KNOWLEDGE AND PRACTICE REGARDING CONTACT LENS WEAR AND CARE AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI SAINS MALAYSIA

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SCHOOL OF HEALTH SCIENCES

UNIVERSITI SAINS MALAYSIA

2022

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by

NURUL AKMAL BINTI ASNIL KHAIRI

Dissertation submitted in partial fulfillment of
the requirements for the degree
of Bachelor of Nursing (Honours)

June 2022

CERTIFICATE

This is to certify that the dissertation entitled **Knowledge and Practice Regarding Contact Lens Wear and Care Among Undergraduate Students in Universiti Sains Malaysia** is the bona fide record of research work done by **Ms Nurul Akmal Binti Asnil Khairi** during the period from **October 2021 to July 2022** 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 a dissertation to be submitted in partial fulfillment for the degree of Bachelor of 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.

Signature

Nurul Akmal binti Asnil Khiri

Date: 14 August 2022

ACKNOWLEDGEMENTS

First, I would like to say Alhamdulillah, praise to Allah because with permission that I could finish my research as planned. Research project is a wonderful activity although very though. Being able to start this project and finished the writing have thought me the meaning of patience, time management, courage, and other good values.

I would like to express my sincere gratitude and appreciation to my supervisor, Dr. Norhasmah Mohd Zain for helping me throughout the process of preparing until completing the dissertation. I was extremely lucky to have a supervisor who give me an excellent supervision by responding to all my queries on time and providing the suggestion promptly. She also as a course coordinator for GTJ412 Nursing Research II 2021/2022. She helped me a lot in preparing the dissertation to ensure that I was on the right track and did not delay my work.

Furthermore, I would also like to thank all the participants for giving cooperation with me during the data collection periods. In addition, I want to thank my parents, Mr. Asnil Khairi Bin Jaafar for full support and encouragement, and my youngest brother, Mr. Muhammad Luqman Adli for supporting me whenever in process finishing my thesis. Their love, constant full moral support enlightens my day.

Lastly, I wish to thank all my friends especially Ms. Nurizzati Binti Manan and Ms. Nurul Syakinah Binti Masazlin who gave me a lot of help during the process of completing this dissertation for their direct or indirect help

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

Pengetahuan dan Amalan Berkenaan Pemakaian dan Penjagaan Kanta Lekap Dalam Kalangan Pelajar Sarjana Muda di Universiti Sains Malaysia

ABSTRAK

Kanta sentuh ialah kanta pembetulan optik nipis yang dipakai pada mata dan terletak pada permukaan kornea. Kanta sentuh memerlukan pengetahuan dan amalan mengenai pemakaian dan penjagaan kanta sentuh untuk mengawal pengunaan dan komplikasinya dengan berkesan. Objektif kajian ini bertujuan untuk mengetahui pengetahuan dan amalan berkaitan pemakaian dan penjagaan kanta sentuh serta faktor yang dikaitkan dengan amalan pemakaian dan penjagaan kanta sentuh dalam kalangan pelajar sarjana muda di Universiti Sains Malaysia. Reka bentuk kajian keratan rentas telah digunakan dalam penyelidikan ini. Borang soal selidik dikumpul dengan menggunakan kaedah dalam talian. Soal selidik menggunakan Borang Google telah dihantar melalui WhatsApp. Statistik deskriptif digunakan untuk menggambarkan responden dan mengenal pasti tahap pengetahuan dan amalan pemakaian dan penjagaan kanta sentuh dalam kalangan pelajar sarjana muda di Universiti Sains Malaysia. Pearson Chi-square digunakan untuk menguji perkaitan antara pembolehubah. Majoriti responden kurang pengetahuan dan amalan pemakaian dan penjagaan kanta sentuh. Hasilnya menunjukkan bahawa tiada perkaitan antara pengetahuan dan amalan pemakaian dan penjagaan kanta sentuh sebagai nilai $p > 0.05$. Keputusan kajian ini telah menunjukkan tahap pengetahuan yang tidak memuaskan dalam kalangan pelajar prasiswazah yang ditunjukkan oleh tahap pengetahuan yang lemah dan amalan yang lemah berkaitan pemakaian kanta sentuh, penjagaan dan komplikasi. Terdapat keperluan untuk lebih banyak program pendidikan, kesedaran dan tingkah laku kepada pemakai kanta sentuh terutamanya pelajar prasiswazah mengenai penggunaan kanta sentuh, penjagaan, dan komplikasi berkaitannya, yang harus disediakan oleh semua pengamal penjagaan mata primer.

