INTER-CAMPUS COMPARISON OF UNDERGRADUATES' HEALTH LITERACY AND ASSOCIATED FACTORS IN UNIVERSITI SAINS MALAYSIA (USM)

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by

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CERTIFICATE

This is to certify that the dissertation titled Inter-Campus Comparison of Undergraduates' Health Literacy And Associated Factors in Universiti Sains Malaysia is the bona fide record of research work done by Mr Tee Hong Zhen during the period of from October 2023 to July 2024 under my supervision. I have read this dissertation and in my opinion it conforms to acceptable standards of scholarly presentation and is fully acceptable, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Nursing (Honours).

DECLARATION

I hereby declare that this dissertation is the result of own investigation, except when otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any 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

Covid-19	Coronavirus Disease 2019
HLS	Health Literacy Survey
HLS-EU-Q47	European Health Literacy Survey Questionnaire
HLS-SF12	Health Literacy Short-Form 12
NVS	Newest Vital Sign
USM	Universiti Sains Malaysia
RSES	Rosenberg Self-Esteem Scale

Perbandingan Literasi Kesihatan Di Antara Kampus Dalam Kalangan Prasiswazah Universiti Sains Malaysia

ABSTRAK

Literasi Kesihatan merupakan keupayaan seseorang untuk mencari, memahami, menilai dan mengamalkan sesuatu maklumat kesihatan dalam aspek-aspek penjagaan kesihatan, pencegahan penyakit and promosi kesihatan. Terdapat banyak kajian yang menunjuk bahawa tahap literasi kesihatan yang buruk berkaitan dengan tahap kesihatan yang buruk. Kajian ini bertujuan untuk menentukan dan membanding literasi kesihatan prasiswazah dalam kalangan Kampus Induk, Kampus Kesihatan dan Kampus Kejuruteraan serta mengenalpasti kewujudan kaitan antara ciri-ciri sociodemografik dan nilai harga diri dengan literasi kesihatan. Bagi mencapai tujuan ini, kajian telah menggunakan reka bentuk kajian keratan rentas dan responden telah dicapai melalui aplikasi sosial media. Sejumlah 357 maklum balas diperolehi. Statistik deskriptif telah digunakan bagi menggambarkan responden dan mengenalpasti tahap literasi Kesihatan responden. Ujian *one way ANOVA* digunakan bagi membanding tahap literasi Kesihatan antara kampus manakala ujian *Pearson's Chi-Square test* digunakan untuk mengenal pasti keadaan kaitan antara ciri-ciri sociodemografak yang terpilih dan nilai harga diri dengan literasi kesihatan. Hasil kajian menunjuk bahawa tahap literasi kesihatan dalam kalangan prasiswazah USM adalah sederhana (mean markah indeks 33.85 dari 50) dan hampir separuh (44.3%) mempunyai tahap literasi kesihatan terhad. Ia juga menunjuk bahawa tahap literasi kesihatan dalam kalangan prasiswazah Kampus Kesihatan lebih tinggi berbanding prasiswazah Kampus Induk. Malah, hasil kajian menunjuk terdapat kaitan antara nilai harga diri dengan tahap literasi kesihatan (p=0.007). tetapi tiada kaitan antara jantina, kaum, pendapatan keluarga dan tahun pengajian dengan literasi kesihatan. Pemberian

fokus yang lebih tinggi kepada kesihatan dan intervensi pendidikan boleh membantu meningkatkan tahap literasi kesihatan prasiswazah.

Inter-Campus Comparison of Undergraduates' Health Literacy And Associated Factors in Universiti Sains Malaysia (USM)

ABSTRACT

Health literacy is the ability to seek, understand, evaluate and act on health information in three subdomains of healthcare, disease prevention and health promotion. Many studies have shown that poor levels of health literacy are associated with poor health outcomes. This study sought to determine and compare health literacy among USM's Main Campus, Health Campus and Engineering Campus, and identify the presence of association between selected sociodemographic characteristics and self-esteem with health literacy. To that end, this study utilised a cross-sectional study design and respondents were recruited via social media applications. An explanation of the study and a link to a Google form containing the questionnaire were given. A total of 357 responses were obtained. Descriptive statistics were used to describe the respondents and obtain the level of health literacy they have, one-way ANOVA was used to compare health literacy among campuses, and Pearson's Chi-Square test was used to determine the presence of associations between selected sociodemographic characteristics and self-esteem with health literacy. Study results indicated that health literacy among undergraduates is moderate (mean index score of 33.85 out of 50) and that close to half the respondents (44.3%) had limited health literacy. It also showed that respondents from the Health Campus had better health literacy from the Main Campus. There was an association between self-esteem and health literacy ($p=0.007$) but no association between sex, ethnicity, household income and year of study with health literacy. A greater focus on health in general as well as health literacy education intervention are appropriate to help improve undergraduates' health literacy.

CHAPTER 1
INTRODUCTION

1.1 Introduction

This section will serve as an introduction and start with the study background, problem statement, research questions, research objectives and research hypotheses before moving on to operational definitions and significance of the study.

