

THE DIFFERENCES IN DIETARY INTAKE AND SOCIAL SUPPORT ACROSS
SOCIAL FRAILTY CATEGORIES AMONG OLDER PATIENTS IN HOSPITAL
PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM), KELANTAN.

by

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LIST OF ABBREVIATIONS

CVD	Cardiovascular Disease
DASH	Dietary Approaches to Stop Hypertension
DOSM	Department of Statistics Malaysia
Ha	Alternative Hypothesis
HIV	Human Immunodeficiency Virus
Ho	Null Hypothesis
HPUSM	Hospital Pakar Universiti Sains Malaysia
ICU	Intensive Care Unit
IQR	Interquartile Range
KRK	Klinik Rawatan Keluarga
LDL	Low-Density Lipoprotein
MIND	Mediterranean-DASH Intervention for Neurodegenerative Delay
MNA	Mini Nutritional Assessment
MOS-SSS	Medical Outcomes Study Social Support Survey
NCGG-SGS	National Center for Geriatrics and Gerontology–Study of Geriatric Syndrome
NHMS	National Health and Morbidity Survey
PUFAs	Polyunsaturated Fatty Acids
SD	Standard Deviation
SFQ	Social Frailty Questionnaire
UNHCR	United Nations High Commissioner for Refugees
USM	Universiti Sains Malaysia
WHO	World Health Organization

**PERBEZAAN PENGAMBILAN DIET DAN SOKONGAN SOSIAL MENGIKUT
KATEGORI KELEMAHAN SOSIAL DALAM KALANGAN PESAKIT WARGA
EMAS DI HOSPITAL PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM),
KELANTAN.**

ABSTRAK

Peningkatan populasi warga emas telah menyebabkan golongan ini semakin terdedah kepada kelemahan sosial, iaitu keadaan yang melibatkan kurang penyertaan sosial, sumber sosial yang terhad serta kurang penglibatan dalam aktiviti sosial. Kelemahan sosial telah dikaitkan dengan pelbagai kesan kesihatan yang buruk. Walau bagaimanapun, hubungan antara pengambilan makanan dan sokongan sosial dalam kalangan pesakit warga emas masih kurang difahami, terutamanya dalam penjagaan kesihatan di Malaysia. Oleh itu, kajian ini bertujuan untuk menentukan perbezaan pengambilan makanan dan sokongan sosial mengikut kategori kelemahan sosial dalam kalangan pesakit warga emas di Hospital Pakar Universiti Sains Malaysia (HPUSM), Kelantan. Kajian ini telah dijalankan melibatkan 140 orang pesakit warga emas yang mendapatkan rawatan di HPUSM. Status kelemahan sosial dinilai dan peserta dikategorikan kepada kumpulan teguh, pra-rapuh dan rapuh. Pengambilan makanan dinilai menggunakan kaedah penilaian diet, manakala sokongan sosial yang diterima diukur berdasarkan empat domain, iaitu sokongan emosi, sokongan ketara, interaksi sosial positif dan sokongan kasih sayang. Oleh kerana data tidak bertaburan secara normal, keputusan dilaporkan dalam bentuk median dan julat antara kuartil (IQR), manakala perbezaan antara kategori kelemahan sosial dianalisis menggunakan ujian Kruskal–Wallis. Dapatan kajian menunjukkan bahawa majoriti peserta dikategorikan sebagai rapuh (57.1%), diikuti oleh

pra-rapuh (22.1%) dan teguh (20.7%). Pengambilan makanan tidak menunjukkan perbezaan yang signifikan antara kategori kerapuhan sosial ($p > 0.05$), walaupun pengambilan tenaga dan nutrien secara keseluruhannya berada di bawah saranan yang ditetapkan. Sebaliknya, perbezaan yang signifikan diperoleh bagi sokongan emosi, interaksi sosial positif dan sokongan kasih sayang ($p < 0.05$), manakala sokongan ketara tidak menunjukkan perbezaan yang signifikan. Kesimpulannya, kelemahan sosial didapati mempunyai prevalens yang tinggi dalam kalangan pesakit warga emas dan dikaitkan dengan perbezaan dalam beberapa domain sokongan sosial, tetapi tidak dalam pengambilan makanan. Dapatan ini menekankan kepentingan aspek kesejahteraan psikososial di samping penjagaan pemakanan dalam pengurusan kesihatan pesakit warga emas.

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ABSTRACT

The ageing population is increasingly exposed to social frailty, a condition characterised by reduced social participation, limited social resources, and decreased engagement in social activities. Social frailty has been associated with adverse health outcomes. However, its relationship with dietary intake and social support among older patients remains insufficiently understood, particularly in Malaysian healthcare settings. Therefore, this study aimed to determine the differences in dietary intake and social support across social frailty categories among older patients in Hospital Pakar Universiti Sains Malaysia (HPUSM), Kelantan. A cross-sectional study was conducted among 140 older patients attending HPUSM. Social frailty status was assessed by using the Makizako Social Frailty questionnaire, and participants were categorised as robust, pre-frail, or frail. Dietary intake was evaluated using a 3-day diet history, while perceived social support was measured using the Medical Outcomes Study Support (MOS-SSS) across four domains, including emotional support, tangible support, positive social interaction, and affective support. As the data were not normally distributed, results were presented as median and interquartile range (IQR), and differences across social frailty categories were analysed using the Kruskal–Wallis test. A total of 140 older patients participated in this study, of whom the majority were female (63.6%). The result showed that 57.1% of the participants were socially frail, 22.1% were pre-frail, and 20.7% were robust. Dietary intake did not differ significantly across social frailty categories ($p > 0.05$), although overall energy and nutrient intakes were generally below the recommended levels. In contrast, significant differences were observed in emotional support, positive social interaction, and affective support ($p < 0.05$) with social

