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Global diet and health: old questions, fresh evidence, new horizons

Few, if any, would contest that diet and nutrition have a critical and substantial impact on human health. But, the devil is in the details. Common questions include: is there such a thing as an optimal diet? What is suboptimal? Which dietary components matter most? And given the necessity to take action on climate change and planetary health, what should the world eat?¹ The Global Burden of Disease (GBD) Study contributes towards answering these questions through estimating the burden of mortality and disability attributable to specific dietary risks, within a comparative risk assessment framework which currently considers 84 behavioural, environmental, occupational and metabolic risks across 195 countries and territories.² The latest in the series is the current report by the GBD Diet Collaborators,³ using data from GBD2017.² Fifteen dietary risks are evaluated for their impacts on mortality and disability from cancers, cardiovascular diseases and diabetes.

The current GBD findings peel away like an onion to reveal layers of information: first, that globally, in 2017, consumption of nearly all healthy foods and nutrients was suboptimal (topped by low intakes of nuts/seeds, milk, whole grains), while that of all unhealthy items exceeded the recommended level (e.g. sugary beverages, sodium, processed and red meat); second, the burden of disease attributable to dietary factors is huge, being 10.9 (95% uncertainty interval 10.1-11.7) million deaths and 255 (234-274) million disability adjusted life years (DALYs), 22% and 16% of all adult deaths and DALYs respectively; third, more than half of all diet-related deaths and two-thirds of diet-related DALYs were attributable to just three factors – high intake of sodium, and low intakes of whole grains and fruit; and fourth, that there is a disproportionate burden in economically poorer and less developed settings. The regional level findings were broadly similar, with some notable inter-country differences.

This information is not entirely novel. The current headline results were included within the GBD2017 publication, which reported that out of 19 risk categories dietary risks were the leading category for deaths and second leading category for DALYs.² In GBD2016,⁴ the leading top three dietary risks for deaths were the same as in the current report³, albeit in a different ranking order but with overlapping 95% uncertainty limits. This reassures that using updated methodology, the previous findings are replicated. The national-level data provide opportunities for countries to compare, identify data gaps, and set priorities; the global-level data act as an accountability tool.⁵

While acknowledging the huge achievements and value of GBD risk estimates, it is vital to be critical to further improve credibility of outputs. Model inputs determine model outputs, and a look underneath the bonnet reveals important challenges. Despite the authors' attempts to provide detailed information, there remains a degree of "black-box" methodology. Dietary data were from several mixed sources, not available for all countries, and the extent and type of extrapolation is unclear despite their data representativeness index. The relationships between the 15 dietary risks and selected end points are based on meta-analyses from populations largely of European descent, with limited and sometimes no data from some world regions, reflecting gaps in the evidence-base. Generalisability, therefore, of dietary risks and outcome relationships is questionable, and potential heterogeneity across populations is ignored. For instance, there is considerable statistical heterogeneity in the overall summary estimates for the association between both fish intake and dietary omega-3 fatty acids and incident type 2 diabetes. This is partly explained by geography:

positive, null or inverse associations in North American, European and Asian/Australasian studies, respectively.⁶ The GBD use of summary risk estimates fails to account for such differences, which could reflect differences in food preparation, environmental factors or confounding structure. The authors acknowledge the need for future collaborative efforts to harmonise data across studies and conduct analyses adjusting for the same set of confounders. It is encouraging that initiatives such as InterConnect⁷ have emerged recently, and may provide approaches that GBD can use. For some diet-disease associations, GBD conclusions seem based on a single endpoint or food from a food group. Low milk consumption, for example, is considered as a risk for colo-rectal cancer, but evidence of the inverse associations of fermented dairy products, such as cheese or yoghurt, with colo-rectal cancer or other disease outcomes is not considered.⁸⁻¹⁰ Causal inference from nutritional epidemiology evidence is challenging, but as new evidence emerges it is important that GBD continues to critically appraise their choice of dietary factors and related outcomes and their generalisability. Implications arising from the findings are also challenging. For instance, the high attributable burden of low wholegrain intake needs to be considered alongside the substantial geographical variation in carbohydrate intakes,¹¹ with Asian diets being particularly carbohydrate-rich, especially in refined form.

Limitations notwithstanding, the current GBD findings provide evidence to shift the focus, as the authors argue, from an emphasis on dietary restriction to promoting healthy food components in a global context. This largely endorses a case for moving from nutrient based to food based guidelines. Their findings also reinforce those of the EAT-Lancet Commission on optimising diets for sustainable food systems, achievable through predominantly plant based diets.¹ There are of course considerable challenges in shifting populations' diets in this direction, illustrated by the cost of fruits and vegetables being disproportionately prohibitive: two servings of fruits and three servings of vegetables per day per individual accounted for 52%, 18%, 16% and 2% respectively of household income in low-, low-to-middle-, upper-to-middle- and high-income countries.¹² A menu of integrated policy interventions across whole food systems, internationally and within countries, is essential to support the radical shift in diets needed to optimise human, and protect planetary, health.¹³ Important food for thought.

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