPF.

Section D: Practice of sunscreen usage

Section D consists of 6 questions of sunscreen usage practice. It includes the practice on sunscreen type, frequency, amount, reapplication of sunscreen uses as well as the knowledge of SPF.

3.8.2 Translation of Instrument

The original questionnaire was established in English. As the study population were students who are currently in tertiary education and can communicate and comprehend in English well, the questionnaire was kept in the original English version.

3.8.3 Validity and Reliability

Validity and reliability of instrument is a crucial element to ensure a good measurement in research and provide accurate an accurate result. The evidence of validity and reliability are prerequisites to assure the integrity and quality of a measurement instrument (Kimberlin & Winterstein, 2009). Validity in referred to the truthfulness of findings, whereas Reliability represented the stability of that findings (Ahmed & Ishtiaq, 2021). Reliability also estimates to evaluate internal consistency of measurement instruments and reliability of instrument scores (Kimberlin & Winterstein, 2009).

The questionnaire was sent to the experts in this field, who are nursing lecturers at Health Campus, USM, for validation and accuracy of the content of the instrument. This is also to make sure that it is suitable to measure the same aspect and the participants can understand the question. In order to ensure the reliability of the questionnaire, a pilot study was conducted among 11 students who were randomly selected from the target group. Those students will be excluded from the main study. The Cronbach's alpha has showed an acceptable reliability (α=0.70)

3.9 Variables

Table 3.1 Independent and dependent variables

Dependent variable	Independent variable
i. Knowledge ii. Practice	i. Sunscreen usage

3.9.1 Measurement of Variables and Variable Scoring

For both knowledge and practice items, the response may be high, moderate or low. '1' mark was given for each correct response and '0' mark for incorrect response. The minimum score of knowledge questions was 0 and the maximum score was 7. For practice, the minimum score was 0 and the maximum score was 6.

Table 3.2 Knowledge and practice of sunscreen usage score range

No.	Category	Score range
1.	Knowledge of sunscreen use	
	High	5 – 7
	Moderate	3 – 4
	Low	0 – 2
2.	Practice of sunscreen use	
	High	5 – 6
	Moderate	3 – 4
	Low	0 – 2