frailty, while tangible support showed no significant difference. In conclusion, social frailty was highly prevalent among older patients and was associated with differences in selected domains of social support but not dietary intake. These findings showed the importance of addressing psychosocial well-being alongside nutritional care in the management of older patients.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Population aging is a global phenomenon that has significant implications for public health, social care, and healthcare systems. According to the WHO (2014) report from the Global Forum on Innovations for Ageing Populations, the number of older patients is increasing rapidly, especially in low- and middle-income countries. Malaysia is undergoing a similar demographic transition, with the Department of Statistics Malaysia reporting that the older population has risen steadily and is expected to reach 15% by 2030, officially categorizing the nation as an ‘aged society’ (DOSM, 2016), hence classifying Malaysia as one of the fastest nations to achieve an aged country within 20 years. With advances in healthcare treatment and accessibility, older patients nowadays can live longer, healthier, and with enhanced functional fitness. The United Nations categorizes anyone above 60 years old as an elderly person (UNHCR, 2020). In addition, the United States Census Bureau defines an older patient as someone who is aged 65 and over (US Census Bureau, 2019). In Malaysia, older patients are defined as individuals aged 60 years and above, aligning with the broader definition of an aging population (Abdullah *et al.*, 2024).

One of the major concerns among the aging population is frailty, a geriatric syndrome characterized by increased vulnerability to adverse health outcomes. Frailty is conceptually defined as a state of increased vulnerability in older individuals, resulting from age-associated declines in physiological reserve and function as they cope with everyday life stressors (WHO, 2017). Frailty also refers to dysregulation across multidimensional determinants, such as physical, cognitive, psychological, and social determinants (Wleklik *et al.*, 2020). It is therefore an unavoidable part of the ageing process, which affects individuals across all age groups, not just older populations. Social frailty was first proposed by Gobbens *et al.* in 2010. In 2017, based on the concept of social needs in the social production functions theory, social frailty was defined as a continuum of being at risk of losing, or having lost, social resources, social behaviors, social activities, and self-management abilities to fulfill basic social needs (Bunt *et al.*, 2017). Thereby, social frailty is a broad construct that includes not only social isolation and loneliness (social needs) but also social exercise and participation (social fulfillment), housing and food (resources), behavior and motivation (self-management) (Quach *et al.*, 2021). Therefore, social frailty has been associated with worse health behaviors, which may contribute to the decline in the health of socially frail older patients (Carcedo-Argüelles *et al.*, 2024).

The quality and quantity of diet among older patients are closely linked to the risk of social frailty by affecting different processes involved in food intake, including the purchase, preparation, and consumption of food (Tsang *et al.*, 2025). Adequate nutrition not only supports physical health but also plays a crucial role in maintaining mental well-being and social engagement (Muscaritoli, 2021). In older patients, at the individual level, functional factors are of interest as the ageing process is accompanied by numerous functional changes at different levels. Factors like declining chemosensory function,

chewing and swallowing difficulties, physical limitations of the upper and lower extremities, and cognitive impairments impede shopping, cooking, and eating, may reduce the attractiveness of meals, and may consequently influence dietary intake (Kiesswetter *et al.*, 2018). Older patients primarily need adequate nutrition, as it is essential for maintaining health and supporting overall functional capacity. As people age, they encounter greater health challenges, face a higher risk of disability, and experience physiological and social changes that impact essential aspects of their lives, including nutrition (Zhao & Andreyeva, 2022). In addition, the risk of social isolation has also been associated with poor nutritional health including increased risk of malnutrition, decreased fruit and vegetable intake, and decreased energy intake (Low *et al.*, 2024). Thus, poor dietary intake can result in inadequate nutrient intake and increased risk of malnutrition, with possible negative health consequences such as higher mortality risk, increased risk of sarcopenia and falls, and poor wound healing (Low *et al.*, 2024).

A few studies have examined the association between social frailty and dietary intake among older adults. Pek *et al.* (2020) found that social frailty was associated with poorer nutritional status in a sample of 229 older adults from Singapore. In addition, Van Assen *et al.* (2022) studied 45,336 Dutch community-dwelling people aged 65 years and older and found that social frailty was associated with lower consumption of vegetables and hot meals. Last but not least, in Japan, Makizako *et al.* (2015) reported that socially frail older adults had significantly lower dietary variety scores, which increased their risk of developing physical frailty.