Knowledge and Practice Regarding Contact Lens Wear and Care Among Undergraduate Students in Universiti Sains Malaysia

ABSTRACT

Contact lenses are thin optical correction lenses worn on the eye and rest on the cornea's surface. Contact lens requires knowledge and practice regarding contact lens wear and care to control its progression and its complication effectively. Objective of this study aims to determine the knowledge and practice regarding contact lens wear and care and factor associated with the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia. A cross-sectional study design was used in this research. The questionnaire was collected by using online method. The questionnaire using Google Form was sent through WhatsApp. Descriptive statistics were used to describe the respondent and identify the level of knowledge and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia. Pearson Chi-square were used to test the association between variables. Majority of respondents were having poor knowledge and practice of contact lens wear and care. The result revealed that there was no association between knowledge and practice of contact lens wear and care as p-value > 0.05. The results of this study have shown an unsatisfactory level of knowledge among undergraduate students indicated by poor knowledge level and poor practices related to contact lens wear, care, and complications. There is a need for more education, awareness, and behavioural program to contact lens wearers especially undergraduate students regarding contact lens usage, care, and its related complications, which should be provided by all primary eye care practitioners

CHAPTER 1

INTRODUCTION

The chapter starts with the background of the study about contact lens. Then is followed by a problems statement, research questions, research objectives, the hypothesis of the study. Finally, the operational definitions of the important terms used are described and the significance of the study.

1.1 Background of The Study

Contact lenses are thin optical correction lenses worn on the eye and rest on the cornea's surface (Muhanifa, 2015). Millions of people worldwide wear contact lenses, and these lenses are on the rise and trending. According to a survey in 2020, there is undoubtedly a significant demand for contact lenses, with over 140 million wearers worldwide (Pucker & Tichenor, 2020).

A recent survey from US Centers for Disease Control and Prevention (CDC) estimated that the prevalence of contact lens wearers in the US has risen from 40.9 million in 2015 to 45 million in 2019 (Cope et al., 2015). An estimated 8% of contact lens wearers are under 18 years old, 17% are between ages 18-24 years old, and 75% of adults ages 25 and older wear contact lenses (CDC, 2015).

In a study in Kuala Lumpur, the state's prevalence of contact lens wear among teenagers was 9.9% (Mohd-Ali & Azmi, 2021). However, the low percentage is shown due to the low response rate, but it can prove by the portion of myopic teenagers in urban areas in Malaysia has increased over the years due to wearing contact lenses (Lim, 2018).

A contact lens, which has a variety of applications, including refractive correction, therapeutic purposes, and improved cosmesis, also enhances the aesthetics of a person, has become a popular way for young people all over the world to correct the refractive defect. Contact lenses improve peripheral vision and can be used in the rain without causing discomfort. For all these reasons, a contact lens is an excellent choice for sports and other outdoor activities.

The number of individuals who wear contact lenses is growing every day, but many people are unaware of the benefits and drawbacks of wearing them. Contact lens requires knowledge and practice regarding contact lens wear and care to control its progression and its complication effectively. Education is one part of self-care that enables people who wear contact lenses to become more responsible and successful in self-managing their condition. A previous study by Tajunisah et al. (2008) on the knowledge and practice of content lens wear and care among medical students at the University of Malaya highlights that contact lens wear needs additional education on contact lens care and the consequences complication (Bhandari & Rou, 2012).

1.2 Problem Statements

Contact lens wear is prevalent, and the industry is very profitable. By 2020, the global contact lens market is expected to grow at a 6.7% annual rate to $12,476.3 million US dollars (Alipour et al., 2017). As a result, qualified contact lens practitioners distribute them, and they are sold as an ‘over-the-counter product’ in several countries. With the increasing number of contact lens usage, the number of complications due to contact lens wear increases. Therefore, contact lens wear and care that is not adhered to can lead to severe ocular complications and permanent vision loss (Loffredo et al., 2020). According to research, overall rates of non-compliance with contact lens wear have been cited in the literature as ranging from 40-91% in the past (Robertson & Cavanagh, 2011). One of the

most severe consequences in contact lens wearers is a corneal ulcer (April 2018). According to reports, 10-30% of patients with corneal ulcers, also known as corneal neovascularization was worn contact lenses (Alipour et al., 2017). In research by Brewitt (1997), poor cleanliness practices were responsible for 66% of contact lens problems (Brewitt, 1997).

Having an optimum level of knowledge and practice regarding contact lens wear and care will give the best chance of avoiding or delaying issues. Their quality of life will be impacted when they are frequently admitted to the hospital for more intensive treatment. Aside from the health implications, it also leads to a loss of production and a rise in treatment costs. Improving their knowledge and self-practice will enable them to make a more significant contribution to their care and avoid long-term difficulties.

1.3 Research Questions

1. What is the level of knowledge of contact lens wear and care among undergraduate students in Universiti Sains Malaysia (USM)?
2. What is the level of practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia?
3. Is there any association between selected sociodemographic data (age, gender, the purpose of contact lens use, and the duration of contact lens use) with the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia?
4. Is there any association between knowledge and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia?

1.4 Research Objective

1.4.1 General Objective

This study aims to determine the knowledge and practice regarding contact lens wear and care and factor associated with the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

1.4.2 Specific Objectives

1. To identify the level of knowledge of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.
2. To identify the level of practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.
3. To determine the association between selected sociodemographic data (age, gender, the purpose of contact lens uses, and the duration of contact lens use) with the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.
4. To determine the association between the knowledge of contact lens wear and care with the practice of contact lens wear and care among undergraduate students Universiti Sains Malaysia.

