

Physical activity and favourable adiposity genetic liability reduce the risk of hypertension among high body mass individuals

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Running head: Favourable adiposity, genetic liability, physical activity, and hypertension

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Abstract

Background and Purpose:

Hypertension is a global health issue, and the risk factors include genetics, physical inactivity, and excess body fat (adiposity). Genetic predisposition to adiposity generally increases risk of hypertension. Several genetic variants have been identified to increase adiposity but unexpectedly reduce hypertension (favourable adiposity genes). Here, we tested the effect of these genetic variants on risk of hypertension in European ancestry participants under various scenarios of physical activity and body mass index.

Methods:

Favourable adiposity genetic liability was estimated using previously identified genetic variants and their effect sizes. The study analysed data from 210,290 unrelated participants in the UK Biobank. Logistic regression was used to examine the association between this genetic liability and hypertension (defined as systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mmHg, or the use of anti-hypertensive medications). The analyses were conducted separately based on physical activity status (physically active and inactive) within low and high body mass groups.

Results:

Individuals with high body mass, could reduce their risk of hypertension by up to 13% depending on the favourable adiposity genetic liability and physical activity status ($P_{\text{adjusted}} = 5.44 \times 10^{-7}$). In high body mass individuals, physical activity alone contributes to 5-7% reduction in risk of hypertension.

Conclusion:

The study provides evidence that the protective effect of favourable adiposity on hypertension risk varies according to body mass composition and physical activity status.

Key words: Hypertension, favourable adiposity, genetic liability, physical activity, body mass.

Physical Activity was defined as METs for moderate activity ≥ 150 OR METs for vigorous activity ≥ 75 OR summed METs for all activity ≥ 600 .