ASSOCIATION OF APPETITE LEVEL AND CALORIE INTAKE ON MALNUTRITION STATUS AMONG OLDER ADULTS IN HOSPITAL PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM)

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by

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Dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Health Science (Honours) (Dietetics)

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

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Sofiyyah Binti Rahmat

Date: 29th June 2025

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LIST OF ABBREVIATIONS

HPUSM	Hospital Pakar Universiti Sains Malaysia
USM	Universiti Sains Malaysia
MNA	Mini Nutritional Assessment
SNAQ	Simplified Nutritional Appetite Questionnaire
DHQ	Diet History Questionnaire
SES	Socioeconomic Status
BMI	Body Mass Index
KH	Knee Height
DS	Demi Span
AS	Arm Span
IQR	Interquartile Range
SD	Standard Deviation
RNI	Recommended Nutrient Intake
MDG-OA	Malaysian Dietary Guideline – Older Adult

PERKAITAN ANTARA TAHAP SELERA MAKAN DAN PENGAMBILAN KALORI DENGAN TAHAP MALNUTRISI DALAM KALANGAN WARGA TUA DI HOSPITAL PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM)

ABSTRAK

Kajian ini mengkaji hubungan antara tahap selera makan, pengambilan kalori dan status malnutrisi dalam kalangan warga emas di Hospital Pakar Universiti Sains Malaysia (HPUSM). Satu kajian keratan rentas telah dijalankan ke atas 113 pesakit berumur 60 tahun ke atas. Data dikumpulkan menggunakan soal selidik yang telah disandarkan untuk menilai tahap selera makan (Simplified Nutritional Appetite Questionnaire SNAQ), pengambilan kalori (Soal Selidik Sejarah Diet 7 hari), dan kecukupan status malnutrisi (Penilaian Pemakanan Ringkas MNA). Daripada 113 subjek, didapati bahawa 77 peserta (68.1%) mempunyai selera makan yang rendah (SNAQ skor <= 14); 33 peserta (29.2%) mempunyai status pemakanan yang normal (skor MNA 12-14) dan 50 (44.2%) berisiko untuk mengalami kekurangan zat makanan (skor MNA 8-11) dan 30 (26.5%) mengalami kekurangan zat makanan (skor MNA 0-7); purata pengambilan kalori adalah 720.475 kcal/hari dan 778.708 kcal/hari dengan sisihan piawai 292.56 kcal dan 240.52 kcal/hari untuk lelaki dan wanita masing-masing. Terdapat hubungan yang signifikan antara status perkahwinan dan jantina (p = < 0.001), antara pekerjaan dahulu dan jantina (p = < 0.001) serta antara susunan tempat tinggal dan jantina (p<0.005). Terdapat hubungan yang signifikan antara masalah mengunyah dan jantina (p=0.01), penggunaan suplemen dan jantina (p=0.001) serta sejarah merokok dan jantina (p= <0.001). Namun, tiada hubungan yang signifikan secara statistik ditemui antara tahap selera makan dan jantina, status malnutrisi dan jantina serta pengambilan kalori dan jantina. Terdapat hubungan yang signifikan antara tahap selera makan dan status

malnutrisi ($p<0.05$, $p=<0.001$). Terdapat juga hubungan yang signifikan antara pengambilan kalori dan status malnutrisi ($p<0.05$, $p=<0.001$). Penyelidikan masa depan harus memberi tumpuan kepada kajian longitudinal untuk menetapkan hubungan kausal dan meneroka intervensi untuk mengatasi selera makan yang kurang baik, pengambilan diet yang tidak mencukupi dan kekurangan zat makanan dalam kalangan populasi warga emas.

ASSOCIATION OF APPETITE LEVEL AND CALORIE INTAKE ON MALNUTRITION STATUS AMONG OLDER ADULTS IN HOSPITAL PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM)