Social support is an interactive process through which emotional, instrumental, and informational support is received from members of one's network, and it serves as a key factor in predicting the physical health and well-being of individuals, including older patients (Drageset, 2021). Functional social support refers to an individual's perception that members of their social network can meet their needs, such as having someone available to drive them to medical appointments or assist with grocery shopping when necessary (Rutter *et al.*, 2020). Social support of healthy eating can be operationalized as household members encouraging a reduction in unhealthy food intake, discussing healthy eating habits, giving reminders to refrain from unhealthy foods, and giving compliments for following a healthy eating plan (Ehmann *et al.*, 2024). Compared to social support, social frailty has received less attention, even though it is distinct from simply lacking or having low social support and is theoretically linked to lower self-efficacy for making dietary changes (Ogden & Quirke-McFarlane, 2023). Research from Zhang *et al.* (2021) states that social support from different sources showed different effects on healthy eating. Family support has a protective impact on inadequate food intake, whereas support from friends was a risk factor for both inadequate and excessive food intake (Zhang *et al.*, 2021). Therefore, social support is an important health determinant and may affect dietary behaviors among older patients.

1.2 Problem Statement

The rapid growth of the ageing population has brought social frailty among older patients to the forefront as a major public health issue, as it contributes to reduced quality of life and a higher risk of negative health outcomes (Ko & Lee, 2022). While physical frailty has been extensively studied, social frailty, which encompasses reduced social interactions, support, and participation, remains less understood, particularly in Malaysian older patients. Dietary intake and social support are known to be critical factors

influencing overall health and well-being in the elderly. Tsang *et al.* (2025) reported that several factors, such as marital status, living arrangement, eating arrangement, loneliness, social support, social isolation, and social frailty, were associated with dietary intake among community-dwelling older adults. These findings highlight the important role of social factors in influencing dietary intake among older adults, suggesting that social circumstances may affect eating behaviours and nutritional well-being in later life (Tsang *et al.*, 2025). Several studies have shown that dietary intake and social support significantly influence the health status of older adults, with inadequate nutrition and poor social networks being associated with increased frailty and negative health outcomes. The Otassha Study by Shimada *et al.* (2016) investigated the impact of nutrition and social factors on frailty in community-dwelling older adults in Tokyo. The result of the study shows that good nutrition and strong social connections help prevent frailty in the older population (Shimada *et al.*, 2016). A European 11-year follow-up study (SHARE data) found that low protein intake and poor social networks increased the risk of developing frailty, especially among women (Haider *et al.*, 2019). In Malaysia, researchers reported that 6.4% of older adults experienced both physical frailty and malnutrition, and 11.3% had pre-frailty with at-risk/malnutrition, with poor social support identified as a significant associated risk factor (Musastika Mustaffa *et al.*, 2024). In addition, a cross-sectional MELoR study in Klang Valley found that social and non-engagement in community activities were both significantly associated with an increased risk of frailty (Risbridger *et al.*, 2021). Despite these findings, there is limited information on the differences in dietary intake and social support across categories of social frailty, particularly among older patients in Malaysia. Older patients represent a vulnerable group due to age-related physiological decline, multiple comorbidities, and increased dependency during hospitalization. These factors may negatively affect their nutritional

intake and limit social interactions, potentially worsening social frailty. In hospital settings, changes in routine, reduced mobility, and separation from usual support systems further exacerbate these risks. However, current data in Malaysia, especially at Hospital Pakar Universiti Sains Malaysia (HPUSM), Kelantan, remain insufficient to clearly describe these differences among older patients. This gap limits the ability to develop targeted interventions to improve both nutritional and social outcomes in this population.

Therefore, this study aims to examine differences in dietary intake and social support across different levels of social frailty among older patients. This study is expected to provide valuable insights into how diet and social support vary according to social frailty in older patients, specifically within the Malaysian context, helping to fill a gap in local research. Thus, this study focuses on comparing dietary intake and social support among older patients with different levels of social frailty at Hospital Pakar Universiti Sains Malaysia, Kelantan.

1.3 Research Question

- I. What is the macronutrient and micronutrient intake of older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan?
- II. What is the level of social support received by older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan?
- III. What is the prevalence of social frailty among the older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan?
- IV. Is there a difference in macronutrient and micronutrient intake among older patients with different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan?

V. Is there a difference in social support scores among older patients with different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan?

1.4 Research Objectives

1.4.1 General objectives

To determine differences in dietary intake and social support by levels of social frailty among older patients in Hospital Pakar Universiti Sains Malaysia (HPUSM), Kelantan.

1.4.2 Specific Objective

- I. To assess the macronutrient and micronutrient intake of older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan.
- II. To evaluate the level of social support received by older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan.
- III. To determine the prevalence of social frailty among the older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan.
- IV. To examine the differences in macronutrient and micronutrient intake according to different levels of social frailty among older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan.
- V. To examine the differences in social support scores according to different levels of social frailty among older patients in Hospital Pakar Universiti Sains Malaysia, Kelantan.

1.5 Research Hypothesis

1.5.1 Null hypothesis (Ho)

I. There is no significant difference in dietary intake among older patients across different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan.

II. There is no significant differences in mean social support among older patients across different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan.

1.5.2 Alternative hypothesis (Ha)

I. There is a significant difference in dietary intake among older patients across different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan.