1.5 Hypothesis

1. $H_0$1: There is no significant association between selected demographic data and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

   H_A1: There is a significant association between selected demographic data and the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

2. $H_0$2: There is no significant association between knowledge and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

   H_A2: There is a significant association between knowledge and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

1.6 Conceptual and Operational Definitions

1.6.1 Knowledge

- The facts, information, understanding, and skills that a person has acquired through experience or education (Oxford University Press, 2019).
- In this study, knowledge is the information, facts, or familiarity towards contact lens wear and care acquired by respondents.

1.6.2 Practice

- The actual application or use of an idea, belief, or method instead of theories about such application or use (Oxford University Press, 2019).
- In this study, practice is the way a person acts towards contact lens wear and care.

1.6.3 Contact Lens

- A contact lens is a synthetic lens that rests on the surface of the eye and corrects vision disorders such as long-sightedness, short-sightedness, presbyopia (lens inability to focus), and astigmatism (blurred vision) (Muhanifa, 2015).
- In this study, a contact lens is provided as a corrective, aesthetics, or therapeutic contact lens.

1.6.4 Wear and Care

- Wear is a verb that explains using or having something over part of the body (Oxford University Press, 2019).
- Care is the process of protecting and serious attention toward someone or something and providing what that person or thing needs to prevent damage and risky (Oxford University Press, 2019).
- Guidelines for using and cleansing contact lenses, designed to optimize their healthful and safe use (Oxford University Press, 2019).
- In this study, wear and care is a way how respondents handle their lens in wearing attitude and their habit care towards contact lens.

1.7 Significance of The Study

This research reveals the knowledge and practice regarding contact lens wear and cares among undergraduate students in Universiti Sains Malaysia. This study increases the level of knowledge and practice regarding contact lens wear and cares among undergraduate students in Universiti Sains Malaysia. Several studies showed good self-practice gives good outcomes to eyes condition and prevents problems of eyes such as infection. *Ky et al* (1998) reported that 80% of contact lens complications are directly related to improper maintenance care (Ky et al., 1998). The perceptions of the people who wear contact lens behaviours are essential to minimize and prevent complications. Health education plays an important role in ensuring people who wear contact lenses receive information regarding self-care practice. This study can determine whether people had received health education regarding good self-practice from health care, providers, especially optometrist, regarding contact lens wear and care, which can also assist the person who wears contact lenses to reduce any infection and complication happening.

Furthermore, this study can also help provide appropriate health education regarding the wear and care of contact lenses. Self-evaluation of contact lens wear and maintenance knowledge can measure how well the actual contact lens instructions were delivered. Hopefully, the information gathered from this study can be used in identifying the factors associated with knowledge and practice regarding contact lens wear and care and ways to overcome the complication that occurs. On the other hand, this study's findings can be used as a baseline and reference for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter generally reviews the current literature related to knowledge and practice regarding contact lens wear and care among undergraduate students in Universiti Sains Malaysia. This chapter will also describe the conceptual framework used in this study in detail.

2.2 Contact Lens

Contact lenses are thin optical correction lenses worn on the eye and resting on the cornea's surface (Muhanifa, 2015). It provides corrective, aesthetics, or therapeutic contact lenses. These lenses are designed to adhere to the tear film, and as people blink, the lens shifts lubricated and oxygenated as a result (Walsh et al., 2019). Contact lenses are worn for a variety of reasons, including medical, cosmetic, and athletic reasons. Contact lens wearer who uses them for medical reasons accounts for a sizable proportion of the population. Contact lenses are very popular among high school and college students because they work in the same way eyeglasses incorrect vision and change the direction of light rays to focus light onto the retina properly. Around 1284, Salvino D'Armate in Italy invented the first wearable pair of eyeglasses (Rubin, 2015). Despite numerous improvements to the original model, eyeglasses remained a basic piece of technology that provided the only form of vision correction at the time. Though contact lenses appear to be a relatively new phenomenon, Leonardo da Vinci (1452-1519) of Italy created the first known sketches (in 1508) that suggested changing the optics of the human eye by directly contacting the cornea with water (Heiting, 2016). Dr. Thomas Young is credited with developing the first corneal contact lens in 1801. He made a one-quarter inch-long glass

tube filled with water and fitted it with a microscope lens on end. Wichterle and Lim's discovery resulted in the first FDA-approved soft contact lenses in the United States in 1971 (Stephens-Borg, 2019). Disposable soft contact lenses are now available and were first commercially available in 1987. These soft lenses solved hygiene issues by allowing the user to throw them away after use. The disposable contact lens was a huge success and is still the most common type today. Contact lenses today are a far cry from da Vinci's original concept. They are very comfortable and often unnoticeable for most wearers, allowing people to live freely and with excellent vision.

As a result from a previous study by Zhu et al. (2018) on the use of contact lenses among University Students in Chengdu: Knowledge and practice of contact lens wearers stated that among the 1500 students, 297 were contact lens users within the age range from 17 years to 25 years, which revealed the prevalence of contact lens use was 19.80% and the 95% confidence interval was 17.78-21.82% (Zhu et al., 2018).

