

Concerns regarding “Association between intelligence quotient and obesity in England” and unjustifiable harm to people in bigger bodies

Dear Dr. Birrell

November 26, 2020

Dr. Fraser Birrell

Editor-in-Chief, *Lifestyle Medicine*

We write to express our concern about a paper you recently published in your newly established journal. The paper examines the association of a non-modifiable measure, IQ, and its relationship to adult body mass index (BMI). We are academics, health professionals, health psychologists and lay experts in weight stigma and discrimination, public health, patient advocacy and risk communication. We believe the contents of this paper are likely to cause unjustifiable harm to people in bigger bodies, some of whom may not be in a position to raise their concerns with the authors or yourselves. We further assert that there are numerous ethical and methodological issues that should be brought to your attention, which limit the applicability of the results.

This paper goes against the stated aims and the scope of your journal. First, your journal states that you “advocate the principles of sound science publishing” and that “if the science is reliable and sound, you will publish.” Yet this paper suffers a number of methodological flaws and, in particular, breaches two ethical principles, namely, beneficence and justice that significantly detract from the soundness of the science. As we demonstrate below, on this occasion your journal has not upheld good scientific principles. Second, you state that your journal “examines clinical and scientific aspects of lifestyle medicine and its incorporation into clinical practice.” This suggests that you are interested in research that identifies potentially modifiable risk factors that might be addressed in clinical practice in a way that is beneficial to people. IQ is neither a “lifestyle” choice nor a modifiable variable (as noted by the authors themselves). IQ is a highly heritable trait,¹ which can be influenced by environmental factors,² most of which are unmodifiable from an individual perspective. We outline our remaining concerns below, along with the scientific evidence that supports them.

1 | HIGH RISK OF HARM

The paper is openly available for anyone to read online, including practitioners, researchers, decision-makers, the general public, and media outlets. Indeed, such articles are often misinterpreted in the media,

adding to inaccurate portrayals, and the stigmatisation and discrimination of people with bigger bodies.³ The media frequently incorrectly attributes personal responsibility⁴ to people with bigger bodies and we believe that this article feeds into an unhelpful narrative that associates weight and measures of intelligence⁵ and policy decisions like barring children’s admission to top schools because of their parents’ weight.⁶

Publishing this study fuels negative stereotypes that people in bigger bodies lack intelligence—a dehumanizing stereotype that serves to deeply entrench discriminatory practices. There is a growing body of evidence supporting the fact that weight-based discrimination and prejudice are highly damaging⁷ and that weight-based discrimination carries both physiological and psychological health risks.⁸ Weight stigma has been associated with numerous adverse psychological consequences including depression, anxiety, low self-esteem, and self-isolation.⁹ Weight stigma, rather than living in a bigger body, can lead to unhealthy diets and sedentary activity⁹ and may also lead to chronic social stress, which has been demonstrated to lead to immunosuppression and increased risk of cardiovascular disease.^{10,11} It has also been associated with inequalities in access to education, healthcare settings, employment, and society.^{4,9} Given that weight stigma can drive poor health, it must be eradicated¹² and therefore the perpetuation of weight stigma in this paper and its conclusions are unacceptable. Indeed, weight stigma is such a substantial concern that an international committee has issued a joint statement calling for its eradication.⁹ In addition, the World Health Organisation (WHO) has recognized the profound consequences of weight stigma and has responded by detailing how the European Region can address weight bias and obesity stigma.¹³ The overwhelming evidence of the damage caused by weight discrimination and stigma and the concerns of the international community appear to have been ignored by the authors of this paper, and as a result the true magnitude of the risk to the target population have not been considered.