ABSTRACT

This study investigates the relationship between appetite level, calorie intake and malnutrition status among older adults in Hospital Pakar Univerisiti Sains Malaysia (HPUSM). A cross-sectional study was conducted among 113 patients aged 60 years old and above. Data were collected using standardized questionnaires to assess appetite level (Simplified Nutritional Appetite Questionnaire), calorie intake (7 days Diet History Questionnaires), and malnutrition status adequacy (Mini Nutritional Assessment). Out of 113 subjects, it was discovered that 77 participants (68.1%) had low appetite; 33 subjects (29.2%) had normal nutritional status (MNA score 12-14), 50 (44.2%) were at-risk of malnutrition (MNA score 8-11) and 30 (26.5%) malnourished (MNA score 0-7); mean of calorie intake is 720.475 kcal/d and 778.708 kcal/d with standard deviation of 292.56 kcal and 240.52 kcal/d for men and women respectively. There is significant association between marital status and gender ($p = < 0.001$), between past occupation and gender ($p = < 0.001$) and living arrangement and gender ($p<0.005$). There were significant association between chewing problem ($p=0.01$), supplement use and gender ($p=0.001$) and smoking history and gender ($p= <0.001$). However, there is no statistically significant association was found between appetite level and gender, malnutrition status and gender and calorie intake and gender. There is a significant association between appetite level and malnutrition status ($p<0.05$, $p= <0.001$). There is also a significant association between calorie intake and malnutrition status ($p<0.05$), $p= <0.001$). Future research should focus on longitudinal studies to establish causal

relationships and explore interventions to combat poor appetite, inadequate dietary intake and malnutrition among the older adults population.

CHAPTER 1

1.0 INTRODUCTION

1.1 Background of Study

Malaysia has an increasing geriatric population. According to Lim *et al*. (2023) , the ageing population rate is growing at a higher rate over time, with the prediction of by 2050, 80% of the world's population especially in low and middle income country would be an ageing population. Malaysia is dealing with the same demographic transition whereby the estimation stated that by 2030, the older population of ≥ 60 years old is expected to reach 15.3%, which is a 4.2% increase from 11.1% of older adult population in 2020. The increment of life expectancy at birth has increased to 73.2 years for men and 78.3 years for women plays a role in the demographic transition (Ng *et al*., 2022). In developing countries where older adult population is increasing, including Malaysia itself, it is proven that older adult generally possesses lower physical ability as a result of declining physical health (Ismail *et al*., 2021). This leads to multiple and complex health conditions and multimorbidity known as geriatric syndromes. Common health problems that includes organ-specific disease such as cognitive impairement, falls and malnutrition (Ward & Reuben, 2024) . Chan *et al*., (2022) stated that the leading causes of premature mortality among older adults include ischemic heart disease, cerebrovascular stroke, lower respiratory infections, diabetes mellitus and lung cancers. Premature mortality can be defined as the lifespan of an individual if he or she lived without any disease or accidents that causes death before they reach the average life expectancy (Ummi Nadiah *et al*., 2013). Besides that, common ageing problems include but not limited to loss of bone density which leads to osteoporosis and sarcopenia which is loss of muscle mass that leads to fat accumulation in the body (Abd Aziz *et al*., 2017).

Malnutrition is a serious problem, and it is a highly prevalent condition, especially in older adults and chronic patients. According to the European Society for Clinical Nutrition and Metabolism (ESPEN), malnutrition can be defined as a state caused by inadequate intake or uptake of nutrition that alters body composition (Serón-Arbeloa *et al*., 2022). It can negatively impact the quality of life and contribute to further comorbidities and other health problems such as poor immune function that leads to infections and poor wound healing (Abd Aziz *et al*., 2017). These conditions would increase the mortality and morbidity rate as well as the frequency and duration of the hospital stay (Serón-Arbeloa *et al*., 2022). The coexistence between undernutrition and overnutrition in the same population is labelled as the double burden of malnutrition (DBM) (Alem *et al*., 2023). Undernutrition encompasses issues such as being underweight, wasting, stunting and micronutrient deficiencies while overnutrition consists of overweight and obesity issues (Dent *et al*., 2023). Undernutrition is more common among older adult as it increases proportionally with age, or anorexia of ageing (Norazman *et al*., 2020). The prevalence of malnutrition among older adult population in Malaysia is 7.3% for at-risk malnutrition and 23.5% for malnutrition (Ahmad *et al*., 2021). Early identification is crucial in combatting malnutrition by implementing therapeutic actions and regular screening tests.

Appetite or desire to consume meals tend to decrease over time. This is because satiety is often achieved before standard full meals are consumed. Decreased appetite or food intake in old age is commonly known as 'Anorexia of Ageing' and it is one of the major factors that plays into the prevalence of undernutrition status that leads to unfavorable health outcomes in the geriatric population (Landi *et al*., 2016). This disorder is described by Morley and Silver in 1980s (Morley & Silver, 1987). Physiological factors such as changes to the digestive system, poor oral health, acute illnesses and sensory decline could affect appetite level which may lead to decreased nutritional intake. Psychological factors such as mood and environment, as well as pharmacological factors such as polypharmacy also play into factors contributing to decreased appetite (Pilgrim *et al*., 2015). All these conditions would lead to lower nutritional intake and a nutrient-rich diet.