2.3 Contact Lens Wear and Care

With the increasing demand of people who use contact lenses daily, contact lens wearing and caring has become an increasingly important concept. Self-care is a significant subset of activities that are an important component of preventing complications from occurring. The primary purpose of contact lenses is vision correction, which necessities various wearing and caring behaviour to control its progression and serious complications effectively. Contact lenses have been approved by the Food and Drug Administration (FDA) as safe when used according to doctor's instructions (FDA, 2018). Contact lens wearers and eye care providers both play an essential role in proper eye care. Ignoring proper contact lens care precautions exposes the wearer to various eye complications, which can result in permanent vision loss (David Mills, 2016). This

complication can be prevented with strict adherence to wear and care habits, including clean habits, clean lenses, and clean cases (CDC, 2021).

Guidelines from the Centers for Disease Control and Prevention (CDC) recommend increasing clean habits (CDC, 2021). Washing hands is very important because hygiene is one of the most critical factors in preventing infections. Before handling lenses, always rinse the hands with soap and water. Before touching contact lenses, always dry the hands thoroughly with a clean cloth. Please make sure there are no perfumes, oils, or lotions in it. They can leave a film on their hands. If they get to lenses, their eyes may become irritated, or their vision may become blurry (Kozarsky, 2021). Additionally, keep contact lenses away from all water. This is because water can introduce germs into the eyes via contact lenses. The most important thing is to remove contact lenses before swimming and to avoid showering while wearing lenses. Aside from that, unless prescribed by an eye care professional, do not sleep with contact lenses. Sleeping with contact lenses has been shown to increase the risk of an eye infection by up to 8 times (Stanborough, 2019). Contact lenses and cosmetics can be worn safely and comfortably if eye makeup is applied after contact lenses are used, and contact lenses are removed before makeup is removed.

Next, the Centers for Disease Control and Prevention (CDC) recommends increasing the number of clean lenses to avoid complications (CDC, 2021). Each time the contact lens is removed from the eye and discarded after the recommended wearing period prescribed by the eye care professional, it is cleaned, rinsed, and disinfected (Kozarsky, 2021). Clean contact lenses carefully and regularly, as directed by an optometrist. Rub the contact lenses with fingers and thoroughly rinse them before soaking them in a multifunction solution recommended by the optometrist. Avoid tap water to wash because many impurities in tap water can contaminate or damage lenses, resulting in eye infection

or injury. Besides that, each time clean and disinfect contact lenses, use a new solution. Never re-use or top-up an old key.

A clean case is also regarded as an essential aspect of wearing and caring. Contact lens cases can disinfect in a variety of ways. Some people have suggested boiling contact cases to disinfect them, but previous research from Pauline (2011), strongly advises against it. They recommend using an effective lens solution to sterile a contact lens case (Pauline, 2011). Its purpose is to ensure that the contact lens case is clean. The reason for this is that bacteria and microorganisms can produce biofilm if the environment is not clean (Copeland, 2021). After cleaning, rinsing with fresh, sterile disinfecting solutions is recommended (CDC, 2021). Do not use tap water while cleaning the case and wiping the lens case lids without using any additional cleaning methods. Lens cases should be replaced at the recommended intervals by the eye care professional.

2.4 Knowledge Regarding Contact Lens Wear and Care

Concerning contact lens knowledge, various aspects of knowledge have been assessed across various regions of the world and between different populations and groups. Among these were contact lens type, symptoms, risk factors, prevention, and treatment. In a study by Abokyi et al. (2017), among the 147 considered knowledgeable, the majority 117 (79.6%) knew that a contact lens was a small lens directly placed on the eyeball. Still, only 57 (38.8%) knew contact lens could use it to correct vision. Logistic regression analysis results show that factors associated with knowledge of contact lens wear among spectacle wearers included age ($p= 0.029$) and the number of changes of spectacle lenses ($p= 0.003$). Of the 147 who knew of contact lenses, the majority reported receiving their education mainly from sources including eye care practitioners 40 (27.2%), family/friends 33 (22.4%), and contact lens wearer 24 (16.3%). The research

found that the level of knowledge of contact lens wear by participants did not differ significantly across the different education sources (Abokyi et al., 2017).

However, in the study done by Supiyaphun & Jongkhajornpong (2021), two hundred and twenty-nine students (68.15%) had an awareness of sleeping overnight with the lens. Almost all participants had an awareness of sharing lenses with friends (95.54%), swimming with lenses (91.07%), and using tap water for cleaning or rising the lens (96.13%). Two hundred ninety-five students (87.80%) were aware of the recommendation for lens replacement. Knowing fresh lens solution every day and changing lens cases every one to three months was reported in 298 students (88.69%) and 255 students (75.89%), respectively. Two hundred sixty-four students (78.57%) had a good knowledge of contact lens wear and care (Supiyaphun & Jongkhajornpong, 2021).