We note the data for this study came from the Adult Psychiatric Morbidity Survey (APMS), which was undertaken by the University of Leicester, UK on behalf of the National Centre (NatCen) for Social Research in 2007. The survey was commissioned by NHS Digital with funding from the Department for Health and Social Care. The authors state that ethics committee approval was obtained from the Royal Free

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Hospital and Medical School Research Ethics Committee. We presume this is for the original 2007 survey but this is not stated. In the interests of transparency, the date and reference number of the original ethics committee approval should be provided in the paper. We have contacted NatCen to ascertain if further permissions to use the data for secondary analysis are needed. Their response indicated that permissions are not needed for the 2007 dataset, but they rely on institutional reviews of research proposals using their data. Given the serious concerns about the paper, it would be useful to determine what, if any, scrutiny by the authors' institutions took place prior to this research taking place.

2 | METHODS

In addition to the ethical concerns outlined above, there are also several methodological issues that we wish to draw to your attention. These issues highlight the critical necessity to carefully consider and address existing stereotypical and scientific assumptions that may negatively impact research directions, methods, and conclusions. Our methodological concerns are divided into three main categories, which we review below: (1) BMI and IQ measurement, (2) the model and the conclusions drawn from it, and (3) Patient and Public Involvement (PPI).

2.1 | BMI and IQ measurement

The authors justify their research question by stating that they are exploring the controversy around BMI and IQ without providing a balanced argument exploring any potential benefits or harms of the stated hypothesis or acknowledging known limitations of the metrics used. It is well established that BMI is a poor indicator of health¹⁴ and the fact that the authors fail to highlight this is a fundamental flaw in their study. The consequences of this underreporting and the variable conditions in which they occur were minimally addressed by the authors, and not addressed in the context of interpretation and analysis.

The paper also fails to acknowledge widespread concerns around IQ testing and its negative impact on people and communities, opting only to acknowledge that familiarity with English may have biased results. The National Adult Reading Test (NART) was originally developed to estimate premorbid intelligence in people with dementia, for neuropsychological testing and research, because it is not possible to assess premorbid IQ directly in these conditions. In a cohort study, in which NART scores of 80-year olds were correlated with IQ tested at age 11, there was only a modest correlation of 0.6.¹⁵ Therefore, the variance in NART scores due to other factors is high, and indeed some of these are likely to be the same structural issues affecting BMI, such as material and social deprivation.

2.2 | The model and conclusions drawn

The analysis crudely explores the association between IQ and BMI metrics, constructing a model with 15 predictors without explicitly con-

sidering how the predictors might be related and how they influence any association between IQ and BMI. Furthermore, while the authors have adjusted for individual level variables, there is no consideration of the overwhelming evidence supporting the environmental, social, and structural causes of higher BMI.^{16,17} There is no evidence of a direct causal relationship between IQ and weight among those with intellectual disabilities. Adults with severe and profound learning disabilities have been found to have greater instances of 'normal' BMI and underweight, whilst those with mild-moderate learning disabilities were more likely to have overweight and obesity than those in the general population.¹⁸ Amongst those with milder learning disabilities, who may not be known to services (the so called "hidden majority"), factors associated with having low socioeconomic status have been associated with poorer health (including obesity), including material and social deprivation, living in environments in which they did not feel safe, and low income.¹⁹ To propose that a direct, linear relationship between IQ and BMI exists without any further analysis and understanding of the underlying factors, which may link the two is thus incomplete and misleading.

In an attempt to resolve this controversy, Jacob et al. try to control for a large number of potentially related predictors by including them into one large multivariate logistic regression. This approach is controversial and, without a well-informed and often explicit analysis of the relationships between predictor variables, can lead to substantively inaccurate regressions that either obscure or falsely create associations between the predictor variable of interest (IQ) and the outcome variable (BMI).²⁰⁻²² With such a large number of predictor variables in their model and with a research topic so rife with potential harm, we believe that the authors should have explicitly used a well-motivated directed acyclic graph (DAG) to warrant the inclusion of every one of the 15 predictor variables included, paying particular attention to stereotypical assumptions and diagnostic biases.²³⁻²⁵ Simply knowing that a predictor variable might be related both to IQ and to BMI is not enough to warrant its inclusion into a model for an observational study because including it may actually *generate* a confound. For example, it is perhaps reasonable to consider that educational attainment is causally impacted both by IQ *and* by BMI (discrimination at the hands of teachers, parents, and peers impacts ability to progress through educational programs). In this case, where educational attainment is causally impacted by IQ and BMI, it is a collider—and conditioning on it may create a false association between IQ and BMI, known as the Berkson's paradox.

