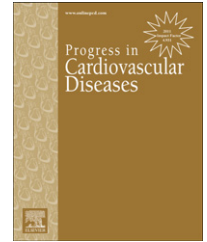


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Low Weight and Overweightness in Older Adults: Risk and Clinical Management

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ABSTRACT

The prevalence of individuals who are overweight or obese is growing exponentially in the United States and worldwide. This growth is concerning, as both overweightness and obesity lead to impaired physical function, decreased quality of life, and increased risk of chronic diseases. Additionally, overweightness and obesity are related to increased mortality among young and middle-aged adults. This weight-related risk of mortality is more ambiguous among older adults. In fact, obesity may be protective in this population, a relationship described as the “obesity paradox”. In this review we discuss the effects of overweightness and obesity among the elderly on cardiovascular disease and all-cause mortality, along with the risks of low weight. We conclude by discussing the goal of weight management among older adults, focusing particularly on benefits of preserving lean body mass and muscular strength while stabilizing body fat. Ideally, overweight or mildly obese elderly individuals should devise a plan with their physicians to maintain their weight, while increasing lean body mass through a plan of healthy diet, behavioral therapy, and physical activity.

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The prevalence of individuals who are overweight or obese, defined as a body mass index (BMI) between 25 and 29.9 kg/m² and a BMI > 30 kg/m², respectively, is growing exponentially in the United States (US) and worldwide.¹ From 1986 to 2000, prevalence of individuals with a BMI > 30 kg/m² doubled, those with a BMI of > 40 kg/m² or more quadrupled, and those with even more extreme obesity (BMI > to 50 kg/m²) increased five-fold.² This growth is concerning, as both overweightness and obesity lead to impaired physical function, decreased quality of life (Qol), along with increasing the risk of a number of chronic diseases.^{3,4}

The detrimental effects of overweightness and obesity on the human body are numerous, affecting most organ systems.^{2,3,5–7} Obesity increases the risk of dyslipidemia, inflammation, increased total blood volume, hypertension (HTN), left ventricular hypertrophy, and left atrial enlargement, which in turn may lead to atrial fibrillation, systolic and diastolic left ventricular dysfunction, and atherosclerotic heart disease^{3–6,8–11} (Table 1). The risks of osteoarthritis, cancer, sleep-disorder breathing, and liver and gallbladder diseases are also increased by obesity.^{3,12,13} While links between overweightness and obesity with mortality are less

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Abbreviations and Acronyms

BF = body fat

BMI = body mass index

CHD = coronary heart disease

CI = confidence interval

CVD = cardiovascular disease

HF = heart failure

HR = hazards ratio

HTN = hypertension

LBM = lean body mass

PA = physical activity

QoL = quality of life

US = United States

clear^{5,6,14} the US clinical guidelines established by the National Institutes of Health and National Heart, Lung, and Blood Institute identify them as marker risk factors for increased morbidity and mortality.^{5,6} However, the risk of mortality with increasing BMI is less pronounced among older adults,^{15–17} with mortality and morbidity risks that are more ambiguous compared to younger adults.^{18–20}

The prevalence of overweightness and obesity among the elderly is high, with 74% of US men and 66% of US women aged 60 years and over having a BMI of 25 or greater, of which 37% are classified as obese.^{7,9,21,22} With aging there are normal physiological changes in body composition that lead to overweightness.²³ Increasing total body fat content, more central fat distribution, and decreasing lean body mass (LBM) are all typical, and lead to progressive increases in BMI and body fat (BF) until 60 years of age, followed by subsequent declines in both thereafter.^{6,23,24}

Despite the typical health risks of obesity, there appears to be an “obesity paradox” in which older adults have a lower risk of mortality compared with young adults by being overweight and no detrimental effects from being mildly obese.^{4,25} This “paradox” occurs in a wide array of diseases including cardiovascular disease (CVD) as well as advanced cancers, human immunodeficiency virus/acquired immunodeficiency syndrome, renal failure, rheumatoid arthritis, and chronic obstructive pulmonary disease.^{4,5,26}

In this review we discuss the effects of overweightness and obesity on CVD and all-cause mortality, the risks of being low weight, and the goal of weight management among the elderly.

Obesity and CVD

Numerous studies have described an “obesity paradox”, in which individuals with higher BMIs are at decreased risk of mortality from CVD, such as HTN, coronary heart disease (CHD), and heart failure (HF) compared to their leaner counterparts, despite the known associations between obesity and these diseases.^{5,6,8,11,14,27–37}

Among older patients with HTN in the Systolic Hypertension in Elderly Program, a wide range of BMIs was associated with a similar risk of death and stroke, while relatively low BMIs were associated with greater risk.²⁷ Similarly, in the Bypass Angioplasty Revascularization Investigation registry,

adults who underwent percutaneous coronary interventions had a 5.5% lower risk for in-hospital events (death, myocardial infarction, stroke, and coma) with each unit increase in BMI.³⁰ Similar findings have been described in other revascularization studies.^{31,35}

Mortality outcomes in CVD are also generally lower in those who are overweight and obese compared to their healthy-weight counterparts.^{29,36} A recent meta-analysis of 40 studies in 250,000 patients described that overweight and obese patients with CHD had a lower risk for total and CVD mortality compared with underweight and normal weight individuals. This effect, however, was reversed once individuals reached a BMI ≥ 35 kg/m².³⁶ The investigators concluded that these findings might be explained by the lack of discriminatory power of BMI to differentiate between BF and LBM, though others have demonstrated that these relationships continue to hold true when using BF, instead of BMI, as the criterion.^{32,36}

Multiple possible reasons have been proposed as to why overweight and obese individuals do better than their low and normal weight counterparts (Table 2). These reasons include earlier presentation of heavier patients,³⁵ greater likelihood of receiving optimal medical therapy,^{38–40} cardioprotective metabolic effects of increased BF,^{31,41} benefits of higher LBM, including greater muscle mass and muscular strength,³⁸ and benefits of higher metabolic reserves.⁴² A recent study of 6142 HF individuals confirmed the “obesity paradox” in older individuals with heart failure.³⁷ It has been suggested that in HF, underweight individuals may not have enough metabolic

Table 1 – Effects of obesity and low weight on the body.

Cardiovascular effects of obesity
Dyslipidemia
Inflammation
Increased total blood volume
Hypertension
Left ventricular hypertrophy
Left atrial enlargement
Atrial fibrillation
Systolic left ventricular dysfunction
Diastolic left ventricular dysfunction
Atherosclerotic heart disease
Effects of obesity on other organ systems
Increased risk of osteoarthritis
Increased risk of cancer
Sleep-disorder breathing
Increased risk of liver disease
Increased risk of gallbladder disease
Other risks associated with obesity
Decline in activities of daily living
Increased weakness
Increased slowness
Frailty syndrome
Detrimental effects of low weight
Poor nutritional status
Increased risk of malnutrition
Osteoporosis
Traumatic events secondary to falls
Frailty syndrome
Cardiac cachexia

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