

High intake of dietary fiber and whole grains associated with reduced risk of non-communicable diseases

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People who eat higher levels of dietary fibre and whole grains have lower rates of non-communicable diseases compared with people who eat lesser amounts, while links for low glycaemic load and low glycaemic index diets are less clear. Observational studies and clinical trials conducted over nearly 40 years reveal the health benefits of eating at least 25g to 29g or more of dietary fibre a day, according to a series of systematic reviews and meta-analyses published in *The Lancet*.

The results suggest a 15-30% decrease in all-cause and cardiovascular related mortality when comparing people who eat the highest amount of fibre to those who eat the least. Eating fibre-rich foods also reduced incidence of coronary heart disease, stroke, type 2 diabetes and colorectal cancer by 16-24%. Per 1,000 participants, the impact translates into 13 fewer deaths and six fewer cases of coronary heart disease.

In addition, a meta-analysis of clinical trials suggested that increasing fibre intakes was associated with lower bodyweight and cholesterol, compared with lower intakes.

The study was commissioned by the World Health Organization to inform the development of new recommendations for optimal daily fibre intake and to determine which types of carbohydrate provide the best protection against non-communicable diseases (NCDs) and weight gain.

Most people worldwide consume less than 20 g of [dietary fibre](#) per day. In 2015, the UK Scientific Advisory Committee on Nutrition recommended an increase in dietary fibre intake to 30 g per day, but only 9% of UK adults manage to reach this target. In the US, fibre intake among adults averages 15 g a day. Rich sources of dietary fibre include whole grains, pulses, vegetables and fruit.

"Previous reviews and meta-analyses have usually examined a single indicator of carbohydrate quality and a limited number of diseases so it has not been possible to establish which foods to recommend for protecting against a range of conditions," says corresponding author Professor Jim Mann, the University of Otago, New Zealand.

"Our findings provide convincing evidence for nutrition guidelines to focus on increasing dietary fibre and on replacing refined grains with whole grains. This reduces incidence risk and mortality from a broad range of important diseases."

The researchers included 185 observational studies containing data that relate to 135 million person years and 58 clinical trials involving 4,635 adult participants. They focused on premature deaths from and incidence of coronary heart disease, cardiovascular disease and stroke, as well as incidence of type 2 diabetes, colorectal cancer and cancers associated with obesity: breast, endometrial, oesophageal and prostate cancer. The authors only included studies with healthy participants, so the findings cannot be applied to people with existing chronic diseases.

For every 8g increase of dietary fibre eaten per day, total deaths and incidences of coronary heart disease, type 2 diabetes and colorectal cancer decreased by 5-27%. Protection against stroke, and breast cancer also increased. Consuming 25g to 29g each day was adequate but the data suggest that higher intakes of dietary fibre could provide even greater protection.

For every 15g increase of whole grains eaten per day, total deaths and incidences of coronary heart disease, type 2 diabetes and colorectal cancer decreased by 2-19%. Higher intakes of whole grains were associated with a 13-33% reduction in NCD risk—translating into 26 fewer deaths per 1,000 people from all-cause mortality and seven fewer cases of coronary heart disease per 1,000 people. The meta-analysis of clinical trials involving whole grains showed a reduction in bodyweight. Whole grains are high in dietary fibre, which could explain their beneficial effects.

The study also found that diets with a low glycaemic index and low glycaemic load provided limited support for protection against type 2 diabetes and stroke only. Foods with a low glycaemic index or low glycaemic load may also contain added sugars, saturated fats, and sodium. This may account for the links to health being less clear.

"The health benefits of fibre are supported by over 100 years of research into its chemistry, physical properties, physiology and effects on metabolism. Fibre-rich whole foods that require chewing and retain much of their structure in the gut increase satiety and help weight control and can favourably influence lipid and glucose levels. The breakdown of fibre in the large bowel by the resident bacteria has additional wide-ranging effects including protection from colorectal cancer." says Professor Jim Mann.

While their study did not show any risks associated with dietary fibre, the authors note that high intakes might have ill-effects for people with low iron or mineral levels, for whom high levels of whole grains can further reduce iron levels. They also note that the study mainly relates to naturally-occurring fibre rich foods rather than synthetic and extracted fibre, such as powders, that can be added to foods.

Commenting on the implications and limitations of the study, Professor

Gary Frost, Imperial College London, UK, says, "[The authors] report findings from both prospective cohort studies and randomised controlled trials in tandem. This method enables us to understand how altering the quality of carbohydrate intake in randomised controlled trials affects non-communicable disease risk factors and how these changes in diet quality align with disease incidence in prospective cohort studies. This alignment is seen beautifully for dietary fibre intake, in which observational studies reveal a reduction in all-cause and cardiovascular mortality, which is associated with a reduction in bodyweight, total cholesterol, LDL cholesterol, and systolic blood pressure reported in randomised controlled trials... There are some important considerations that arise from this Article. First, total carbohydrate intake was not considered in the systematic review and meta-analysis... Second, although the absence of association between glycaemic index and load with non-communicable disease and risk factors is consistent with another recent systematic review, caution is needed when interpreting these data, as the number of studies is small and findings are heterogeneous. Third, the absence of quantifiable and objective biomarkers for assessing carbohydrate intake means dietary research relies on self-reported intake, which is prone to error and misreporting. Improving the accuracy of dietary assessment is a priority area for nutrition research. The analyses presented by Reynolds and colleagues provides compelling evidence that dietary fibre and whole grain are major determinants of numerous health outcomes and should form part of public health policy."

More information: Andrew Reynolds et al, Carbohydrate quality and human health: a series of systematic reviews and meta-analyses, *The Lancet* (2019). [DOI: 10.1016/S0140-6736\(18\)31809-9](https://doi.org/10.1016/S0140-6736(18)31809-9)

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