Ocular health education, especially knowledge in the correct and careful practice regarding contact lens wear, can prevent complications from the wearer' inappropriate behaviour (Tajunisah et al., 2008). Furthermore, from the standpoint of public health, knowledge of contact lens risks will aid in the development of appropriate action in the prevention, detection, and treatment of contact lens-related eye infections in the population (Cope et al., 2015). According to Ibanga et al. (2017), 138 (57.02%) of study participants were aware that wearing contact lenses could result in ocular complications, while 73 (30.17%) were unaware. Thirty-one people (12.81%) did not respond to the question. As a result, greater awareness and knowledge of risk factors and symptoms are required to reduce its eye-related problem (Ibanga et al., 2017).

2.5 Practice Regarding Contact Lens Wear and Care

Contact lens risk reduction must be prioritized to manage infection in patients effectively and improve outcomes. Clean habits, lenses, and cases are essential

components of successful prevent contact lens-related eye infection control (CDC, 2021). As a result, all contact lens wearers should be educated on proper wear and care habits, such as clean habits, clean lenses, and clean cases.

The Centers for Disease Control and Prevention (CDC) recommends developing a clean habit. Hand washing is important because hygiene is one of the most important factors in infection prevention. According to a previous study by Tajunisah et al. (2008), 109 students (90.9%) washed their hands before handling contact lenses, and 102 (84.3%) claimed to adhere to contact lens cleaning and maintenance instructions strictly. Sixteen students (13.2%) also admitted to not removing their contact lenses before going to bed, which may predispose them to corneal infection (Tajunisah et al., 2008). Aside from that, a previous study found that increasing the number of clean lenses helped to avoid complications (CDC, 2021). In a study conducted by Khoza et al. (2020), most respondents (99.4%; n = 233 and 77.3%; n = 191, respectively) believed that cleaning contact lenses and contact lens cases were necessary. In terms of contact lens complications, students know the importance of cleaning the lens each time it is removed from the eye (Khoza et al., 2020).

Most ophthalmologists recommend cleaning cases daily with fresh contact lens solution and allowing them to air dry. The lens cases should be replaced every 90 days at the very least. It is important to change the storage solution because pathogen contamination is always a possibility. According to Supiyaphun & Jongkhajornpong (2021), 298 students (88.69%) and 255 students (75.89%) were aware of using lens solutions every day and changing lens cases every one to three months (Supiyaphun & Jongkhajornpong, 2021).

2.6 Association Between Knowledge and Practice Regarding Contact Lens Wear and Care

When it comes to cleaning contact lenses, most people do not so correctly. According to a recent survey, even more surprising, some people have admitted to cleaning their eyes with lemonade (Neighmond, 2012). According to a study published in the Journal of the American Dental Association (2016), lemon juice has a PH of 2.25 in comparison, the PH of the human eyes is 7.4. Anything acidic to the eyes will sting and hurt them (Camila, 2019). Besides that, according to the Oman Journal of Ophthalmology, acidic substances can also raise intraocular pressure and damage the collagen fibre and ciliary bodies in the eyes (Singh et al., 2013).

Tajunisah et al. (2008) have conducted a study as cited that even among educated and knowledgeable users, such as medical student, a lack of proper practice may increase the risk of contact lens-related complications. Educating the public about contact lens care and potential complications is an essential first step, which all contact lens manufacturers should address. The prevalence of eye complications among contact lens wearers will reduce when they follow great practice (Tajunisah et al., 2008). According to Alobaidan et al. (2018), there is a strong association between a higher of knowledge and acceptable practice in young adult compared to those older than 25 years of age, with 164 young adults having good knowledge and practice while only 115 adults older than 25 years of age having good knowledge and practice (Alobaidan et al., 2018). Apart from that, ocular health education, particularly knowledge in the correct and careful practice of contact lens wear, can help avoid complications caused by the wearer's inappropriate behaviour (Janti et al., 2014).

2.7 Factor Affecting Practice Regarding Contact Lens Wear and Care

Many factors will affect practice regarding contact lens wear and care. The factors that will be highlighted in this study are age, gender, the purpose of using contact lens and the duration of contact lenses use (year).

2.7.1 Age

In a previous study by Supiyaphun & Jongkhajornpong (2021) on contact lens use patterns, behaviour, and knowledge among University students in Thailand, the level of practice regarding contact lens wear and care was associated with age. In this study, younger people more likely to be knowledgeable have a good practice than older people. The mean age in this study was 19.2 (SD 1.4) years, with a female predominance. Younger people were more likely to remember and recall what they have thought, and most of them were college students; they remembered and recalled faster than older people. As a result, future educational interventions would be tailored to the needs of these populations (Supiyaphun & Jongkhajornpong, 2021).

2.7.2 Gender

Of the total 73 soft contact lens users included in the study, 44 (60%) were females and 29 (40%) were males. However in this study, on comparing the level of practice between gender, male participants show the higher level of practice with 93% while female with 88% compliance rate (Pradhan et al., 2017)

2.7.3 Purpose of Using Contact Lens

In this study, 290 students (83.31%) wore contact lenses to correct refractive errors, while only 46 students (13.69%) wore contact lenses for cosmetic reasons. The main reason for wearing contact lenses is to correct refractive errors, therefore they are very compliant regarding the practice of contact lens wear and care (Supiyaphun &

Jongkhajornpong, 2021). However, in a previous study by Mohd-Ali & Tan (2019), the reasons for contact lens wear were for cosmetic purposes (58.1%). Approximately, 49.9% purchased lenses from unlicensed vendors. This practice indicates an insufficient level of knowledge and practice, which probably explains why teenage wearers in this study exhibit non-compliance to contact lens wear and care (Mohd-Ali & Tan, 2019).