1.2 Study Background

Health literacy is the capability to seek, understand, evaluate and act on health information in the three domains of healthcare, disease prevention and health promotion (Sørensen et al., 2012). Consequently, good health literacy is linked to better health outcomes as people become more likely to be more mindful in maintaining and elevating health; seek healthcare in earlier stage of diseases due to increased awareness of signs and symptoms such as breast cancer; be more adherent to medication regimen and less likely to default on follow-up appointments; utilise health-related initiatives more like mammograms screening and smoking-cessation; and overall make well-informed choices in taking charge of their health in parts of their life such as diet and physical activity. Conversely, poor health literacy is negatively associated with health (Jayasinghe et al., 2016).

However, poor health literacy is a common theme across the globe and even developed countries such as Germany are not exempt with 46% of the German population found to have limited health literacy (Sørensen et al., 2015). Other studies found that 31.7% of hospital users in Brazil and 79.6% of older adults in Iran have limited health literacy (Apolinario, Mansur, Carthery-Goulart, Brucki & Nitrini, 2014; Javadzade, Sharifirad, Radjati, Mostafavi, Reisi & Hasanzade, 2012).

Furthermore, university students and even those enrolled in health-related courses are also mostly found to have poor health literacy. 30.8% of nursing students in a Spanish university had problematic or inadequate levels of health literacy while more than 50% of students in a Hungarian university had limited health literacy in most subindexes (Bánfai-Csonka, Bánfai, Jeges, & Betlehem, 2022; Juvinyà-Canal, Suñer-Soler, Boixadós Porquet, Vernay, Blanchard & Bertran-Noguer, 2020).

Thus, the associated factors of poor health literacy are a topic of interest as it allows for the identification of population groups in which limited levels of health literacy is prevalent. Sex, age, financial status, parent's education, field of study, education level, ethnicity, nationality, self-esteem and language proficiency have all been implicated in previous studies (Bánfai-Csonka et al., 2022; Bhusal, Paudel, Gaihre, Paudel, Adhikari & Pradnan, 2021; Jaafar et al., 2021; Rababah, Al-Hammouri, Drew & Aldalaykeh, 2019; Pandey et al., 2021; Sørensen et al., 2015).

Nations have acted to address the high prevalence of limited health literacy with diverse national strategies to improve health literacy in their population with Australia publishing a national statement on health literacy in a call for more action to improve health literacy (Australian Commission on Safety and Quality in Health Care, 2014; Nutbeam, McGill & Premkumar, 2018). The list of countries includes Malaysia (Economic Planning Unit, 2021). Yet, studies on health literacy in Malaysia remains scarce.

1.3 Problem Statement

Low health literacy is associated with a host of effects that are altogether detrimental to health. Jayasinghe et al. (2016) provide a few examples, including generally being unhealthy, being less likely to comprehend health information, taking

charge of their health less, being more likely to present in the later stages of disease, utilising health resources more and having higher mortality. Diabetes and cancer are good examples to illustrate these effects: presentation with late-stage breast cancer due to a lack of self-examination of usage of free screening tools, or non-compliance with medication or lifestyle changes due to poor health literacy, leading to a host of complications including retinopathy, nephropathy, weakened immune system and so on. Additionally, those with poor health literacy are more likely to only seek healthcare when they become sick rather than utilising preventive health services; and are more likely to find navigating the healthcare system confusing and daunting, leading to further stress, disorientation and discontinuity in care (Griese, Berens, Nowak, Pelikan & Schaeffer, 2020; Ying, Ming, Said, Yusof & Mohd-Dom, 2015). Good health literacy, meanwhile, is established to be beneficial educationally, mentally and economically in addition to its health benefits (McDaid, 2016; Rababah, Al-Hammouri & Drew, 2020).

A few other phenomena further accentuate the importance of promoting health literacy. They include lower birth rate, an increase in the elderly population, understaffing and underinvestment in healthcare, the rise of non-communicable disease prevalence and burden, and global threats to health including climate change among others (Cristea, Noja, Stefea & Sala, 2020; Goh, Azam-Ali, McCullough & Roy Mitra, 2020; Hermsen, MacGeorge, Andresen, Myers, Lillis & Rosof, 2020; Nargund, 2009; World Health Organisation, 2020; World Health Organisation, n.d.). A common feature of all of these is that they can be addressed in some ways through health literacy promotion, be it via better self-care and preventive health behaviours, disease prevention, and greater awareness and consciousness among society (Fernandez, Larson & Zikmund-Fisher, 2016; Global Self-Care Foundation, 2022; RobatSarpooshi, Mahdizadeh, Alizadeh Siuki, Haddadi, Robatsarpooshi & Peynan, 2020).

Health literacy plays an important role here as a determinant of health that is responsive to interventions, presenting improving health literacy as a way to help cope with rising challenges in healthcare (Global Self-Care Foundation, 2022; Sørensen et al., 2021). A few studies have looked at interventions to increase health literacy and found them to be effective (Gibson, Smith & Morrison, 2022; Saunders, Palesy & Lewis, 2018; Visscher et al., 2018). Health professionals play an important role here and where health professionals are concerned, a novel study showed that those with a high health literacy tend to have positive attitudes toward health literacy promotion and use special communication techniques to improve communication (Mor-Anavy, Lev-Ari & Levin-Zamir, 2021). Additionally, general healthcare staff can also be provided education on other areas of health such as oral health to help in promoting comprehensive and holistic care (Ying et al., 2015). All in all, the World Health Organisation Regional Office for Europe succinctly describes the importance of health literacy: it benefits a person's current health, future health and the health of future generations.