2.3 | Public and Patient Involvement

The authors conducted secondary data analysis from an existing dataset of a survey conducted in the UK in 2006–2007. The current research questions do not appear to have been generated with regard to PPI.²⁶ PPI is critically important in health research to ensure that research questions are currently relevant to those whose lives may be affected. This research does not address any of the more recently published priority issues

for people with higher BMIs (e.g., <https://mrc.ukri.org/research/initiatives/obesity-research/>, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733038/Obesity_workshop_series_to_support_prioritisation_of_research.pdf; <https://mrc.ukri.org/research/initiatives/obesity-research/>). PPI seeks to democratise research and aims to ensure that researchers are accountable to the public who often directly and indirectly fund research activity. Our collective view, which includes PPI members, is that the topic of this paper would not have been identified as a research priority by people in bigger bodies or members of the public more generally. People with higher BMIs have reported a strong need for research to explore how best to support rather than create further harms reinforcing blame, stigmatisation, and discrimination.

3 | SOCIETAL AND CLINICAL IMPLICATIONS

The paper sets out to explore the risk factors for obesity and states its ultimate purpose is to determine effective prevention strategies. The findings suggest that people with lower IQs could be regularly assessed for obesity, which, as suggested above, would be a highly discriminatory practice and—combined with the fact that most people's weights and BMIs are already frequently screened throughout their lives—a highly ineffective and circuitous practice. There are no suggestions as to how this might be explored in future research and/or implemented into clinical services, although good practice guidelines are available.²⁷ The authors state that “dietitians, physiotherapists, and general practitioners” can undertake preventative screening work with people with low IQs with no acknowledgement of the complexity of this proposed activity. It is well established that healthcare professionals find it challenging to raise weight management with people,²⁸ yet their views about the relevance of this research question and the implications for their practice have not been ascertained. The authors also suggest that “IQ may be regularly assessed in specific situations such as the follow up of children with development difficulties or the follow up of adults with psychiatry disorders” without considering the impact of this statement on people in these distinct groups.

Given our numerous, evidence-based concerns, we do not believe the paper meets the journal's criteria for publication. We seek its retraction or, failing that, the publication of this letter alongside it to address the balance.

Yours faithfully

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CONFLICT OF INTEREST

I declare that I have no competing relationships or conflicts of interest. Under ICMJE I led the response, drafted the original letter, revised it according to the feedback I received and submitted it to the journal. I approve of the final version and agree to be accountable for all aspects of the letter.

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REFERENCES

1. Plomin R, Deary IJ. Genetics and intelligence differences: five special findings. *Mol Psychiatry*. 2015;20(1):98-108.
2. Makharia A, Nagarajan A, Mishra A, Peddisetty S, Chahal D, Singh Y. Effect of environmental factors on intelligence quotient of children. *Ind Psychiatry J*. 2016;25(2):189-194.
3. Flint SW, Nobles J, Gately P, Sahota P, Association for the Study of Obesity; Obesity Empowerment Network; Helping Overcome Obesity Problems; World Obesity Federation Applied Obesity Research Centre and Weight Stigma Research Group at Leeds Beckett University.