II. There is a significant difference in mean social support scores among older patients across different levels of social frailty in Hospital Pakar Universiti Sains Malaysia, Kelantan.

1.6 Justification of Study

The findings of the research generate important evidence on dietary intakes and the level of social support received by older patients, as these elements are crucial, as they are recognized as determinants of healthy aging. Ageing itself may increase the risk of malnutrition due to the co-existence of several factors, such as poor oral health, frailty, chronic disease, psychosocial problems, and physical limitations, which will gradually worsen body function (Nazri *et al.*, 2020). At the same time, the availability and quality of social support, whether emotional, instrumental, or financial, can directly shape dietary behaviour by influencing food choices, meal preparations, and adherence to a healthy eating pattern.

Beyond biological and medical factors, social support plays a pivotal role in shaping health behaviours, including dietary intake. Regular social interaction has been shown to lead to a higher-quality diet and better nutritional status, both of which are associated with improved appetite (Kim *et al.*, 2020). Conversely, a lack of social support or the presence of social frailty has been associated with poor dietary intake, malnutrition, and accelerated functional decline among older adults (Makizako *et al.*, 2018). Despite the growing evidence internationally, there remains limited research in Malaysia examining dietary intake and social support in relation to social frailty among older patients in clinical settings. In particular, there is a lack of local studies that explore how these factors differ across varying levels of social frailty within clinical settings. Therefore, this study is justified as it seeks to provide insights into the differences in dietary intake and levels of social support among older Malaysian patients with different social frailty statuses. The findings will contribute to filling the gap in local evidence and support the development of more targeted nutritional and social interventions for older patients in both inpatient and outpatient healthcare settings.

1.7 Conceptual Framework

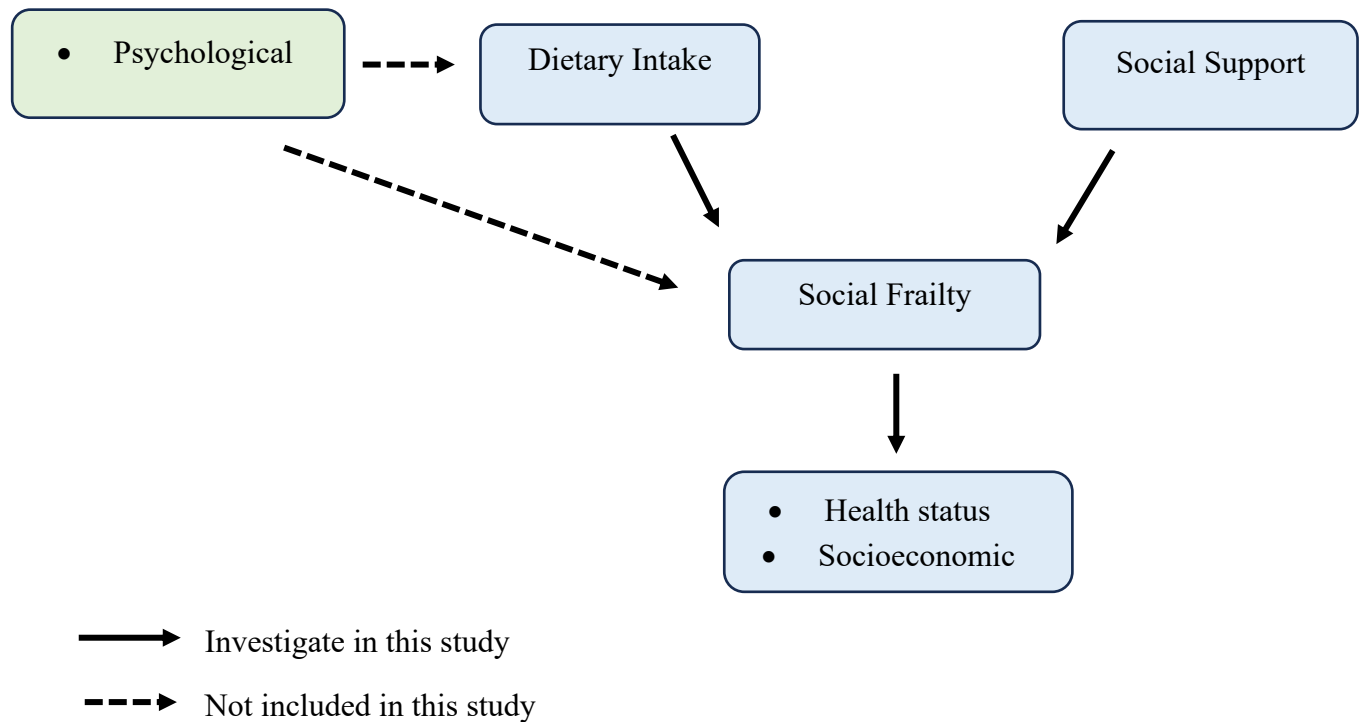


Figure 1: Conceptual framework of the study

Social frailty is defined as the progressive loss of social resources, activities, and roles necessary to meet basic social needs and maintain well-being in later life (Qi *et al.*, 2023). Dietary intake and social support are important factors related to the health and well-being of older patients. Dietary intake is shaped by health status, including chronic disease, dental problems, limited mobility, socioeconomic conditions, including low income, living arrangements, and psychological well-being, such as appetite loss and depression (Ministry of Health Malaysia, 2023). Adequate intake helps maintain physical and social functioning, while poor intake may lead to malnutrition, reduced strength, and limited participation in social activities, thereby increasing the risk of social frailty (O’Connell *et al.*, 2020). Social support is also closely related to frailty, with evidence showing that support from family, peers, and the community (Qi *et al.*, 2023). Social

