Using childhood body composition to predict adult disease risk: A systematic review

This is a summary of the following paper: *Bander A, Murphy-Alford A, Owino V et al (2022) Childhood BMI and other measures of body composition as a predictor of cardiometabolic non-communicable diseases in adulthood: A systematic review. Public Health Nutrition, 26, 2, 323–350.* **https://pubmed.ncbi.nlm.nih.gov/36274635/**

Non-communicable diseases make up 71% of global deaths and are a huge financial burden for developed and developing countries alike. Childhood malnutrition has recently emerged as a possible risk factor for adult non-communicable disease risk, which could provide a useful marker for estimating the future burden of disease in a population. This systematic review of 29 studies investigated which measures of early life body composition could best predict non-communicable disease risk.

Due to heterogeneity among the included studies – where significant differences were observed in both protocol and outcomes, making it difficult to compare results – the review was presented as a narrative rather than as a quantitative summary. The studies featured a range of sample sizes (between 128 and 34,196 participants), which was a challenge for analysis, although all cohorts were representative of their target populations, which improved the validity of the findings. Most studies (n = 21) were from high-income countries, with five studies from India and only one study each from Guatemala and the Solomon Islands, making it difficult to extrapolate the findings to developing contexts as a whole.

The review featured a robust and systematic identification, screening and selection process, which considered an initial 5,764 studies. However, those included featured a mix of good, adequate and poor-quality studies when considering external and internal validity. It can be concluded that evidence on childhood body composition and later non-communicable disease is severely limited. No studies featured methods such as isotope dilution, plethysmography or dual-energy X-ray absorptiometry, which are more costly than basic anthropometric measures but have greater accuracy and precision. Body mass index (BMI) was the most common proxy measure of body composition used in the studies.

Most studies indicated that childhood BMI is associated with later-life cardiometabolic risk, but that changes in BMI rather than absolute BMI appear to be more important. Several studies showed that infant weight gain (catch-up growth to normal weight-for-age) is protective of non-communicable disease in later life and that low BMI at birth and in infancy are associated with an increased risk of non-communicable disease. Yet, high childhood BMI is also associated with an increased risk of non-communicable disease. The authors do articulate that BMI is a poor measure of adiposity, as it cannot differentiate between fat and fat free mass and is confounded by several factors in children, making it difficult to establish clear links. The lack of adjustment for current body size, which only featured in 11 studies, also impacts the interpretation of these results.

It should be noted that all studies controlled for known confounders to different degrees – which is important, given the broad range of confounding variables that could be present with this type of study – but the studies were observational in nature, which presents its own inherent limitations.

Ethical considerations for international research in low- and middle-income countries

This is a summary of the following paper: *Doherty T, Engebretsen IMS, Tylleskär T et al (2022) Questioning the ethics of international research on formula milk supplementation in low-income African countries. BMJ Global Health, 7, 5, e009181.* **https://gh.bmj.com/content/7/5/e009181**

There has been substantial growth in investment towards international research conducted in low- and middle-income countries (LMICs) by researchers or research sponsors from high-income countries. While ethical guidelines exist, examples of research with no benefit, and large potential for harm, still occur in LMICs.

Using the example of a formula milk supplementation trial in Uganda and Guinea-Bissau, this article presents key ethical considerations to be taken by institutional review boards, research funders, clinicians, scientists and governments when reviewing potential international research projects across LMICs. Such considerations are critical to ensure that research complies with international guidelines and recommendations, and provides scalable and sustainable strategies while protecting human rights.

Research studies must be justified and align with international public health recommendations, as well as with national guidelines in the country of implementation. In cases where research involves the modification of existing recommendations or guidelines, this decision must be adequately justified. In the case of the trial in Uganda and Guinea-Bissau, combining breastfeeding with formula milk supplementation for 30 days contradicted existing nutrition guidelines in both countries for the management of low birthweight infants, without justification.

Proposed interventions should be scalable within the study context, with demonstrated public health benefits and minimal risk of negative health and/or environmental impacts. Similarly, the principle of beneficence (i.e., doing no harm and acting in a patient or population's best interest) should guide the ethical review process, considering impacts throughout the study duration and beyond. This may involve considering how interventions maintain international and national guidelines and recommendations within and beyond implementation settings; how they influence health behaviours in the short and longer term; and how they align with contextual factors such as poverty, education, levels of infrastructure and access to resources. The formula milk supplementation trial violated these principles in several ways: the intervention modality itself (single-use, individually packed, premixed, hospital-distributed bottles) was not scalable within the study settings and presented risks to the establishment and continuation of breastfeeding, while contradicting the World Health Organization's Baby Friendly Hospital Initiative 10 steps to successful breastfeeding and having a negative impact on the environment. The authors suggest that we should instead focus on interventions that we already know work, including improving maternal nutrition; supporting and protecting early and exclusive breastfeeding and breastfeeding on demand; skin-to-skin contact; and continued lactation support.

Unlike the trial example, which seeks informed consent for formula milk supplementation from mothers within six hours of delivery, processes of gaining consent must be conducted under appropriate circumstances that allow potential participants the opportunity to make informed decisions on the risks and benefits of their involvement. They must also ensure that decision-making is not induced by perceived benefits of the intervention, or influenced by factors such as time pressures or existing vulnerabilities.

Finally, the role of the intervention being tested, and its long-term implications, must be considered – particularly when it undermines globally and/or nationally recommended interventions. Central to this is considering who benefits from the research and who bears its burdens.

The authors of this article call for those who review potential research projects in LMICs to exercise their responsibility to protect their citizens, in light of the ethical and human rights concerns that may be present.