Yet, before interventions can be planned, information on groups to be targeted is needed. While interest in health literacy in Malaysia has increased in the past decade consistent with other countries, data yet remain scarce. Doubly so for university students. A review found that up till November 2019, there were only 29 studies that related to the health literacy of Malaysians (Abdullah, Liew, Salim, Ng & Chinna, 2020). Of them, only 5 involved university students and 2 related to general health literacy.

There is thus a dearth of information studies on health literacy involving university students in Malaysia. This is where this study and its results will come into play, whereby by comparing how health literacy and its three domains differ between the different campuses, it provides a snapshot of how campus dynamics can influence health literacy. It will also enable the identification of at-risk population via investigating the

presence of associations between selected characteristics such as age, gender, year of study, household income and self-esteem. Self-esteem in particular is significant for how neglected it is in the field of health literacy research despite its potential importance in the field (Rüegg, 2022).

1.4 Research Questions

Research questions for this proposal are:

i. Is there any difference in health literacy level among undergraduate students studying at the Main Campus, Health Campus and Engineering Campus?
ii. What is the level of self-esteem among undergraduate students in USM?
iii. Is there any association between specific sociodemographic factors and self-esteem with health literacy for undergraduate students of USM?

1.5 Research Objectives

1.5.1 General Objective

The general objective of this study is to compare health literacy levels among undergraduate students at the Main Campus, the Health Campus, and the Engineering Campus of USM and determine the associations between selected sociodemographic factors and self-esteem with health literacy.

1.5.2 Specific Objectives

i. To compare the health literacy level of undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus
ii. To determine the level of self-esteem among undergraduate students in USM
iii. To determine the association between selected sociodemographic factors and self-esteem with health literacy among undergraduate students in USM

1.6 Research Hypothesis

Hypothesis 1	(H_0):	There is no significant difference in health literacy level among undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus.
	(H_1):	There is a significant difference in health literacy level among undergraduates studying at the Main Campus, the Health Campus and the Engineering Campus.
Hypothesis 2	(H_0):	There is no association between selected sociodemographic factors with health literacy level among undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus.
	(H_1):	There is an association between sociodemographic factors with health literacy level among undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus.
Hypothesis 3	(H_0):	There is no association between self-esteem and health literacy level among undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus.
	(H_1):	There is an association between self-esteem and health literacy level among undergraduate students studying at the Main Campus, the Health Campus and the Engineering Campus.

1.7 Conceptual and Operational Definitions

Conceptual and operational definitions for terms used in this study are as follow:

Table 1.1: Conceptual and operational definitions for this research proposal

	Conceptual definition	Operational definition
Health Literacy Level	Health literacy is the capability to seek, understand, evaluate and utilise health information (Sørensen et al., 2012).	In this study, health literacy is the index score obtained from transforming the mean point from the 'Health Literacy Short-Form 12' (HLS-SF12) survey instrument into an index score (Duong et al., 2019). A higher score represents good heath literacy and vice versa (range of index score: 0-50)
Undergraduates	An undergraduate is a person at an institute of higher education studying for their first bachelor's degree (Merriam-Webster, 2023a).	In this study, undergraduate will refer to Malaysians studying for their first bachelor's degree full-time at either the Health Campus, the Main Campus or the Engineering Campus of USM.
Inter Campus	Inter means between while campus means the 'grounds and buildings of a university, college, or school' (Merriam-Webster, 2023b; Merriam-Webster, 2023c).	In this study, inter-campus refers to 'between the Main Campus, the Health Campus and the Engineering Campus of USM'.

1.8 Significance of Study

The findings of this study will determine and compare the health literacy level of undergraduate students at the Main Campus, the Health Campus and Engineering Campus

and their associated factors, potentially highlighting any disparities. This study will allow for the identification of low or high health literacy levels among the students and the associated factors of it. Different studies have reported slight differences in the associated factors of health literacy and here, doing a comparison among campuses for USM will allow for the identification of if and how campus dynamics – examples include campus culture, housing condition, accessibility and familiarity to healthcare, and field of studies – of a particular university influences the health literacy level of the respective campuses' students (Evans, Anthony & Gabriel, 2019). Despite feasibility and manpower issues limiting the scope of campus dynamics that can be obtained for this study such as field of study (which in USM is equivalent to the campus), the data obtained from this study will still be illuminating and can be used by university faculty members, government officials and stakeholders to understand the health literacy situation in a Malaysian public university and plan accordingly.