support may differ among individuals with varying levels of frailty (Qi *et al.*, 2023). Previous studies have reported differences in dietary patterns among individuals with different levels of social support, with those having stronger support tending to report better diet quality (Pieroth *et al.*, 2017). These findings suggest that dietary intake and social support may vary according to an individual's social condition. In this study, social frailty is treated as a dependent variable, while dietary intake and social support are treated as independent variables and examined as outcome variables. Since social frailty cannot be managed with medical treatment alone, a comprehensive approach that addresses both nutritional and social factors is required. Therefore, this study aims to examine the differences in dietary intake and social support across different levels of social frailty among older patients.

CHAPTER 2

LITERATURE REVIEW

2.1 Older Patients and Aging Population

Population aging refers to the rising number and proportion of individuals aged 60 years and above, accompanied by a decline in the number and proportion of those aged 15 years and below (Ismail *et al.*, 2021). Before the 20th century, few individuals lived long enough to be considered older adults; however, advancements in modern medical technology during the early 20th century enabled the treatment of many fatal diseases and significantly reduced mortality rates worldwide (Ismail *et al.*, 2021). These improvements in longevity have contributed to the global trend of population aging, with increasing numbers of people now surviving into later life (Ismail *et al.*, 2021). Thus, the life expectancy of the population in many countries is increasing rapidly, and the number of older patients is also rising (WHO, 2024). Many nations in developing countries have experienced a demographic transition, marked by a shift from high mortality and fertility rates to lower levels, although the pace and timing of this transition vary across countries (United Nations, 2023). Consequently, these demographic changes contribute to population aging, with an increasing proportion of older patients (United Nations, 2023). In the hospital setting, older patients represent a particularly vulnerable group, as they are more likely to present with multiple comorbidities, polypharmacy, and age-related physiological decline, which complicate disease management and recovery (WHO, 2022). Hospitalized older adults are at increased risk of adverse outcomes such

as functional decline, prolonged length of stay, hospital-acquired infections, and readmission (Cunha, 2019). Furthermore, acute illness and hospitalization may exacerbate existing nutritional deficiencies and social vulnerabilities, making this population highly susceptible to malnutrition and social issues (Abdurrahman Sadiç *et al.*, 2025). This demographic shift brings new challenges, particularly the risk of social frailty, which reflects the progressive loss of social resources, activities, and roles essential for well-being in later life (Li *et al.*, 2024). Among the factors influencing social frailty, dietary intake and social support play vital roles, as adequate nutrition and strong social networks are fundamental to sustaining health, independence, and active participation among older patients (Tsang *et al.*, 2025). These changes, coupled with an increase in life expectancy, result in an increasing number of older patients. In sum, the steady rise in life expectancy at older ages has firmly established population aging as a global phenomenon (United Nations, 2023).

According to the United Nations Population Division, the number of people aged 65 and older, currently estimated at 857 million, is expected to nearly double over the next two and a half decades, reaching 1.58 billion in 2050 (United Nations, 2024). The share of the global population older than 65 is projected to grow from 10 percent this year to 16 percent in 2050, as many high-income countries are expected to see significantly higher rates than that (United Nations, 2024). The U.S. Bureau of Population Census estimates that by 2050, the world's population aged 65 and over is expected to reach 1.6 billion people, of which 1.3 billion will come from developing regions today; of the world's elderly population, 75% will live in developing countries and 25% in developed countries. Malaysia is a country in Southeast Asia that is experiencing population aging (Md Yusuf *et al.*, 2020). This demographic transformation will have a major impact on the population's health, social, and economic development in the world (WHO, 2024).

Although today, Malaysia still has a relatively small population of 60 years and older and is still not categorized as an aged nation as compared to industrialized countries in Europe and North America, the number and percentages of this category of the population are increasing (Ismail *et al.*, 2021). In 1970, the population of older adults in Malaysia aged 60 years and over was 539,118, and it had increased to 745,152 by 1980 (Ismail *et al.*, 2021). By percentage, it increased from 5.2% to 5.7% and further to 6.6% in 2000 and is expected to reach 11.3% by 2020 (Ismail *et al.*, 2021).

Research on older patients' dietary intake, social support, and social frailty is critical for public health since these factors are closely linked to healthy aging, disease prevention, and quality of life (Jankowska-Polańska *et al.*, 2025). Inadequate nutrition and weak social networks can accelerate the onset of frailty, increase healthcare burdens, and reduce independence among older patients (Norazman *et al.*, 2020). Poor dietary intake contributes to malnutrition, sarcopenia, impaired immune function, and increased risk of chronic diseases, all of which heighten vulnerability to frailty and disability (Norazman *et al.*, 2020). Similarly, limited social support is strongly associated with loneliness, depression, and cognitive decline, factors that further exacerbate functional loss and social frailty (Mao *et al.*, 2025). These consequences not only reduce older patients' independence and quality of life but also place a substantial burden on healthcare systems, as frail and socially isolated individuals are more likely to experience higher rates of hospitalization, longer hospital stays, and premature institutionalization (Mao *et al.*, 2025).