- Weight stigma and discrimination: a call to the media. *Lancet Diabetes Endocrinol.* 2018;6(3):169-170.
4. Puhl RM, Heuer CA. The stigma of obesity: a review and update. *Obesity (Silver Spring).* 2009;17(5):941-964.
 5. Goswami N. The greater your weight, the lower your IQ, say scientists. *The Telegraph*, October 15. 2006.
 6. Connor N. Top China schools test parents for IQ, ancestor's grades and 'obesity' on enrollment. *The Telegraph*, May 9. 2017.
 7. Spahlholz J, Baer N, König HH, Riedel-Heller SG, Luck-Sikorski C. Obesity and discrimination—a systematic review and meta-analysis of observational studies. *Obes Rev.* 2016;17(1):43-55.
 8. Puhl RM, Heuer CA. Obesity stigma: important considerations for public health. *Am J Public Health.* 2010;100(6):1019-1028.
 9. Rubino F, Puhl RM, Cummings DE, et al. Joint international consensus statement for ending stigma of obesity. *Nat Med.* 2020;26(4):485-497.
 10. Steptoe A, Kivimäki M. Stress and cardiovascular disease: an update on current knowledge. *Annu Rev Public Health.* 2013;34:337-354.
 11. Segerstrom SC, Miller GE. Psychological stress and the human immune system: a meta-analytic study of 30 years of inquiry. *Psychol Bull.* 2004;130(4):601-630.
 12. Tomiyama AJ, Carr D, Granberg EM, et al. How and why weight stigma drives the obesity 'epidemic' and harms health. *BMC Med.* 2018;16(1):123.
 13. World Health Organisation. Weight bias and obesity stigma: considerations for the WHO European Region. 2017. www.euro.who.int.
 14. Romero-Corral A, Somers VK, Sierra-Johnson J, et al. Accuracy of body mass index in diagnosing obesity in the adult general population. *Int J Obes.* 2008;32(6):959-966.
 15. McGurn B, Starr JM, Topfer JA, et al. Pronunciation of irregular words is preserved in dementia, validating premorbid IQ estimation. *Neurology.* 2004;62(7):1184-1186.
 16. UK Government Office for Science. Tackling obesities: future choices—modelling future trends in obesity and their impact on health. Report. 2007.
 17. Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet.* 2011;378(9793):804-814.
 18. Bhaumik S, Watson JM, Thorp CF, Tyrer F, McGrother CW, et al. Body mass index in adults with intellectual disability: distribution, associations and service implications: a population-based prevalence study. *J Intellect Disabil Res.* 2008;52(Pt 4):287-298.
 19. Emerson E, Hatton C, Baines S, Robertson J. The physical health of British adults with intellectual disability: cross sectional study. *Int J Equity Health.* 2016;15:11.
 20. Hernán MA, Hernández-Díaz S, Werler MM, Mitchell AA. Causal knowledge as a prerequisite for confounding evaluation: an application to birth defects epidemiology. *Am J Epidemiol.* 2002;155(2):176-184.
 21. Robins JM. Data, design, and background knowledge in etiologic inference. *Epidemiology.* 2001;12(3):313-320.
 22. MJ G. *When Less Conditioning Provides Better Estimates: Overcontrol and Collider Bias in Resarch on Intergenerational Mobility.* Stockholm, Sweden: Swedish Institute for Social Research: Stockholm University; 2019.
 23. Palad CJ, Yarlagadda S, Stanford FC. Weight stigma and its impact on paediatric care. *Curr Opin Endocrinol Diabetes Obes.* 2019;26(1):19-24.
 24. Hebl MR, Xu J. Weighing the care: physicians' reactions to the size of a patient. *Int J Obes Relat Metab Disord.* 2001;25(8):1246-1252.
 25. Young L. The effects of obesity on the clinical judgements of mental health professionals. *J Health Soc Behav.* 1985;26:233-246.
 26. NIHR. Patient and public involvement in social care research. NIHR, Leeds. 2017.
 27. Caroline Walker Trust. Eating well: Children and adults with learning disabilities. Caroline Walker Trust, London. 2007.
 28. Bradbury D, Chisholm A, Watson PM, Bundy C, Bradbury N, Birtwistle S. Barriers and facilitators to health care professionals discussing child weight with parents: a meta-synthesis of qualitative studies. *Br J Health Psychol.* 2018;23(3):701-722.