

Sarcopenic Obesity in Older Adults: A Comprehensive Review of Epidemiology, Risk Factors, Complications, Prevention, and Management

Manjula K V¹, Renuka Devi²

PBBSC Nursing and Msc in Psychology, Nursing Tutour, JSS School of Nursing, Mysuru

MSc in Psychiatry, Principal, JSS School of Nursing, Mysuru

Abstract: *Sarcopenic obesity is a complex clinical condition characterized by the coexistence of reduced skeletal muscle mass and strength with excess adiposity. It is one of the growing public health problems among older adults, due to its strong association with metabolic disorders, cardiovascular diseases, frailty, disability, and increased mortality. The dual burden of sarcopenia and obesity exacerbates inflammation, insulin resistance, and physical inactivity, creating a vicious cycle that accelerates health deterioration. Early identification of sarcopenic obesity remains challenging due to heterogeneous diagnostic criteria and lack of standardized assessment tools. This review aims to synthesize current evidence on the definition, epidemiology, causes, clinical manifestations, prevention and management strategies of sarcopenic obesity. It is placed on lifestyle-based interventions, including resistance exercise, nutritional optimization, and multidisciplinary care approaches. Understanding sarcopenic obesity is essential for developing effective preventive and therapeutic strategies to promote healthy aging and improve quality of life.*

Keywords: Sarcopenia Obesity, Aging, Muscle loss, Frailty

1. Introduction

Sarcopenic involves age-related loss of muscle mass and function, obesity is characterized by excessive fat accumulation. When these conditions coexist, their adverse effects are synergistic rather than additive. Sarcopenic obesity is associated with poor physical performance, higher risk of falls, metabolic dysfunction, disability, hospitalization, and mortality. Despite its clinical relevance, sarcopenic obesity remains underdiagnosed and undertreated due to variability in diagnostic criteria and limited awareness among healthcare professionals. This article reviews current evidence to provide a comprehensive understanding of sarcopenic obesity and inform future research and intervention strategies.

2. Definition

Sarcopenic obesity is defined as the **presence of sarcopenic (low muscle mass, muscle strength, and/or physical performance) in individuals with excess body fat or obesity**. According to the European Working Group on Sarcopenic in Older People (EWGSOP), sarcopenic is primarily identified by reduced muscle strength, with confirmation by low muscle quantity or quality. Obesity is commonly assessed using body mass index (BMI), waist circumference, or body fat percentage. The absence of universally accepted diagnostic criteria for sarcopenic obesity contributes to variability in prevalence estimates.

Epidemiology

The prevalence of sarcopenic obesity varies widely due to differences in diagnostic criteria, population characteristics and assessment methods. Global estimates suggest prevalence rates ranging from **2% to 20%** among

community-dwelling older adults. Higher prevalence has been reported in individuals aged above 65 years, women, and those with sedentary lifestyles. In Asian and European populations, prevalence rates between **5% and 15%** have been documented, while studies indicate a growing burden in low- and middle-income countries due to rapid demographic transitions and lifestyle changes.

Causes

The development of sarcopenic obesity is multifactorial and includes

- **Aging-related physiological changes** – decline in anabolic hormones and muscle protein synthesis,
- **Physical inactivity** – reduced muscle loading and increased fat accumulation,
- **Chronic low-grade inflammation** – elevated cytokines such as IL-6 and TNF- α
- **Insulin resistance** – impaired glucose uptake in muscle tissue
- **Poor nutritional intake** – inadequate protein and micronutrients
- **Hormonal changes** – decreased growth hormone, testosterone, and estrogen,
- **Chronic diseases** – diabetes mellitus, cardiovascular disease, and osteoarthritis.

Clinical Features

Common manifestations of sarcopenic obesity include: Reduced muscle strength and endurance, Difficulty in walking, climbing stairs, or performing daily activities, Increased fatigue, Poor balance and higher risk of falls, Central obesity with reduced lean body mass, Decreased quality of life, Increased dependency in activities of daily living,

Management

Management of sarcopenic obesity requires a **multidisciplinary approach**: **Exercise Interventions** are Progressive resistance training, combined aerobic and strength training, Balance and flexibility exercises, **Nutritional Management** are High-quality protein supplementation, Adequate vitamin D and calcium intake and Calorie control without excessive restriction. **Medical and Supportive Care** including Management of comorbidities, Hormonal evaluation when indicated, Physiotherapy and occupational therapy and Behavioural interventions to improve and maintain weight.

3. Complications

Sarcopenic obesity is associated with multiple adverse health outcomes due to the combined effects of reduced muscle mass and excess adiposity. These complications are often more severe than those seen in sarcopenic or obesity alone.

