Reviewer's report

Title: Impact of Adiposity on Cardiac Structure in Adult Life: the Childhood Determinants of Adult Health (CDAH) Study

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Reviewer: Terrence Forrester

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Impact of Adiposity on Cardiac Structure in Adult Life: the Childhood Determinants of Adult Health (CDAH) Study

Context
The modifiable determinants of cardiovascular disease continue to constitute an area of study which holds potential to inform interventions to prevent, ameliorate, and treat disease. Recognising that exposures and their pathophysiologic effects are often spread over decades rightly raises the profile of a life course approach to risk assessment. This manuscript presents incremental findings in this area by analysis of cohort data based on a large childhood cohort whose members are now young adults. The study in essence adds to the examination list cardiorespiratory fitness, glucose metabolism and longitudinal changes in size and body composition which operate over some two decades. The findings add to the literature and so reinforce already described relationships between size/adiposity in earlier life, as well as change in body composition and size over time, and left ventricular structure, held to be a proxy for future CVD risk. Within this context the authors add information on a very small subset (a convenience sample constituting less than half of one percent of the cohort) who had physical fitness tests and cardiac echos.

Major Comments
The great weakness of the study relates to sampling. The authors indicate a random sample of 204 was selected but that only 180 of these had complete examinations. It is unclear what the hypotheses were that drove the sample selection. In addition, one fears that the 180/204 actually measured might have proven post hoc to be a convenience sub-sample of the already very small (<0.5%) set of individuals selected for additional investigations. Given this, it is worrisome that there are no power calculations to inform the level of confidence, a priori, one might place on observed differences across subcategories.

Other Comments
The aim/objective of this observational study appears to be to evaluate the particular relationship between body composition and body size over time and cardiac structure and function. This is stated clearly enough in a non hypothetical style.
The methods used for making anatomical and physiological measurements are appropriate. The sampling methodology as above seems to lack power calculations. The statistical approach is appropriate for life course data.

The discussions seem muted in relation to the metabolic determinants of cardiac structure/function, blood glucose, serum lipids. In addition, an opportunity was lost or rejected to explore fully potential mechanisms linking adiposity with cardiac structure and function.

The limitations of the study are stated baldly and restricted to sample size and potential bias due to incomplete recruitment. For example…It is odd that adiposity is currently the leading pathophysiological candidate for inducing cardiac structural and functional changes in the setting of overweight/obesity. Yet the discussion is silent on the weakness demonstrated by the analyses of the relationship of measures of fat mass (skinfolds and BMI) and cardiac anatomy. Is this weakening related to measurement error? Is it that both BMI and skinfold assessment of body composition are proxies for some other anatomic or pathophysiological process? Is the pathway for the effect of fitness through modulation of body composition or is it metabolic or physiological?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that i have no competing interests