1.2 Problem Statement

Globally, malnutrition is categorized as a serious problem and imposes a significant adverse effect on health and overall quality of life (Serón-Arbeloa *et al*., 2022) and increases the overall economic burden on the healthcare settings (Norman *et al*., 2021). This condition is the result of long term insufficient nutritional needs and worsens after the COVID-19 pandemic hits (Chiann *et al*., 2022). This ever-growing problem is prevalent in many categories of population, especially in the older adult population, thus promoting the development of geriatric syndromes among older adults (Norman *et al*., 2021).

The leading cause of poor nutritional status, or undernutrition, among older adults is reduced appetite (Khalaf *et al*., 2023). Despite being one of the important factors of undernutrition, appetite loss is rarely assessed, especially in the clinical and hospital settings (Souto Barreto *et al*., 2022). Appetite or ability to desire food and drinks impacts one's nutritional and dietary intake. Lower appetite or anorexia of ageing is frequently linked to slow gait, reduced mobility and poor endurance as well as frailty, sarcopenia and increased mortality (Landi *et al*., 2016).

Furthermore, inadequate dietary intake and low diet quality has always been a problem among older adults, resulting in unmet nutritional needs and essential energy requirements (Landi *et al*., 2016). This could lead to unintentional and unwanted weight loss, decreasing the amount of lean body mass and muscle tissues (Soenen *et al*., 2013). Weight loss over 5% or more in the period between 6 to 12 months indicates higher risk of morbidity (Gaddey & Holder, 2014). If the state of undernutrition is prolonged, effects such as sarcopenia, immune dysfunction and reduced cognitive function would soon begin to set.

Thus, this study is set to investigate the impact of appetite level, or anorexia of ageing, in relation with their calorie intake in order to determine whether or not these factors have an association with malnutrition among older adult population. Possible benefits that could be gained from this research include more data to further support or deny the previous or future studies, in the effort to narrow the knowledge gaps regarding this field of interest. The knowledge produced from this study would also contributes in developing nutrition intervention among older adults population, as well as intervention for maintaining healthy appetite level and calorie intake for this population.

1.3 Research Questions

The following questions are expected to be answered at the end of the study:-

i. What is the association between sociodemographic status and gender among older adults in HPUSM?
ii. What is the association between medical history and gender among older adults in HPUSM?
iii. What is the association between level of appetite and gender among older adults in HPUSM?
iv. What is the association between malnutrition status and gender among older adults in HPUSM?
v. What is the association between calorie intake and gender among older adults in HPUSM?
vi. Is there an association between appetite level and malnutrition status among older adults in HPUSM?
vii. Is there an association between calorie intake with malnutrition status among older adults in HPUSM?

1.4 Research Objectives

1.4.1 General Objective

To determine the association between appetite level and calorie intake on malnutrition status among older adults in Hospital Pakar Universiti Sains Malaysia (HPUSM).

1.4.2 Specific Objectives

i. To determine the association between sociodemographic status and gender among older adults in HPUSM.
ii. To determine the association between medical history and gender among older adults in HPUSM.
iii. To determine the association between level of appetite and gender among older adults in HPUSM.
iv. To assess the association between malnutrition status and gender among older adults in HPUSM.
v. To assess the association between calorie intake and gender among older adults in HPUSM.
vi. To determine the association between appetite level and malnutrition status among older adults in HPUSM.
vii. To determine the association between calorie intake and malnutrition status among older adults in HPUSM.

1.5 Research Hypothesis

1.5.1 Null Hypothesis (H_0)

1. There is no association between appetite level and malnutrition status among older adults in Hospital Pakar USM, Kubang Kerian, Kelantan.
2. There is no association between calorie intake and malnutrition status among older adults in Hospital Pakar USM, Kubang Kerian, Kelantan.

1.5.2 Alternative Hypothesis (H_0)

1. There is an association between appetite level and malnutrition status among older adults in Hospital Pakar USM, Kubang Kerian, Kelantan.
2. There is an association between calorie intake and malnutrition status among older adults in Hospital Pakar USM, Kubang Kerian, Kelantan.