In all three campuses, good health literacy will lead to better health, potentially better academic achievement and better policymaking in the future. For the health campus, health literacy training is doubly important as all undergraduates there are studying in health-related courses, allowing for good communication, and greater confidence and competence in providing health education for patients in the future, not to mention it is related to their attitude toward health literacy promotion. This study can also be used as a guide for future studies on health literacy in USM or other universities in Malaysia and to plan for more effective training and education measures to enhance health literacy as any discrepancies between the campuses can be reasonably attributed to the field of study. Only one study related to health literacy was conducted in USM before. However, the study was on mental health literacy and was conducted among non-medical students in 2010, before the Covid-19 pandemic which has greatly impacted lives and how people

view health (Khan, Sulaiman, & Hassali, 2010). Additionally, social and technological trends present day are vastly different than from a decade ago. Therefore, an inter-campus comparison that will allow for robust analysis is appropriate and timely.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This section concerns literature reviews and will provide an overview of the research that has been done in areas that are related to this study. They include heath literacy, consequences of health literacy, associated factors of health literacy, health literacy research in Malaysia and health literacy among university students. Lastly, this section will provide the conceptual framework that will be the basis for this study.

2.2 Health Literacy

Health literacy is a topic that has become widely studied in the past decade or so. A simple search with the term 'health literacy' on PubMed illustrates this, with results going from just 96 in 2005 to 436 in 2010 and 2,562 in 2022. Congruent with the increased interest in it, many definitions have been attached to it; A review in 2016 counted more than 200 different definitions (Malloy-Weir, Charles, Gafni & Entwistle, 2016).

No single definition exists but one that is commonly used is that health literacy is the capability to seek, understand, evaluate and act on health information in the three domains of healthcare, disease prevention and health promotion (Sørensen et al., 2012). Accordingly, it consists of 4 aspects (to access, to understand, to appraise and to apply) against 3 domains (healthcare, disease prevention and health promotion), giving rise to 12 subdimensions. Taking disease prevention for example, the 4 aspects would become 'to access information on risk factors for health' for access, 'to understand information on risk factors and derive meaning' for understanding, 'to interpret and evaluate information on risk factors' for evaluation/appraisal, and 'to make informed decisions to protect against risk factors for health' for application (The HLS$_{19}$ Consortium of the WHO Action Network M-POHL, 2021).

The ‘European Health Literacy Survey Questionnaire’ (HLS-EU-Q47), the corresponding questionnaire to Sørensen et al.’s 2012 definition, and variants are thus frequently used to obtain health literacy scores and rates (Sørensen et al, 2013). A systematic review found that in Portugal, the HLS-EU-Q47 and its variants were used the most of all health literacy instruments together with the ‘Short Assessment of Health Literacy’ (SAHL) questionnaire whereas another systematic review noted that close to 20 versions of the HLS-EU-Q47 exist and has been used all over Asia and Europe (Barros, Santos & Santos-Silva, 2022; Tavousi et al., 2022). More convincingly, a more global systematic review found that the HLS-EU-Q47 was translated and used in more countries, and was used the most, demonstrating its potential universality (Tavousi et al, 2022).

The increase in interest in health literacy has generated more data on health literacy such as its association with health, the prevalence of poor and good health literacy factors associated with it. Many nations – developing nations in particular – have poor health literacy levels in their populace. Up to 80% of Iranians and 47% of Europeans have limited health literacy (Kamal, Basakha & Sajjadi, 2018; Sørensen et al., 2015).

An important finding is that health literacy is a determinant of health that is responsive to interventions (Sørensen, Levin-Zamir, Duong, Okan, Brasil & Nutbeam, 2021). In response to this, nations in America, Europe and Asia have all acted to address low health literacy (Nutbeam et al., 2018, Economic Planning Unit, 2021). Sørensen et al. (2021) lists some of the policies and planning undertaken by nations, including those of Austria, the US, Germany, Portugal and Scotland such as making health information more accessible, engaging stakeholders with town hall meetings, making the health-system overall less daunting, empowering all people regardless of age and making health literacy a standard of healthcare. On this, The HLS$_{19}$ Consortium of the WHO Action Network M-POHL (2021) in their international report recommends for longitudinal

studies on health literacy, targeted interventions for at-risk groups, prioritisation for specific, concrete health literacy tasks that are experienced as being harder and improving the quality of health information in the mass media.

For Malaysia, the nation plans to introduce a national policy to improve understanding on health information and services, to appoint individuals as agents and health icons to promote more awareness and develop a surveillance program for health literacy (Economic Planning Unit, 2021).

2.3 Consequences of Health Literacy

Physical activity is an example of the consequences of health literacy. It is beneficial cognitively, physically and mentally (Ruegsegger & Booth, 2018). It can help with metabolic syndrome, thus lowering the risk of getting many non-communicable diseases (Alamnia, Tesfaye, Abrha & Kelly, 2021). Even against cancer, it is beneficial; results are consistent that physical activity helps with preventing cancer, enhances survival rate and improves quality of life (Burke, Wurz, Bradshaw, Saunders, West & Brunet, 2017; McTiernan et al., 2019).

On this, robust evidence shows that health literacy can be employed to help with this, with a meta-analysis showing that increasing health literacy could potentially help with empowering older people to exercise (Lim, van Schooten, Radford & Delbaere, 2021). But less physical inactivity is just one aspect of good health literacy. If the health benefits from physical activity is considered massive, then the health benefits associated with good health literacy are even more massive. Literature has identified several ways how this might come to be.

