

0032

## Longitudinal and bi-directional associations of arterial stiffness with general and central fat mass from adolescence through young adulthood: The ALSPAC Study

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### Abstract

**Background:** The deleterious effect of obesity on arterial function and structure is well established. However, no study has investigated whether arterial health during adolescence contributes to young adults' adiposity.

**Objective:** To examine the longitudinal and bi-directional associations of carotid-femoral pulse wave velocity (cfPWV), a measure of arterial stiffness, with total and trunk fat mass from ages 17.7 through 24.5 years.

**Methods:** We studied 3862 participants (56% females) from the Avon Longitudinal Study of Parents and Children, UK. cfPWV was measured by ultrasound, total and trunk fat mass were measured by dual-energy Xray absorptiometry. We conducted cross-lagged structural equation models and adjusted for baseline covariates such as age, sex, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglyceride, high sensitivity C-reactive protein, systolic blood pressure, fasting blood glucose, fasting insulin concentration, heart rate, moderate to vigorous physical activity, smoking status, family history of cardiometabolic diseases, lean mass, total or trunk fat mass. All variables were measured both at age 17.7 and 24.5 years.

**Results:** Altogether 19.6% and 37.2% were overweight/obese at ages 17.7 and 24.5 years, respectively. cfPWV at 17.7 years was independently and directly associated with total fat mass [Regression coefficient 0.05kg (standard error 0.05);  $p=0.001$ ] and trunk fat mass [0.04kg (0.07);  $p=0.013$ ] at 24.5 years. In the reverse analysis, baseline total and trunk fat mass were directly and independently associated with follow-up cfPWV.

**Conclusion:** Arterial stiffness was bi-directionally associated with general and central adiposity, suggesting that adolescent's arterial health may be targeted in the prevention of obesity in young adulthood.

**Keywords:** Obesity, atherosclerosis, early adulthood, preventive cardiology, public health

**Abbreviations:** cfPWV- Carotid-femoral pulse wave velocity.

### Funding and Conflicts of Interest

The authors have no conflict of interest.

The UK Medical Research Council and Wellcome (Grant ref: 217065/Z/19/Z; 076467/Z/05/Z) and the University of Bristol provide core support for ALSPAC. The British Heart Foundation grant (CS/15/6/31468) funded carotid-femoral pulse wave velocity measurement. The Medical Research Council grant (MR/M006727/1) supported smoking data collection. Comprehensive list of grants funding is available on the ALSPAC website

(<http://www.bristol.ac.uk/alspac/external/documents/grant-acknowledgements.pdf>); This research (Dr Agbaje) was specifically funded by the Doctoral Program in Clinical Research, Institute of Public Health and Clinical Nutrition, Faculty of Health Sciences, University of Eastern Finland; the Jenny and Antti Wihuri Foundation (Grant no: 00180006); and the North Savo regional and central Finnish Cultural Foundation (Grants no: 65191835 and 00200150).