- **Functional Decline and Disability**; Loss of muscle strength combined with increased body weight leads to impaired mobility and reduced physical performance. Individuals experience difficulty in walking, climbing stairs, standing from a seated position, and performing activities of daily living, resulting in increased dependency.
- **Increased Risk of Falls and Fractures**; Sarcopenic obesity compromises balance, coordination, and muscle power while excess fat mass increases mechanical load. This significantly elevates the risk of falls and fall-related injuries, including osteoporotic fractures.
- **Metabolic and Cardiovascular Complications**; the condition is strongly associated with: Insulin resistance and type 2 diabetes mellitus, Dyslipidemia, Hypertension, in Metabolic syndrome seen in increase the risk of cardiovascular diseases such as coronary artery disease and stroke.
- **Chronic Inflammation**; Excess adipose tissue produces pro-inflammatory cytokines (e.g., TNF- α , IL-6), which accelerate muscle protein breakdown and worsen sarcopenic. Persistent low-grade inflammation contributes to disease progression and systemic complications.
- **Frailty Syndrome**; Sarcopenic obesity is a major contributor to frailty, characterized by weakness, fatigue, slow gait speed, and reduced physiological reserve. Frail individuals are highly vulnerable to stressors such as illness or hospitalization.
- **Reduced Quality of Life**; Physical limitations, fatigue, and loss of independence negatively affect psychological well-being, leading to decreased self-esteem, social isolation, depression, and anxiety.
- **Increased Morbidity and Mortality**; Studies indicate that sarcopenic obesity is associated with higher rates of hospitalization, longer hospital stays, postoperative complications, and increased all-cause mortality compared to sarcopenic or obesity alone.
- **Impaired Glucose and Lipid Metabolism**; Reduced muscle mass decreases glucose uptake and lipid oxidation, leading to poor metabolic control and increased fat accumulation, perpetuating a vicious cycle of muscle loss and obesity.

- **Musculoskeletal Disorders**; Increased body weight places excessive stress on joints while weakened muscles fail to provide adequate support, increasing the risk of osteoarthritis, chronic pain, and postural abnormalities.
- **Poor Recovery from Illness and Surgery**; Individuals with sarcopenic obesity show delayed wound healing, reduced immune response, and prolonged rehabilitation following acute illness or surgical procedure.

Prevention

Preventive strategies focus on maintaining muscle mass while preventing excessive fat accumulation: Regular **resistance and strength training exercises**, Adequate **dietary protein intake** (1.0–1.2 g/kg/day for older adults), Balanced diet rich in fruits, vegetables, and whole grains, Maintenance of healthy body weight, Early screening for muscle weakness in older adults, Health education promoting active aging,

4. Conclusion

Sarcopenic obesity is an emerging and under recognized condition with serious health consequences among older adults. Early identification and integrated lifestyle-based interventions are critical for preventing functional decline and improving health outcomes. Standardization of diagnostic criteria and longitudinal research are essential to guide effective public health policies and clinical management strategies. Sarcopenic obesity leads to complex, multisystem complications that significantly impair physical function, metabolic health, and overall survival. Early identification and integrated management are essential to prevent long-term disability and improve health outcomes.

References

- [1] Rosenberg IH. Sarcopenic: origins and clinical relevance. *J Nutr.* 1997;127(5 Suppl):990S-991S.
- [2] Cruz-Jentoft AJ, Bahat G, Bauer J, et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing.* 2019;48(1):16-31.
- [3] Stenholm S, Harris TB, Rantanen T, Visser M, Kritchevsky SB, Ferrucci L. Sarcopenic obesity: definition, cause and consequences. *Curr Opin Clin Nutr Metab Care.* 2008;11(6):693-700.
- [4] Donini LM, Busetto L, Bauer JM, et al. Critical appraisal of definitions and diagnostic criteria for sarcopenic obesity. *Clin Nutr.* 2020;39(8):2368-2377.
- [5] WHO. Obesity and overweight. *World Health Organization*; 2023.
- [6] Luo Y, Wang Y, Tang S, Xu L, Zhao X, Han M, et al. Prevalence of sarcopenic obesity in the older non-hospitalized population: a systematic review and meta-analysis. *BMC Geriatr.* 2024;24(1):357. doi:10.1186/s12877-024-04952-z.
- [7] Zhang X, Xie X, Dou Q, Liu C, Zhang W, Yang Y, et al. Association of sarcopenic obesity with the risk of adverse outcomes in older adults: a systematic review and meta-analysis. [Verify journal details before submission].
- [8] Scott D, Sanders KM, Aitken D, Hayes A, Ebeling PR, Jones G. Sarcopenic obesity and dynapenic obesity: 5-

year associations with falls risk in middle-aged and older adults. Obesity (Silver Spring). [Verify volume/pages before submission].

- [9] Batsis JA, Villareal DT. Sarcopenic obesity in older adults: aetiology, epidemiology and treatment strategies. Nat Rev Endocrinol. [Verify publication details before submission].
- [10] Chen LK, Woo J, Assantachai P, Auyeung TW, Chou MY, Iijima K, et al. Asian Working Group for Sarcopenia: 2019 consensus update on sarcopenia diagnosis and treatment. J Am Med Dir Assoc. 2020;21(3):300-307.e2.
- [11] The Asia-Oceania Association for the Study of Obesity working group. The Asia-Oceania consensus: definitions and diagnostic criteria for sarcopenic obesity. 2025.
- [12] Japanese Working Group on Sarcopenic Obesity. Diagnosis of sarcopenic obesity in Japan: consensus statement of the Japanese Working Group on Sarcopenic Obesity. 2024.
- [13] Global prevalence of sarcopenic obesity in older adults: a systematic review and meta-analysis. Clin Nutr. 2021.