

Influence of adipose tissue mass on bone mass in an overweight or obese population: systematic review and meta-analysis

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Context: The scientific literature shows conflicting evidence about the relationship between adiposity and bone mass in overweight and obese populations. **Objective:** The aim of this review was to quantify the correlation between adipose mass (absolute and relative) and bone mineral density (BMD) in overweight and obese populations. **Data Sources:** Three databases were searched electronically. In addition, reference lists of relevant articles were screened. **Study Selection:** A total of 16 studies, comprising 2587 participants and 75 correlation coefficients were selected for inclusion in the review. **Data Extraction:** Data were extracted from each study using a standardized form. **Results:** Multilevel modeling indicated opposing relationships between BMD and adiposity: absolute adiposity correlated positively, and relative adiposity negatively, with BMD. Sex and age were the primary moderators of these relationships. Strong evidence supported a negative relationship between relative adipose mass and BMD in men ($R = -0.37$; 95%CI, -0.57 to -0.12) and in those aged less than 25 years ($R = -0.28$; 95%CI, -0.45 to -0.08). **Conclusion:** To prevent bone loss in overweight and obese populations, nutrition- and exercise-based interventions that focus on a controlled reduction of adipose mass with concomitant preservation of lean mass are recommended. **Systematic Review Registration:** PROSPERO no. CRD42015024313.

INTRODUCTION

The increasing prevalence of obesity is a global health problem, and recent statistics show that an estimated 38% of all adults are overweight, and 13% are obese.¹ In addition to the well-documented health consequences of increasing levels of overweight and obesity,² obesity also represents a substantial social and economic burden, owing to both direct (eg, increased healthcare costs) and

indirect (eg, higher dependence on welfare due to premature retirement and unemployment; increased sick leave) costs.³ The increasing prevalence of osteoporosis is another worldwide health issue with far-reaching social and economic consequences. Osteoporosis is estimated to cause more than 8.9 million fractures per year worldwide,⁴ and, compared with 1990 statistics, the global incidence of osteoporosis-related hip fracture is predicted to increase by 310% in men and 240% in women by the year 2050.⁵

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