thebmj

BMJ 2019;366:l5272 doi: 10.1136/bmj.l5272 (Published 4 September 2019)

EDITORIALS

Vegetarian diets and health

Report of an increased stroke risk should be explored by researchers and kept under review for guidelines

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A substantial proportion of the world's population is vegetarian, although prevalence varies substantially across different regions of the world.[1] Vegetarians do not eat meat or any meat products, fish, or poultry and also might not consume eggs and dairy products. Commonly reported reasons for consuming a vegetarian diet include cultural values, religious beliefs, ethical views, environmental concerns, and health considerations.

Existing studies have reported mostly protective associations between vegetarian diets and chronic disease risk factors. One systematic review and meta-analysis of 10 cohort studies reported a significant protective effect against ischaemic heart disease but not total cardiovascular and cerebrovascular diseases.[2] However, there have been calls for more evidence on possible associations between dietary patterns and stroke outcomes.[1]

In *The BMJ*, Tong and colleagues report the latest findings from the EPIC-Oxford study (doi:10.1136/bmj.l4897),[3] which examined the associations of meat eaters, fish eaters, and vegetarians with risks of ischaemic heart disease and stroke over 18 years of follow-up. Compared with meat eaters, fish eaters and vegetarians had 13% and 22% lower rates of ischaemic heart disease, respectively; a finding that is broadly consistent with previous findings.

Conversely, the study also showed that vegetarians had a 20% higher risk of total stroke than meat eaters (hazard ratio 1.20 (95% confidence interval 1.02 to 1.40)), mostly due to a higher rate of haemorrhagic stroke. Fish eaters had a non-significant 14% higher rate of total stroke than meat eaters (1.14 (0.94 to 1.38)). The higher relative risk of stroke among vegetarians is a new contribution to the body of evidence on the health effects of a vegetarian diet.

Tong and colleagues' study has many strengths that diminish the likelihood that this association is an artefact. It focused on dietary patterns that nutrition science now recognises as the key dietary exposure of interest in chronic disease epidemiology.[4] The study was based on a large longitudinal cohort, the ideal study design for examining long term effects of dietary patterns on health. The authors paid particular attention to adjusting for sociodemographic and lifestyle confounders and to applying rigorous statistical methods. Although randomised controlled trials are better at establishing causation, they face practical, ethical, and methodological challenges when testing the kind of exposures and health outcomes examined here.[5]

Vegetarians and others should keep the reported stroke risk in perspective, however. It is based on results from just one study, and the increase is modest relative to meat eaters: "equivalent to three more cases of total stroke (95% confidence interval 0.8 to 5.4 more) per 1000 population over 10 years."[3] Relevance to vegetarians worldwide must also be considered. Participants were all from the United Kingdom where dietary patterns and other lifestyle behaviours are likely to differ from those prevalent in low and middle income countries, where most of the world's vegetarians live.

When interpreting these results, any plausible dietary mediators of the association between vegetarian diets and stroke should be considered. In addition to differences in intakes of total protein and protein sources, vegetarians had higher intakes of fruit, vegetables, legumes, and nuts than meat eaters, and lower intakes of sodium. The authors did not account for differences in energy intake between dietary groups, however, or report intakes of other components necessary to understand total dietary patterns. Previous analyses suggest no cause for concern for many of these individual dietary components,[6,7] although further work is needed to understand the impact of substitution within the overall diet. Vitamin B12 is considered a nutrient at risk in some vegetarian diets, unless fortified foods and supplements are used.[8] The role of suboptimal intake of B12 in stroke risk is unclear,[1] and further exploration should include re-evaluation of existing vitamin B trials[9] and mechanistic studies to support observational evidence.

Dietary guidelines contain the most evidence informed advice available for vegetarians, as well as for fish and meat eaters.[10] They consider dietary associations with multiple health outcomes—not just ischaemic heart disease and stroke—alongside nutritional adequacy; a dietary outcome of particular importance to vegetarians. Dietary guidelines increasingly recognise the need to reduce intake of ultra-processed foods,[11] a dietary component that is substantially more widespread than it was when Tong and colleagues' data were collected. This recommendation is particularly relevant to

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vegetarians who might be unaware that many foods marketed to vegetarians are ultra-processed.

Finally, dietary guidelines[12] and other recent authoritative reports[13 14] also recognise plant based diets for their environmental sustainability as well as health benefits. Shifting towards plant based dietary patterns for reasons of personal or planetary health does not necessarily mean becoming a vegetarian. Indeed, populations in some low and middle income countries who consume very low amounts of animal source foods may benefit from being able to eat a little more of these foods to gain additional nutrients necessary to help combat all forms of malnutrition.

Competing interests: *The BMJ* has judged that there are no disqualifying financial ties to commercial companies. The authors declare the following other interests: None. The BMJ policy on financial interests is here: https://www.bmj.com/sites/default/files/attachments/resources/2016/03/16-current-bmj-education-coi-form.pdf.

Provenance and peer review: Commissioned; not peer reviewed.

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