

Addressing nutritional needs of sarcopenia in older adults

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Introduction

- Malaysia will be an aging nation by 2030 with 15 % of older adults in the population: Impact government allocated resources on health, pension, and social programs.
- Ageing is associated with many adverse health outcomes including the decline in muscle mass and strength known as sarcopenia.
- The rate of decline in muscle mass & physical function are varied: modifiable behavior factors such as diet can influence the development of sarcopenia (Bloom et al. 2018).

Introduction

- Improving diet & nutrition may be effective for both the prevention and treatment of sarcopenia, thus promoting health in later life (Robinson et al. 2012).
- Identification of individuals at risk of malnutrition to provide early intervention: an important public health strategy for preventing the development of sarcopenia and related complications, such as frailty (Morley 2008).

What is sarcopenia?



Definition

Age-related loss of skeletal muscle, muscle strength, or/and reduced physical performance
Growing public health problems in healthy community-dwelling older adults in Asia (Wang et al. 2017; Yoshimura et al. 2017)



Process

Progressive muscle disease that is described as a combination of low muscle quality and physical performance.



Outcomes

It is associated with chronic diseases, disability, risk of falls, poor quality of life, independency and mortality.

Prevalence of sarcopenia

Global

10 to 27% for those ≥ 60 years (Petermann-Rocha et al. 2022)



Malaysia

At the community:
60-70 years: 5 to 13 %
80 years and older: 11 to 50 %
(Rosli et al. 2017)



Malaysia

Prevalence of sarcopenia was 33.6% of community-dwelling older adults (Ranee et al. 2022)



Asia

4.15% and 11.5% in the general communities
(Shafiee et al. 2017)

Malaysia

Among older adults with T2D:
28.5% (Sazlina et al. 2020)
Long-term care homes: 47 %
(Yap et al. 2020)



Risk factors of sarcopenia

- A low-quality diet is one of the major contributing factors to sarcopenia and muscle weakness (Beaudart et al. 2019).
- Higher body mass index was associated with an increased risk of sarcopenia (Liu et al. 2022).
- Smoking was associated with an increased risk of sarcopenia in a meta-analysis of 29 studies (Gao et al. 2021).
- Association between malnutrition and sarcopenia; early identification of older adults with associated risk factors (Chen et al. 2022).



Malnutrition & sarcopenia

Country	Methodology	Findings
Malaysia (Norazman et al. 2020)	Cross-sectional study, Community-dwelling, ≥ 60 years old	<ul style="list-style-type: none">• Mid-upper arm circumference, calf circumference (CC), and skeletal muscle mass index were all significantly associated with malnutrition risk; related to frailty & sarcopenia
Indonesia (Arjuna et al. 2017)	Cross-sectional study, Community-dwelling, ≥ 65 years old	<ul style="list-style-type: none">• A significant correlation between malnutrition risk and muscle function in terms of HGS and gait speed
Taiwan (Chang 2017)	Cross-sectional study, Community-dwelling, ≥ 65 years old	<ul style="list-style-type: none">• Older adults at risk of malnutrition have poorer muscle strength, had less energy, and more often had sarcopenia and measures of frailty



Outcomes measures



Muscle mass

Anthropometry, Dual-energy X-ray absorptiometry (DXA), Bioimpedance analysis (BIA), Computed tomography (CT), Magnetic resonance imaging (MRI)



Muscle strength

Handgrip strength (HGS)
Quadriceps strength
Muscle quality index

Physical performance

Short Physical Performance Battery (SPPB), Gait/walking speed, Timed get-up-and-go test, Balance Stair climb power test



Sarcopenia

Combined outcomes of muscle mass, muscle strength or physical performance

Bloom et al. (2018)



Nutrient intake & sarcopenia

Country	Methodology	Findings
Malaysia (Ranee et al. 2022)	Cross-sectional study, Community-dwelling, ≥ 60 years old	<ul style="list-style-type: none">Lower net intake of energy, carbohydrate, protein, fat and sodium in subjects with sarcopenia
Singapore (Chew et al. 2022)	Cross-sectional study, Community-dwelling, ≥ 65 years old	<ul style="list-style-type: none">Subjects with sarcopenia had lower dietary protein intake
Iran (Bagheri et al. 2021)	Cross-sectional study, Community-dwelling, ≥ 55 years old	<ul style="list-style-type: none">Adherence to carbohydrate-vitamin dietary pattern associated with lower low gait speed