1.6 Justification of Study

The findings of this research will produce information regarding the malnutrition status of older adults' population in Hospital Pakar USM in relation to their calorie intake and appetite level. Sociodemographic and medical history was also observed in relation of gender among older adults in Hospital Pakar USM. Several studies have been done to investigate these relationships. Therefore, the outcome of this study could strengthen existing evidence. Additionally, it can be used as data to develop systematic plans to combat malnutrition, especially in the older adult community. To illustrate, interventions through dietary guidelines, hospital-based interventions or community programs tailored to older adults may be organized and developed using the findings from this study. Participants can also be aware of their appetite and nutritional status, thus helping them to improve their habits.

1.7 Conceptual Framework

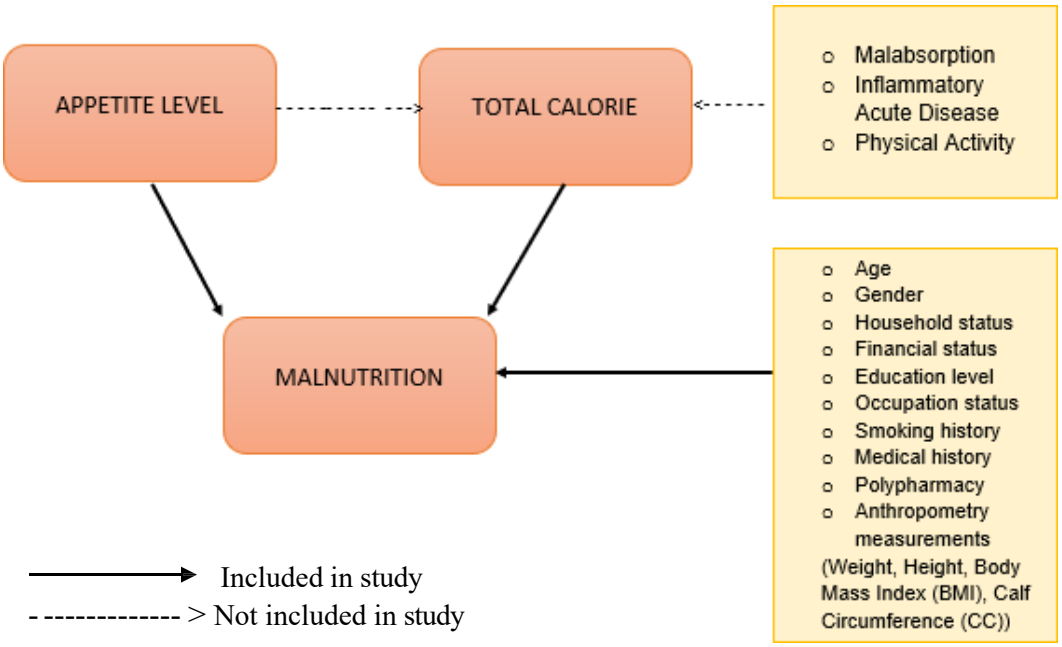

Figure 1: Conceptual framework of association between appetite level and dietary intake with malnutrition status.

Dietary intake influences malnutrition as essential nutrients required by the body to carry out its function and maintain its homeostasis condition are insufficient. Changes in energy expenditure and malabsorption could also lead to malnutrition (Saunders & Smith, 2010). Furthermore, presence of acute diseases could attribute to increased inflammatory status, trigger depressive state and incur cognitive disorder, whereby all these conditions could cause weight loss and affect nutritional status in older adults gradually (Norman *et al*., 2021). Typically, older adults consume low protein, below the recommended intake. This is a key determinant in increased risk of malnutrition development.

Ageing population tend to have poor appetite and insufficient dietary intake which causes increased risk of weight loss and malnutrition (Sieske *et al*., 2019)**.** Furthermore, poor appetite is a determinant for reduced energy intake that is commonly linked to low diet variation and overall diet quality especially for older adults (van der Meij *et al*., 2017). According to the findings of van der Meij *et al*. (2017), lower intake of energy, protein, fiber, solid fruits and vegetables are reported for older adults with low appetite compared to those with normal or good appetite. Appetite regulation is considered to be complex with different control systems such as the brain, digestive system, endocrine system and sensory nerves involved in this process. Hormones released prior, during and post meal differs from one another, thus managing feeding behaviour and portion of the meal eaten (Pilgrim *et al*., 2015). Additionally, a decrease in gastrointestinal hormones and changes in anorectic signalling such as orexin A, peptide YY, cholecystokinin and others, are reported to alter appetite regulation among older adults (Pilgrim *et al*., 2015). Agerelated oral changes i.e poor dentition, difficulty to chew and swallow is also leads to decreased dietary intake, poor appetite and overall nutritional status. Therefore, this study seeks to investigate the relationship between appetite level and dietary intake of older adults with their malnutrition status.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 Prevalence of malnutrition among older adults