One way is through increased self-care and participation in healthcare (Brabers, Rademakers, Groenewegen, van Dijk & de Jong, 2017; Hermsen et al., 2020). When

patients have more health literacy, that is, when they understand more about health and feel empowered, they become more able to take charge of their health and better equipped to participate in their healthcare such as getting involved in shared decision-making with their healthcare provider and understanding the risks, benefits and the rationale for their treatment. This will help with satisfaction as the patient will feel like they are not just passive receivers, reduce anxiety as they understand what is going on and know what to expect in their course of treatment, and increase adherence to treatment because they were involved in the decision-making and understands the importance of sticking to their treatment plan. All this helps to improve health outcomes when seeking treatment by elevating satisfaction, improving mental health, supporting self-care and aiding in the early identification of any adverse effects. Additionally, treatment adherence, particularly with antibiotics, will help with ensuring the full regimen is undertaken, helping with antimicrobial resistance. For this, health literacy is important so that an adequate understanding on antibiotic use on the side of the patient is established (Hermsen et al., 2020). Moreover, good health literacy might have a role in reducing antibiotic use, providing another pathway for health literacy to act on antimicrobial resistance.

Another way good health literacy is associated with good health outcomes is through vaccination. Vaccination is a good and cost-effective way of protecting against infectious diseases. Even against Covid-19, vaccines remain effective though protection decreases with time (Centre for Disease Control and Prevention [CDC], 2022). Yet, vaccine hesitancy remains a problem. Misinformation like conspiracy theories, super-focusing on potential adverse effects and downplaying of the disease itself (“Microchips!” “Myocarditis!” “It’s just a cold!”) all contribute to vaccine hesitancy and this false belief can still linger even after being corrected (Bolsen & Palm, 2022; Lee, Sun, Jang &

Connelly, 2022). Health literacy promotion presents a way of reducing vaccine hesitancy (Zhang, Li, Peng, Jiang, Jin, & Zhang, 2022).

Moreover, good health literacy is associated with disease prevention and early detection. Health literacy is associated with a healthy lifestyle such as physical activity, a healthy diet, not smoking, adequate sleep duration and moderation in drinking (Yokokawa, Yuasa, Sanada, Hisaoka & Fukuda, 2015). Together, they act as a protective barrier against many non-communicable diseases. Health literacy is also associated with preventive behaviours like mask-wearing, hand-washing and social distancing in the recent Covid-19 pandemic, demonstrating that even with communicable diseases, health literacy is important, it being associated with less infection and thus less presentation with disease and healthcare burden (Nguyen et al., 2020). For early detection, higher health literacy is associated with mammogram screening in females, better recognition of signs and symptoms of disease and more effective communication between patients and their healthcare providers (Komenaka et al., 2015; Magnani et al., 2018).

For children, health literacy is similarly very important. Childhood is part of a child's formative years where habits are formed. Health literacy intervention from young helps in developing healthy lifestyles while avoiding smoking and drugs in their formative years which will last till adulthood (McDaid, 2016). Healthy eating and physical activity while young predict healthy eating and physical activity in adulthood. More health information will empower children and build confidence in them, thus building resilience and allowing them to withstand peer pressure. Physical activity, in addition, is associated with greater cognitive function, which in turn has a considerable influence on employment and health at adulthood (McDaid, 2016).

Next, health literacy is also associated with uptake or participation in health-related changes. This is illustrated in a study in Kenya by Raufman et al. (2020) that looks at why adoption of cleaner and cleaner cookstoves remains low despite the household air pollution associated with the use of solid fuel stoves. The results suggest that health literacy might need to be considered in the implementation.

Lastly, among the ranks of health professionals, health literacy is important too. Mor-Anavy et al. in their novel research in 2021 examine health literacy on the part of health professionals and the attitude thereof. Their results indicate that the level of health literacy is associated with the attitude of the health professional toward health literacy promotion, and that the attitude toward health literacy promotion is associated with the use of communication techniques to improve understanding among patients with poor health literacy.

For poor health literacy, outcomes associated with it include being unhealthy, being less likely to comprehend health information, taking charge of their own health less, being more likely to present with later stage diseases, utilising health resources more and having higher mortality (Jayasinghe et al., 2016).

2.4 Associated Factors of Health Literacy

Across the many literatures of health literacy, sociodemographic information of respondents was taken and invariably found to be associated with health literacy. In addition, self-esteem was also found to be implicated in levels of health literacy. The following two sections will detail these two associated factors.

2.4.1 Sociodemographic Variables

A sociodemographic variable is the personal characteristics that can be used to group people (DataPlanet, n.d.). It includes age, sex, financial status, education, race and

ethnicity. All of these and others have been implicated in studies looking at the associated factors of health literacy though some are less often looked at and some are sometimes found to not be associated with health literacy.