2.7.4 Duration of Contact Lens Use (Year)

The participants mostly wore contact lenses five days per week for 8-12 hours per day (Supiyaphun & Jongkhajornpong, 2021). Therefore, the risk increases as the duration and length of wear increase (Stapleton et al., 2021). The majority of the participants in this study, 88% had worn contact lens for more than six months, thus were experienced wearers and have good practice regarding contact lens wear and care (Zainodin & Abdul Hadi, 2020).

2.8 Theoretical Framework

The Health Belief Model (HBM) was developed in the early 1950s by social scientists at the U.S. Public Health Service to understand the failure of people to adopt disease prevention strategies or screening tests for the early detection of disease or complication (Concepts et al., 2017). The Health Belief Model (HBM) is one theoretical approach to the understanding health-promoting behaviours. Therefore, this model was deemed suitable for and chosen as the theoretical framework for this study. The health belief model is the most widely applied theory in health education and health promotion to describe change and continuity of health-related behaviours and provide a framework for health behaviour interventions (Mikhail, 1981).

Health Belief Model consists of four constructs: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. It proposes that if people's

perceived susceptibility is high, they will take preventive measures to reduce the risk and avoid illness. In terms of perceived severity, people believe the condition can cause serious consequences and how it affects their lives. Furthermore, people will change their behaviours if they believe that a particular course of action will reduce susceptibility or severity or lead to other positive outcomes, which we refer to as perceived benefits. Finally, people perceive a few negative attributes related to the health action that would discourage the desired behaviour change as perceived barriers (Boskey, 2016).

The model theorises perceived risk, also known as risk susceptibility, as an important construct for explaining health behaviour. Behavioural and social science theories provide a framework for understanding why people engage in health-protecting, health risking, and health-compromising behaviour. To that end, theory development and application are beneficial for comprehending factors that influence the adoption or maintenance of health behaviours, particularly when used to plan, implement, and evaluate health promotion programs (Fernandez et al., 2019). Individual, familial, social, and cultural factors all impact participation in health promotion behaviours (U.S. Department of Health and Human Services, 2018).

By using the Health Belief Model, this study investigates modifying factors such as age, gender, the purpose of use, and duration of contact lens use (year), as well as knowledge and practice regarding contact lens wear and care among Universiti Sains Malaysia undergraduate students. Furthermore, the Health Belief Model can investigate whether it moderated the relationship between the variable mentioned earlier and knowledge and practice regarding contact lens wear and care. This exploratory study will be conducted to determine the knowledge and practice regarding contact lens wear and care and factor associated with knowledge and practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia. For outcome, the participants

will give either good or poor knowledge and practice regarding contact lens wear and care. Overall, this concept is available to determine the knowledge and practice regarding contact lens wear and care among undergraduate students in Universiti Sains Malaysia.