Malnutrition is an ever-growing problem for older adults globally. According to the data from the World Health Organization (WHO), the number or older adults is increasing with 1 billion older adults in 2019 and an expected increase to 1.4 and 2.1 billion by 2030 and 2050, respectively. Since the risk of malnutrition increases proportionally with age (Marit Kolberg *et al.*, 2023), the prevalence of malnutrition is expected to increase as well. In Malaysia, a study conducted by Ahmad *et al*. (2021) using the Mini Nutritional Assessment Short Form (MNA-SF) stated that 7.3% of older adults are malnourished and 23.5% are at risk of being malnourished.

On the other hand, other geographical areas record different percentages of geriatric malnutrition. According to Mostafa *et al*. (2023), the estimation of at-risk and malnourished older adults is around 25% in the United States and is expected to increase throughout the years. Furthermore, in India, the prevalence of malnutrition shows the percentage of 17.9% for malnutrition and 58.8% for at risk malnutrition older adults, based on a study conducted by Krishnamoorthy *et al*. (2018) in Puducherry while Ethiopia records 26.6% geriatric malnutrition prevalence according to Abate *et al*. (2020). These differences across the globe might be influenced by multiple factors that are applicable to each country or geographical area such as food insecurity and availability as well as socio-economic factors.

Hospitalized settings procure higher prevalence of malnutrition, according to the study conducted in Malaysia by Tan *et al*., (2016). The result procured shows that the prevalence for hospitalized older adult population is 34.7%. This shows that hospitalized older adults have a higher malnutrition risk compared to older adults that live in the community, with the evidence that only 3.3% community-dwelling older adults are malnourished, according to the study conducted in Kuala Lumpur, Malaysia (Norazman *et al*., 2020). Shazli *et al*. (2022), stated that the prevalence of hospitalized older adults falls in the range between 9-74.5%. This systematic review involves 22 articles from different countries such as Malaysia, Italy, Saudi Arabia, Korea and others.

Furthermore, it is believed that the length of stay also contributes to the worsening of malnutrition status among hospitalized older adults (Bellanti *et al*., 2022), with 60-65% chance of decline in nutritional status. This incidence might be stemmed from the restrictive food timing, loss of appetite, medications that affects appetite or fasting requirement prior to any medical procedure. Furthermore, there is a difference in prevalence of malnutrition among the rural and urban settings as shown by the study conducted by Ahmad *et al*.(2021), whereby the rural records higher mean prevalence of 10%, as compared to 6.3% by the urbans. This is aligned with other research conducted outside of Malaysia that yields the same result. In a separate study conducted in Ethiopia, the prevalence of malnutrition among rural community is 25.2% as opposed to the urban community with 9.9% (Ferede *et al*., 2022). A study from a neighbouring country, Thailand, concluded that the reason for this occurrence might be due to the lower quality diet practised by the rural community (Chuansangeam *et al*., 2022). However, a metaanalysis study failed to establish a significant correlation between the area of residence with the prevalence of malnutrition (Besora- Moreno *et al*., 2020).

2.2 Prevalence and Risk Factor for Poor Appetite among Older Adults

The commonness of poor appetite level among older adults may differ according to the setting in which they currently reside. Overall prevalence of poor appetite among hospitalized older adults in Malaysia is stated to be 64.2% (Mohamad *et al*., 2010). Additionally, another study by Hanisah *et al*., (2012) stated that institutionalized older adults have a higher percentage of low appetite, which is 70%, compared to non-institutionalized older adults, with a percentage of 18.6%. In the United Kingdom, the setting with the lowest percentage would be the community (11-28%), followed by the care homes (12-22%) and records the highest in a hospitalized setting (30-60%) (Cox, 2024). These differences show that the appetite level of older adults may be influenced by the social settings. This is due to stricter diet regimes such as low sodium diet, which contributes to further decline in appetite as the food is perceived as unappetizing by the hospitalized older adults (Wysokiński *et al*., 2015). Furthermore, consumption of medication may induce side effects of vomiting, metallic after taste, nausea and gastrointestinal problems such as constipation and diarrhea. These conditions lower the overall desire to consume meals to avoid experiencing ‘worse’ side effect.