

ASSOCIATION BETWEEN INHALANT ALLERGIES AND BONE MASS IN YOUNG ADULTS ASSESSED BY RADIAL QUANTITATIVE ULTRASOUND

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Background: Allergic diseases may affect skeletal health through chronic inflammation and immune-mediated mechanisms. However, evidence in young adults remains limited.

Objective: The aim of this study was to examine the association between inhalant allergy and bone mass in men and women aged 18–30 years.

Subjects and methods: The study included 649 young adults (256 men and 393 women). Bone mass was assessed using quantitative ultrasound (Sunlight MiniOmni) of the left radius (a non-dominant site, minimising the influence of mechanical loading), with the Z-score used as the outcome measure. Participants were classified into three groups: inhalant allergy (IA; mites, pollen, grasses, and mould), other allergy (OA; food and animal allergies), and no allergy (NA). Analyses were conducted separately for men and women using two regression models: a base model (Model 1) including covariates (BMI, history of wrist fracture, vitamin D and calcium supplementation), and a lifestyle model (Model 2) including smoking, alcohol consumption, and physical activity.

Results: Regression analyses revealed sex-specific differences. In men, IA was significantly negatively associated with Z-score in both models (Model 1: $\beta=-0.331$, $p=0.011$; Model 2: $\beta=-0.357$, $p=0.006$), indicating reduced bone mass. In women, IA was positively associated with Z-score in Model 1 ($\beta=0.214$, $p=0.039$) and Model 2 ($\beta=0.221$, $p=0.037$), indicating higher bone mass.

Conclusions: Inhalant allergy was associated with bone mass in a sex-specific manner, with less favourable bone health in men but not in women. The divergent pattern observed between sexes may reflect differences in hormonal and immune-mediated mechanisms, potentially involving the bone-protective role of oestrogen in women and greater susceptibility to inflammation-driven bone resorption in men; further research is needed. Allergic diseases may therefore be an important factor in anthropological research on skeletal health and biological variability.

Keywords: Z-score; Skeletal health; Sex differences; Lifestyle factors.

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