Sørensen et al.'s (2015) international survey provides strong evidence that low financial status, low educational level, old age and being male is associated with worse health literacy while Jaafar et al.'s (2021) shows ethnicity and occupation are also associated with health literacy (Sabahan and Sarawakian indigenous people, and the unemployed have a higher prevalence of limited health literacy). A few other studies focusing on university students further found that, nationality, field of study, year of study and parents' highest educational attainment also plays a role in health literacy wherein foreign students, non-health related courses, lower year of study and parents with lower education attainment were associated with higher prevalence of limited health literacy (Bánfai-Csonka et al., 2022; Evans et al., 2019). Another aspect of health literacy that is frequently neglected is general literacy, the ability to read, write, talk and listen (UCL Institute of Health Equity, 2015). As shown by Pandey et al. (2021), inadequate proficiency in a language massively impedes a person's ability to understand information in that language. Immigrants in particular are susceptible to this.

These associated factors are not mutually exclusive and can in fact be related to each other. For example, in Malaysia, one pathway by which old age is associated with poor health literacy is due to limited opportunities for formal schooling back when they were young. For example, in the Fifth Malaysian Population and Family Survey 2014, it was found that most of the elderly in Malaysia only had primary education (47%) while 17.6% received no formal education (National Population and Family Development Board Malaysia, 2016). This is reflected in a 2019 nationwide survey that found that the elderly had poorer health literacy (Jaafar et al., 2021).

2.4.2 Self-Esteem

Another associated factor of health literacy is self-esteem. Health literacy is how a person views themselves and linked to many psychological concepts like self-worth (Hagen, Havnen, Hjemdal, Kennair, Ryum & Solem, 2020). Accordingly, healthy self-esteem is when a person holds a balanced view of oneself and appreciates their strengths and weaknesses and someone with poor self-esteem is more prone to feelings of inadequacy and less self-worth. It is comparatively less looked at, yet it is also an important predictor of health literacy with poor self-esteem implicated to be a strong factor of low health literacy (Bhusal et al., 2021). Evans et al. (2019) posit that self-esteem plays a mediating role between health literacy and health outcomes while more recently, Rüegg (2022) writes that self-esteem is a part of a group of contextual factors that together with health literacy contributes to a person's decision-making ability for better health.

2.5 Health Literacy Research in Malaysia

A variety of studies relating to health literacy have been increasingly carried out in recent years, including the validation and development of health literacy instruments, the investigation of associated factors of health literacy and the prevalence of levels of health literacy among both the general population and specific groups (Abdullah, Liew, et al., 2020; Abdullah, Ng, Su, Ambigapathy, Paranthaman & Chinna, 2020; Salim et al., 2021; Yunus et al., 2020).

In Malaysia, the instrument of choice included the Newest Vital Sign (NVS) and the European Health Literacy Survey Questionnaire (HLS-EU-Q47) with its adapted versions (Abdullah, Liew, et al., 2020; Azlan, Hamzah, Tham, Ayub, Ahmad & Mohamad, 2021; Rajah, Hassali & Murugiah, 2019). The NVS is a short, 6-item instrument to assess health literacy using the nutrition label of an ice cream container whereas the HLS-EU-Q47 is a 47-item instrument developed for robust health literacy

assessment (Weiss et al., 2005; Sørensen et al., 2013). Two instances of validating the NVS were carried out, one by Cheong et al. (2014) and another by Norrafizah et al. (2016). In both, the NVS was translated into Malay. The former found that the NVS was moderately suitable for use among obese housewives while the latter found that the NVS was not suitable for use among rural populations.

There are at least 6 studies involving the NVS as the instrument used to gauge health literacy in Malaysia (Rajah et al., 2019; Abdullah, Liew, et al., 2020). However, recent developments make it clear that HLS-EU-Q47 and its versions has become the instrument of choice. Examples include the validation of the HLS-EU-Q47 and its short form version, the 'Health Literacy Short-Form 12' (HLS-SF12); the use of an adapted version of the HLS-EU-Q47 – the HLS-M-Q18 – in Malaysia's national survey in 2019 instead of the NVS as was done in 2015; and the increase of studies using the HLS such as ones on elderlies and those with chronic diseases (Duong et al., 2017; Duong et al., 2019; Goh et al., 2020; Jaafar et al., 2021; Ministry of Health Malaysia, 2015; Salim et al., 2021; Yunus et al., 2020).

With regards to the level of health literacy in Malaysia, more needs to be done. A nationwide survey using the NVS in 2015 found that only 6.6% of adults had adequate health literacy while another one in 2019 using the HLS-M-Q18 found that 35% have limited health literacy (Ministry of Health Malaysia, 2015; Jaafar et al., 2021).