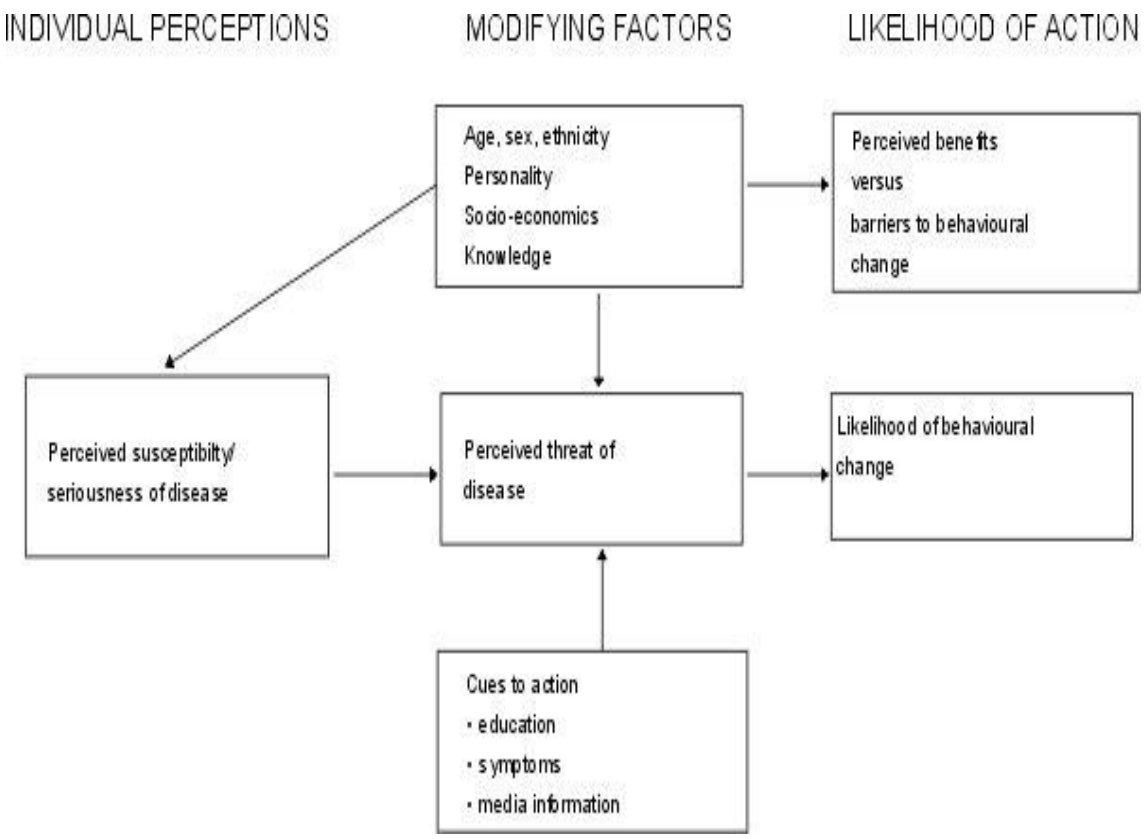

Figure 2.1: The Health Belief Model adopted from Bruce et al. (2018)

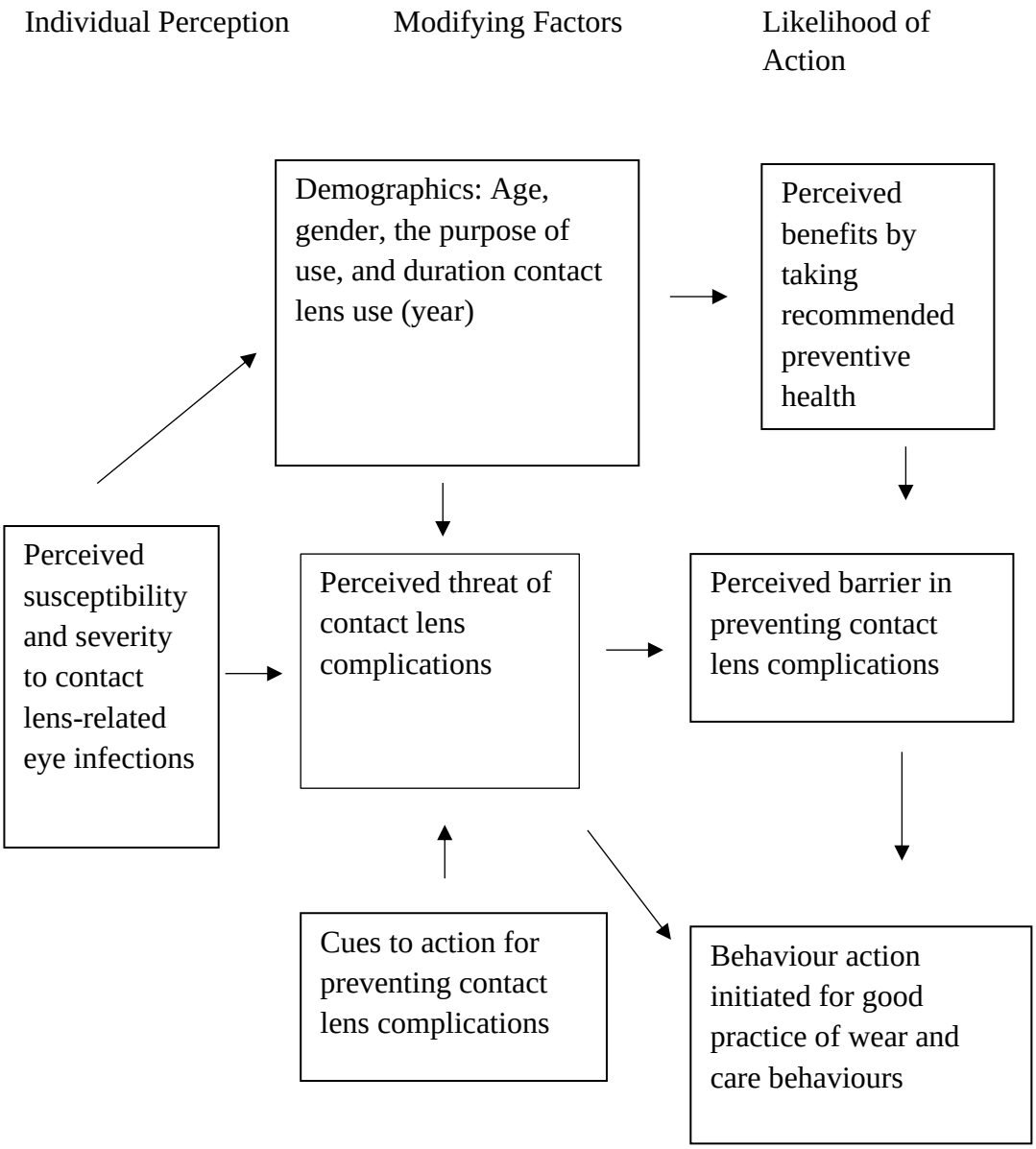

Figure 2.2: Conceptual Framework of The Study for Knowledge and Practice Regarding Contact Lens Wear and Care adopted from Livi et al. (2017)

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this section, research methodology such as research design, research duration, sampling plan, instrumentation, data analysis, expected outcome of the study and ethical consideration are discussed.