2.2 Dietary Intake among Older Patients

Dietary intake refers to the assessment of an individual's habitual food and beverage consumption, encompassing total energy intake as well as the intake of macronutrients and micronutrients, and is commonly measured using dietary recall or dietary record methods (Thomas & Foster, 2016). Over the past few decades, research has consistently demonstrated that maintaining adequate nutritional status plays a crucial role in preventing or delaying the onset of age-related conditions such as CVD, reduced cognitive function, and osteoporosis (Furbatto *et al.*, 2024). However, physiological and social changes, including reduced food intake, impaired sensory perception, malabsorption, lower levels of physical activity, and increased disability, heighten the risk of inadequate nutritional status, particularly with respect to micronutrients, among older patients (Norman *et al.*, 2021). Older patients are prone to insufficient energy, macronutrient (namely protein), along with nutrient deficiencies, more greatly after they reach the age of 65 years, with the most common ones being deficiencies in vitamin B12, iron, vitamin D, and calcium (Kassis *et al.*, 2023). As people age, the amount of stomach acid decreases, which may reduce vitamin B12 intake and consequently lead to symptoms such as depression and fatigue (Kassis *et al.*, 2023). Intrinsic factors such as dental health, mental health, along digestive discomfort drive diet quality reduction with aging, as extrinsic factors include social isolation and financial instability (Kassis *et al.*, 2023). These reasons explain the aging-related reduction of older individuals' nutritional status (Robinson, 2017). Indeed, gastroesophageal reflux, bloating, and constipation are quite prevalent amongst adults aged 60 years and older, with esophageal motility shown to start declining as early as 40 years old (Kassis *et al.*, 2023). The research by Robinson (2017) demonstrates that older adults can benefit from three intervention methods to improve hunger in the elderly, which include eating smaller portions with added energy, choosing

liquid foods instead of solids, and enhancing the dining setting. Micronutrient supplementation has been shown to have benefits in improving issues of vitamin deficiencies in older adults (Robinson, 2017).

Aging is characterized by declining nutritional status due to reduced intakes of nutrient-dense foods, lower intestinal absorption, and impaired nutrient metabolism (Kassis *et al.*, 2023). The U.S. Department of Agriculture (2022) established specific dietary recommendations for people aged 60 years and above because their nutritional needs differ from those of younger individuals. That said, dietary changes should start before the first signs of aging since the onset of decline in different systems can start as early as age 40 years old (Kassis *et al.*, 2023). Promoting a balanced diet and nutritional solutions to meet requirements is therefore important (Kassis *et al.*, 2023). For instance, meeting protein needs could be facilitated by offering solutions that provide high-quality protein and protein-dense products adapted to age-related conditions, such as blunted feelings of hunger (Kassis *et al.*, 2023). Similarly, micronutrient supplementation and fortification could be considered to counterbalance inadequate intake linked to an unbalanced diet (Kassis *et al.*, 2023). Unbalanced or unhealthy diets, such as the western diet, typically contain high levels of salt, saturated fats, and refined sugars and are generally poor sources of dietary fiber and micronutrients (Kassis *et al.*, 2023). The worldwide dietary evolution from traditional healthy eating to westernized eating patterns during recent decades has produced negative health consequences (Statovci *et al.*, 2017). More specifically, westernized diets cause damage to gut microbiota composition, which functions as a powerful metabolic system that affects all body systems and overall health (Low *et al.*, 2021). Healthy dietary patterns, which can be defined by a variety of healthy eating indices, are generally rich sources of fruits, vegetables, legumes, whole grains, nuts, low-fat dairy, and fish, and provide a healthy fat profile characterized by low

saturated and high unsaturated fats, including polyunsaturated omega-3 fatty acids (n-3 PUFAs) omega-3s (Fekete *et al.*, 2022). In addition, unhealthy dietary patterns characterized by low intake of vegetables and fruits, excessive intake of sodium, and added sugars may lead to conditions such as obesity, diabetes, hypertension, and dyslipidemia that greatly burden the cardiovascular system (Fekete *et al.*, 2022). The Mediterranean diet serves as a model of healthy dietary patterns and has been consistently associated with reduced systemic inflammation (Wu *et al.*, 2020), lower risk of osteoporotic fractures (María Carmen Andreo-López *et al.*, 2023), preservation of muscle mass and function (Arroyo-Huidobro *et al.*, 2025), and improved mobility in older adults. Furthermore, adherence to this diet is linked with a lower prevalence of cognitive decline, dementia, and Alzheimer's disease (Fekete *et al.*, 2025). The DASH (Dietary Approach to Stop Hypertension) diet and the Portfolio diet have proven to be effective dietary patterns for cardiovascular health (Kassis *et al.*, 2023). The DASH diet emphasizes fruits, vegetables, whole grains, and low-fat dairy products while limiting the intake of sugar-sweetened foods and beverages, red meat, and added fats (Kassis *et al.*, 2023). The DASH diet has shown effective blood pressure management in multiple clinical studies (Filippou *et al.*, 2020). The Portfolio Diet is a plant-based dietary approach that emphasizes the consumption of nuts, viscous fiber, and plant-based proteins, complemented by the inclusion of plant sterols (Kassis *et al.*, 2023). The portfolio diet is known for its reducing effect on LDL-cholesterol and was ranked first amongst efficacious dietary patterns for secondary prevention of cardiovascular disease in subjects with pre-existing CVD according to the National Heart Foundation of Australia in 2017. Other than that, the MIND diet, a pattern that is increasingly popular amongst scientists and practitioners, is a combination of the Mediterranean and the DASH diets targeting the driving processes behind cognitive decline (Kassis *et al.*, 2023). In other words, these