35% is high in relative to some of the studies that has been conducted. Of the 8 European countries included in a large 2015 survey, only 1 (the Netherlands at 28.7%) had a lower prevalence of limited health literacy (Sørensen et al., 2015). And even compared to the more recent European Health Literacy Population Survey 2019-2021 of M-POHL, only three out of the 17 European countries involved had a lower prevalence

of limited health literacy (The HLS19 Consortium of the WHO Action Network M-POHL). Viewed in the Southeast Asian context wherein the mean prevalence of limited health literacy is 55.3%, 35% is above average (Rajah et al., 2019). However, for more specific subgroups, one study looking into an urban elderly population found 62.6% to have limited health literacy while another that involved those with asthma found that 60.5% of those surveyed had limited health literacy (Yunus et al., 2020; Salim et al., 2021). Others include a 19% rate among elderly patients at an urban clinic, an 85.8% and 65.3 % rate among type 2 diabetics at clinics, and a 28% rate among university students (Abd-Rahim, Mohamed-Yassin, Abdul-Razak, Isa & Baharudin, 2021; Abdullah, Ng et al., 2020; Azreena, Suriani, Juni & Fuziah, 2016; Hamzah, Mohammad & Abdullah, 2016). These results form a large range of values for the prevalence of limited health literacy, with most emphasising the high prevalence of limited health literacy. They also provide insight into which population to focus interventions on and which subgroups are particularly at risk for limited health prevalence.

On associated factors, findings in Malaysia do not differ much from international findings. Sociodemographic factors have been found to be associated with health literacy and include age, sex, ethnicity, household income, education level and language proficiency (Abdullah, Ng et al., 2020; Hamzah, Suandi & Ishak, 2016; Jaafar et al., 2021).

There have been only a few studies that have focused on university students. Jaafar, Ab Malik & Al-Kadhim (2020) and Ying et al. (2015) looked at oral health literacy; Hamzah, Mohammad et al. (2016) at health literacy and information-seeking behaviour; Khan et al. (2010) and Jaladin, Ngu & Tharbe (2015) at mental health literacy; and Yilma, Inthiran, Reidpath & Orimave (2019) at health information searching on the web. None of these studies looked at respondents' fields of study aside from Ying et al.'s (2015) that compared dental students with medical, allied health and pharmacy students. Whereas

studies in other countries have looked at health literacy of health- and non-health-related courses or compared health literacy among health-sciences students, no studies in Malaysia have looked at health literacy from this angle (Elsborg, Krossdal & Kayser, 2017; Juvinyà-Canal et al., 2020). This represents a knowledge gap to be investigated.

2.6 Health Literacy Among University Students

Health literacy studies among university students have been conducted in China, Hungary, Nepal, Malaysia, the United States of America, Laos, Lithuania, Australia and Turkey among others (Bánfai-Csonka et al., 2022; Hamzah, Mohammad et al., 2016; Kühn et al., 2022). Results vary across nations and studies, partially due to differences in instruments used. Traditionally, Assessment of Adult Literacy in Medicine (REALM), the Test of Functional Health Literacy (TOFHLA), and the NVS was used while more recently, a more comprehensive HLS-EU-Q47 became more widely used in Europe and Asia (Tavousi et al., 2022; Sørensen et al., 2015; Duong et al., 2017). A difference of results from different instruments is shown in a study in Hungary wherein the NVS and the HLS-EU-Q16 each demonstrated different prevalence of limited health literacy, making comparison between different studies hard.

Regardless, a common theme that emerges from the many studies is that the assumption that the health literacy level in university students – a group of highly-educated individuals – will be high is a presuming one. In general, health literacy in university students was found to be low. A study on students in universities in Spain and France found that more than 60% had problematic or inadequate health literacy while another two found that 48% and 38% of students in Hungary had problematic or inadequate health literacy (Bánfai-Csonka et al., 2022; Juvinyà-Canal et al., 2020; Balázs & Éva, 2018). Others include 60.8% with limited health literacy in Nepal, 54.6% in Ghana, 28% in Malaysia, 58.5% and 46% in Germany, 33.1% in Lithuania and 77.8% in Turkey

(Bhusal et al., 2021; Evans et al., 2019; Hamzah, Mohammad et al., 2016; Okuyan & Caglar, 2019; Schricker, Rathman & Dadaczynski, 2019; Schultes, 2017; Sukys, Cesnaitiene & Ossowsky, 2017). In Southeast Asia, a study on first year students at the National University of Laos found that 92.7% had limited health literacy (Runk, Durham, Vongxay & Sychareum, 2017).

Another theme is that while students enrolled in health-related fields of study tend to have better health literacy as they are more exposed to health-related topics, it should not be assumed that they will have a high health literacy level (Jaafar et al., 2020; Kühn et al., 2022). From a study involving health and social care students in Spain and France, even though nursing students had higher levels of health literacy, there were still 30.8% of nursing students who had problematic or inadequate levels of health literacy (Juvinyà-Canal et al., 2020). For a profession for which interaction with patients and health education is an integral part of, 3 out of 10 is a higher rate for insufficient health literacy (Yang, 2022). Okuyan & Caglar (2019) presents an even more concerning number: 77.8% of nursing students in a Turkish university polled were found to have inadequate health literacy. Munangatire, Tomas & Mareka (2022) report a 2% rate of inadequate health literacy score among nursing students in their study though differences in instruments used makes it hard to compare this number with the two studies above. An interesting finding is in a study involving a medical university wherein biomedical engineering students consistently scored higher than all other courses in the study (Zhang et al., 2016).