3.2 Research Design

A cross-sectional study design was used in this research. The defining feature of a cross-sectional study is that it can compare different population groups at a single point in time. The rationale and justification for using a cross-sectional study design are that this study design allows researchers to compare many different variables at the same time. For example, we could look at age, gender, school, year of study, the purpose of use, regularity of contact lens use, and duration of contact lens use (year) (Cherry, 2019).

3.3 Study Setting and Population

The study was conducted in three campuses of Universiti Sains Malaysia: the main campus in the island of Penang, a health campus in Kelantan, and engineering campus in Nibong Tebal. This study was conducted from October 2021 to July 2022. The target population of this study was undergraduate students in Universiti Sains Malaysia who wear contact lenses or ever experienced wearing contact lens.

3.3.1 Inclusion criteria

The inclusion criteria for this study were undergraduate students in three campuses in Universiti Sains Malaysia which fulfil the following criteria:

- Aged 18 years or above

- Wear contact lens or ever experienced wearing contact lens

3.3.2 Exclusion criteria

The exclusion criteria for this study were a student that

- Have a history of eye problem (Students who once had eye problems history tend to have more knowledge about eye care)

3.4 Sampling Plan

3.4.1 Sample Size Estimation

The sample size for objectives 1 and 2 is estimated using a single proportion formula taken based on a previous study conducted by Tajunisah et al. (2008).

$$n = [Z / \Delta]^2 \, p \, (1 - p)$$

From Single Proportion Formula:

Where,

n = Minimum required sample size

Z = 95% confidence interval (CI) = 1.96

Δ = Precision = 0.05

P = Anticipated proportion

Next, the sample size for the third objectives is estimated by using the two proportions formula. Objective 3 is calculated based on a previous study conducted by Bhandari & Rou (2012)

$$n = \frac{p1\,(1 - p1) + p2\,(1 - p2)\,(z\alpha + z\beta)^2}{(p1 - p2)^2}$$

From Two Proportions Formula

Where,

n = sample size

p = anticipated population proportion

α = level of statistical significance

1 – β = power of the study

Meanwhile, the objectives 4 is estimated by using sample size calculator in website (Arifin, 2021).

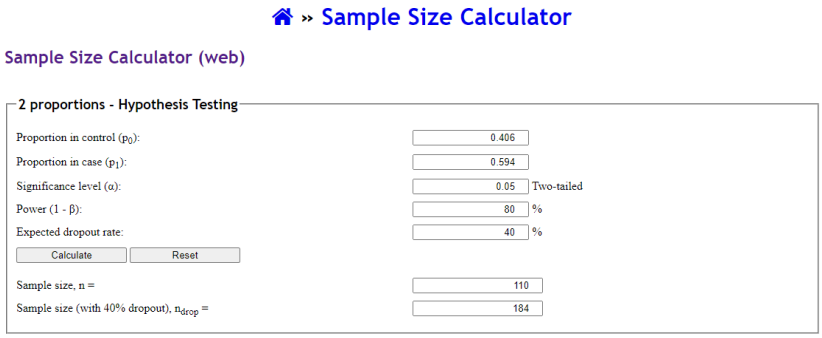

Table 3.1: Sample Size Estimation

Objectives	P	Δ	*z*	n (sample size)	n + 40% non-response rate	Reference
1. To identify the level of knowledge of contact lens wear and care among undergraduate students in Universiti Sains Malaysia	0.88	0.05	1.69	162	227	(Tajunisah et al., 2008)
2. To identify the level of practice regarding contact lens wear and care among undergraduate students in Universiti Sains Malaysia	0.91	0.05	1.69	126	176	(Tajunisah et al., 2008)
3. To examine the association between selected sociodemographic data with the practice of contact lens wear and care among undergraduate students in Universiti Sains Malaysia	P1: (Male population proportion who have good practice regarding contact lens wear and care) = 0.06	0.05	1.96	58	81	(Bhandari & Rou, 2012)

	P2: (Female population proportion who have good knowledge regarding contact lens wear and care = 0.24					
4. To examine the association between the knowledge of contact lens wear and care with the practice of contact lens wear and care among undergraduate student in Universiti Sains Malaysia	P1: (Students who have good knowledge) = 0.406 P2: (Students who have good practice) = 0.594	0.05	1.96	110	184	(Raja Lexshimi et al., 2020)

Therefore, for this study, 227 undergraduate students in Universiti Sains Malaysia were invited to participate in this study.

3.4.2 Sampling Method

This study was used convenience and snowballing sampling methods for the collection of data among undergraduate students in USM. A representative of the class or student from various school in USM was approach and the advertisement were hand over