dietary patterns share common characteristics combining healthy energy substrates, including whole grain carbohydrates, n-3 PUFAs, plant-based protein, reducing trans-fats, saturated fats, refined grains, and added sugars, while providing good sources of antioxidants (Kassis *et al.*, 2023). Well-managed nutrition and a diet adapted to age are essential to maintain mental freshness and a good quality of life at old age (Tessier *et al.*, 2025).

2.3 Social Support in Older Patients

The concept of social support is multidimensional and is often considered part of social capital, which also includes social networks (Haugan & Eriksson, 2021). Social support and social networks can exist in two primary forms, which include structural and functional aspects and formal or informal networks (Haugan & Eriksson, 2021). The structural aspect of social support refers to the existence and size of a social network and the extent to which the person is connected within a social network, such as the number of social ties (quantity of the relationships) and the characteristics of the social exchanges between individuals, such as social support activities and frequency of interactions (Haugan & Eriksson, 2021). The functional or qualitative aspect of social support refers to how a person perceives the support they receive and how well they feel connected within their social network (Haugan & Eriksson, 2021). In other words, it reflects the quality and depth of their relationships. Broadly, social support includes four attributes, including emotional, instrumental, informational, and appraisal support that interact to serve as protective factors (Kwon *et al.*, 2025). Emotional support involves sharing concerns and offering support, like esteem, trust, and listening; meanwhile, instrumental support includes someone close who can provide care, such as in-kind contributions, labour, and time (Kwon *et al.*, 2025). In addition, information support involves getting valuable information or treatment decision help from someone, and appraisal support

requires group activities for peer-based self-evaluation and self-affirmation assistance (Kwon *et al.*, 2025). Thus, social support refers to the cognitive or functional qualitative aspects of human relationships, such as the content and availability of relationships with significant others, whereas social network refers to the quantitative and structural elements of these relationships (Haugan & Eriksson, 2021).

Social support has proven to be health-promoting by strengthening individuals' coping abilities, health, and quality of life while facing stress, and these associations have been seen in many different populations of both healthy and sick people (Haugan & Eriksson, 2021). The scoping review by Resna *et al* (2022) highlighted that social environmental support, particularly through family, peer, and community engagement, is a key determinant in reducing loneliness and enhancing well-being among older adults. In addition, research has also shown that social isolation is more strongly linked to physical health risks such as cardiovascular disease, poorer immunity, and premature mortality, while loneliness is more strongly associated with mental health problems, including depression and anxiety (Holt-Lunstad, 2024). A systematic review by Wu *et al.* (2021) highlighted the important role of social support in improving medication adherence among patients with hypertension. The study found that individuals who received support from family, friends, peers, or healthcare professionals were more likely to take their medications consistently and manage treatment effectively (Shahin *et al.*, 2021).

The Medical Outcome Study Social Support Survey (MOS-SSS) is a widely used instrument for assessing social support, as it offers a concise and practical measure that captures four key dimensions, including informational support, tangible support, positive social interaction, and emotional affection without regard to the specific source of support (Dao-Tran *et al.*, 2023). The original version of MOS-SSS has 19 items and is in the

English language to measure social support among adults with chronic conditions (Sherbourne & Stewart, 1991). There were eleven versions of the MOS-SSS (3, 4, 5, 6, 8, 12, 13, 16, 18, 19, or 22 items), and the MOS-SSS 19-item version was the most common version, used across 31 studies (Dao-Tran *et al.*, 2023). The MOS-SSS has also been validated in 13 other languages, including Chinese, Taiwanese, French, Portuguese, Italian, Spanish, Turkish, Malaysian, Arabic, Farsi/ Persian, Vietnamese, Myanmar, and Greek (Dao-Tran *et al.*, 2023). The MOS-SSS has been validated in various populations, including community-dwelling adults, patients with chronic or infectious disease like heart disease, human immunodeficiency virus [HIV] or tuberculosis, methadone users, cancer patients or cancer survivors, caregivers, community adults, women at various stages of life such as postpartum, mothers of malnourished children, or mother of children with cancer, detainees, and students (Dao-Tran *et al.*, 2023).