Lastly, different students will have different needs in health literacy interventions. It is well established that those enrolled in health-related fields of study will tend to have higher health literacy. However, even among health-related fields, health literacy level differs. Mullan et al. (2017) demonstrate that in the nine subscales of their instrument, medical, allied health and nursing students had different scores with medical students

scoring the highest in 7 out of 9 while allied health scored the highest in the remaining 2. In another study, those enrolled in public health scored better than medicine and molecular biomedicine (Elsborg et al., 2017)

The key takeaway is that health literacy level among undergraduates should not be assumed to be high; that even though students with health-related courses tend to have higher health literacy score, inadequacy in health literacy still needs to be assessed and lastly, that each student will have their strengths and weaknesses in health literacy and a one-fit-all style of health literacy intervention might not be appropriate.

2.7 Conceptual Framework

A model that can be used to illustrate the dimensions and factors of health literacy is presented by Sørensen et al. in 2012 as shown in figure 2.1. The model captures the process of health literacy (seek, understand, evaluate and apply) for the three domains of healthcare, disease prevention and health promotion, the factors of health literacy and the downstream effects of good health literacy.

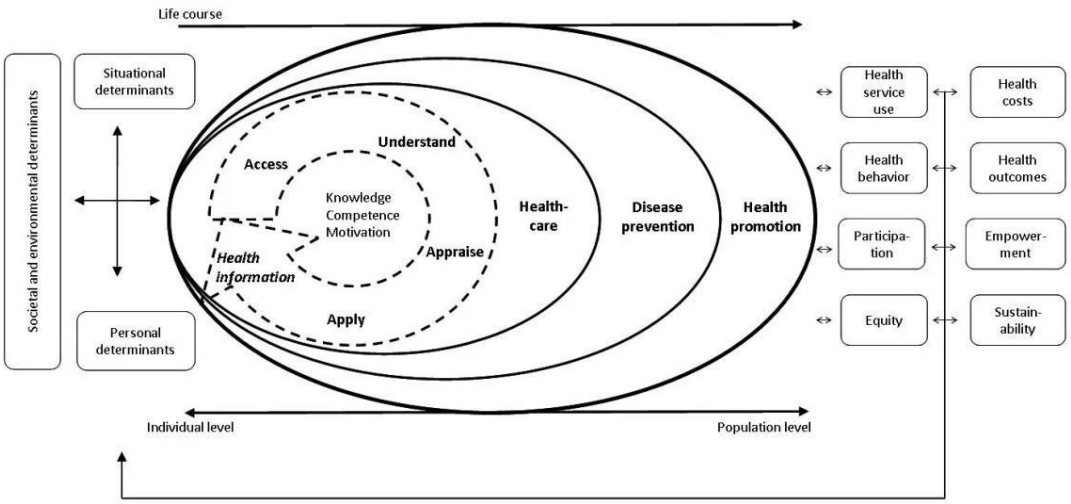

Figure 2.1: Integrated model of health literacy adopted from Sørensen et al. (2012)

In it, the distinction between more distal factors like societal and environmental factors is placed further away while more proximal factors like situational and personal factors is placed nearer to the concentric ovals. It also separates health literacy in a process of seeking, understanding, evaluating and applying where one thing leads to another. Seeking and obtaining something is imperative to understand it while understanding something is imperative to evaluating it.

For the downstream effects of health literacy, health literacy will influence the use of health service and thus the costs of it. It will influence health behaviour by influencing perception of health services and communication with healthcare providers, thereby exerting effects on health outcomes. Good health literacy will also lead to increased participation and sharing in public health discourses, empowering them. Interventions to improve health literacy can also help with equity by improving the gap in health inequality.

Using Sørensen et al.'s integrated model, this study explores personal factors such as sociodemographic variables, self-esteem, fields of study and language proficiency in an attempt to identify which are associated with health literacy. Figure 2.2 presents the conceptual framework for this study which is a simplified version of Sørensen et al.'s model.

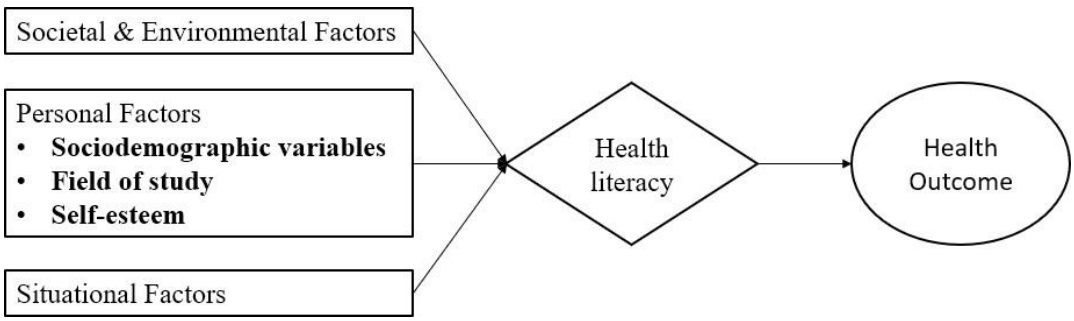

Figure 2.2: Conceptual framework for inter-campus comparison of health literacy