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Nutrient intake & sarcopenia

Country	Methodology	Findings
Belgium (Beudart et al. 2019)	Cross-sectional study, Community-dwelling, ≥ 65 years old	<ul style="list-style-type: none">• Sarcopenic subjects had a lower intake of lipid, iron, magnesium, and potassium, protein
Netherlands (ter Borg et al. 2016)	Cross-sectional study, Community-dwelling, ≥ 65 years old	<ul style="list-style-type: none">• Subjects with sarcopenia had 10–18%⁺ lower intake of n-3 fatty acids, vitamin B6, vitamin E, and magnesium compared with non-sarcopenic subjects

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Dietary intervention

Protein

Adequate energy and protein intake are important elements of nutritional therapy for sarcopenia

- Intervention: varying doses of enriched milk protein, whey protein, leucine, cooked lean meat
- Duration: 12 weeks to 12 months
- Some combined with exercise
- In frail elderly individuals it may be that a combination of exercise with additional protein intake may help to minimize the loss of lean mass and diminished strength that occurs with aging

Review by Ganapathy & Nieves (2020)

Dietary intervention

Omega-3 fatty acids

The most studied include EPA & DHA, proposed of having anti-inflammatory effects

- Intervention: varying amount of omega-3 supplementation, fish oil (EPA & DHA)
- Duration: 8 weeks to 6 months
- Some combined with strength training
- Increase muscle volume, hand grip strength

Review by Ganapathy & Nieves (2020)

Dietary intervention

Vitamin D

- ▲ The deficit of vitamin D has been associated with reduced muscle mass and strength in prospective studies
 - Intervention: vitamin D supplementation
 - Duration: 6 weeks to 9 months
 - It is unclear whether the dose, frequency of dose, or length of treatment impacts the efficacy of vitamin D on improving muscle mass or function

Review by Ganapathy & Nieves (2020)

Dietary intervention

Combination of nutrients

Studies on the impact of supplementation with a combination of several nutrients with regard to muscle strength or mass or physical performance

- Intervention: whey protein, vitamin D, leucine, MCT, calcium, EAA, tea fortified with catechins
- Duration: 6 weeks to 3 months
- Significant improvement in muscle mass, hand grip, and walking speed compared to the control/ placebo group

Review by Ganapathy & Nieves (2020)

Long lasting impact depends on baseline nutritional status, baseline severity of sarcopenia, and long-lasting adherence to the intervention regime (Woo 2017)

Diet & exercise intervention

- Sedentary behavior or absence of exercise are the key elements for the progression of sarcopenia/atrophy of the aging muscle tissue (Gianoudis et al. 2015).
- Resistance exercise is a necessary stimulus to induce increases in skeletal muscle mass (Tieland et al. 2019).
- Combination of nutritional interventions and physical exercise can synergically improve muscle health; may be the most effective strategy for the management of sarcopenia (Damanti et al. 2019).

Diet & exercise intervention

Country	Methodology	Findings
South Korea (Kim et al. 2023)	Older adults aged ≥ 65 years old, 12-week combined intervention consisted of back extensor strengthening exercises and protein supplementation	<ul style="list-style-type: none">• No changes in muscle mass & handgrip strength• SPPB & back performance scale sum score increase & improved
Brazil (Roschel et al. 2021)	Older adults aged with mean age of 72 ± 6 years), twice-a-week, resistance training program, receiving either protein (whey and soy), leucine, or creatine supplementation	<ul style="list-style-type: none">• Leucine supplementation was ineffective to improve muscle mass and function• Whey and soy failed to enhance resistance-training effects.• Resistance exercise per se increased muscle mass and function in all sub-investigations.



Practical recommendations



Protein intake

Total daily protein intake of 1.6–1.8 g/kg/d



3 main meals

Containing 0.6 g/kg of high-quality protein sources



Energy intake

Ensure adequate energy supply to avoid negative energy balance



Exercise

Resistance exercise at least twice a week, increase number of steps



Antioxidant rich diet

Diet with high intake of fruits, vegetables & whole grains



Active lifestyle

Reduce sedentary time

Conclusion

- Improving dietary intake & physical activity level of older adults
- Importance of screening of older adults at risk of sarcopenia: malnutrition, food intake
- Combination of dietary intervention & resistance exercise as first-line intervention & prevention of sarcopenia

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Thank you

Do you have any questions?



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