Global prevalence studies indicate that approximately one in four older patients experiences low social support, social isolation, or social frailty. Meta-analyses estimate the prevalence of social isolation at about 25% worldwide (Teo *et al.*, 2023), loneliness at nearly 29% (Su *et al.*, 2022), and social frailty at 19% in community settings and up to 47% in hospital settings (Zhang *et al.*, 2022). These conditions are not only widespread but also strongly linked to adverse outcomes. Older patients with limited social support are more likely to experience functional decline, reduced autonomy, poorer quality of life, and higher rates of depression (Balqis-Ali *et al.*, 2024). A study conducted among community-dwelling older populations with frailty and pre-frailty in Hangzhou, China, found that this group reported lower levels of perceived social support compared to healthier individuals (Fang *et al.*, 2022). Weaker support was associated with older age, living alone, lower income, and poorer health status, while stronger family ties and frequent social interactions were linked to higher support (Fang *et al.*, 2022). These

findings underscore that social support is not only influenced by sociodemographic and health-related factors but also serves as an important protective factor against frailty, helping to buffer its negative effects and promote better well-being in later life (Fang *et al.*, 2022).

2.4 Social Frailty in Older Patients

Frailty is defined as an age-related state of decreased physical, psychological, and social functioning that predisposes older patients to adverse health outcomes (Nagai *et al.*, 2020). Physical frailty, in particular, reflects a decline in the body's reserves and ability to cope with stress, making older patients more susceptible to illness and disease (Dong *et al.*, 2024). It can cause the body systems to deteriorate, resulting in fatigue, falls, extended sicknesses, or even death (Dong *et al.*, 2024). Physical frailty is the most widely studied form of frailty and has been consistently shown to predict disability, hospitalization, and mortality (Donmez Guler *et al.*, 2025). Recently, social frailty has emerged as a growing area of interest in the field of geriatric research (Donmez Guler *et al.*, 2025). Research indicates that insufficient psychosocial support, which often coexists with physical weakness, has a stronger correlation with adverse health consequences (Donmez Guler *et al.*, 2025). Social frailty is defined as the gradual loss of abilities or resources needed to maintain social activities and meet basic social needs (Donmez Guler *et al.*, 2025). In simpler terms, when individuals are unable to reach the crucial resources needed to meet their basic social needs, it indicates that they may be struggling with social frailty (Dong *et al.*, 2024). Social frailty in the older population needs to be treated as a public health concern due to common social challenges faced by older individuals, such as family relationships, social exclusion and isolation, and financial difficulties (Donmez Guler *et al.*, 2025). It is also deeply connected to physical frailty, with the two conditions often reinforcing each other. Social frailty can worsen physical frailty by

limiting access to resources, reducing mobility, and contributing to poor nutrition and functional decline (Donmez Guler *et al.*, 2025). In turn, physical frailty can deepen social frailty by reducing independence, increasing isolation, and limiting participation in social activities (Donmez Guler *et al.*, 2025).

Social frailty was first proposed by Gobbens *et al.* in 2010. In 2017, based on the concept of social needs in the social production functions theory, social frailty was defined as a continuum of being at risk of losing, or having lost, social resources, social behaviors, social activities, and self-management abilities to fulfill basic social needs (Zhang *et al.*, 2022). Several instruments are available to evaluate social frailty, including the Makizako Social Frailty Index, the Social Frailty Screening Index, and the Tilburg Frailty Indicator (Zhang *et al.*, 2022). The Makizako Social Frailty Index, a five-item tool developed by Makizako *et al.*, stands as the predominant method for evaluating social frailty (Zhang *et al.*, 2022). This assessment focuses on five key indicators, including living alone, going out less frequently compared with last year, not visiting friends, sometimes not feeling helpful to friends or family, and not talking with someone every day (Makizako *et al.*, 2018). Social frailty is also increasingly recognized as a multidimensional construct that extends beyond physical decline to include reduced social participation, weakened social support, loss of meaningful social roles, and financial strain (Nordin *et al.*, 2025). Each of these dimensions can increase the vulnerability of older adults by limiting their access to resources, limiting opportunities for engagement, and limiting resilience (Nordin *et al.*, 2025). In Poland, frailty, malnutrition, and chronic diseases were significant risk factors of social frailty, as they reduce independence, limit social participation, and increase vulnerability to isolation in older adults (Jankowska-Polańska *et al.*, 2025).

Several studies have reported the prevalence of social frailty among older adults in different settings. A systematic review and meta-analysis by Jia *et al.* (2024) reported that the pooled prevalence was 20.0%, indicating that approximately one in five older adults experienced social frailty. Similarly, Ono *et al.* reported that 23.26% of community-dwelling older adults in Japan were classified as socially frail. Furthermore, a systematic review and meta-analysis by Zhang *et al.* (2022), involving 43 studies and 83,907 older adults, found that the prevalence of social frailty was 18.8% among community-dwelling older adults and the prevalence increased substantially to 47.3% among hospitalised older adults. These findings suggest that social frailty is a common condition among older adults and may be particularly prevalent among those receiving healthcare services. Despite the growing international evidence, studies on social frailty in Malaysia remain limited, particularly among older patients in hospital settings. Most local research focuses on physical frailty and cognitive frailty, resulting in a lack of evidence on the prevalence and characteristics of social frailty among Malaysian older adults.