

What if there
was a **nutrient**
that could...

help reduce the risk of

Type2 Diabetes ¹

Bowel Cancer ²

Heart Disease ³

Weight Gain ⁴

Digestive Disorders ⁵

There is. Cereal Fibre.



Why Cereal Fibre?



The importance of dietary fibre is well recognized. Evidence from prospective cohort studies shows a diet high in fibre may reduce the risk of developing type 2 diabetes and heart disease, as well as bowel cancer, breast cancer¹, gallstones², diverticular disease³ and weight gain⁴.

Yet, emerging evidence now suggests that the type of fibre should be of greater interest to health care professionals.

And based on the totality of scientific evidence, cereal fibre appears to be the most important fibre type to demonstrate the strongest risk reduction.

Fibre and Mortality

Results from a recently conducted prospective study concluded that a greater intake of dietary fibre after Myocardial Infarction (MI), especially cereal fibre, was inversely associated with all-cause mortality in patients who survived MI. In addition, increasing consumption of fibre from before to after MI was significantly associated with lower all cause and cardiovascular mortality.⁵



The study also stated some of the possible mechanisms for the beneficial effects of a high fibre diet on Coronary heart disease (CHD) risk and mortality that includes reductions in systemic inflammation, lower serum low density lipoprotein cholesterol level, reduced lipid peroxidation, improved insulin sensitivity, overall better glycemic control, and a beneficial gut microbiota environment.⁵

Similar association between dietary fibre and total mortality was confirmed through meta-analysis of prospective cohort studies conducted by Kim Y, et al.⁶

Park Y, et al in 2011 studied the association between dietary fibre intake in relation to total mortality and death from multiple causes. Data was analyzed from a large prospective cohort study that followed more than 380,000 people over an average of 9 years.⁷

The lead finding was that dietary fiber intake was significantly and inversely associated with risk of total death and death from Cardiovascular disease (CVD), infectious diseases and respiratory diseases in both men and women, after adjustment for a large number of confounding variables.

Interestingly, of all fibre sources, it is cereal fibre that demonstrates the strongest risk reduction.

And it did by, on average, about 20%⁷:

- > reduced risk of total mortality by 23% (males) and 19% (females)
- > reduced risk of CVD mortality by 23% (males) and 28% (females)
- > reduced risk of cancer mortality by 17% (males) and 12% (females)

“Dietary fibre from grains, but not from other sources, was significantly inversely related to total and cause-specific death”⁷

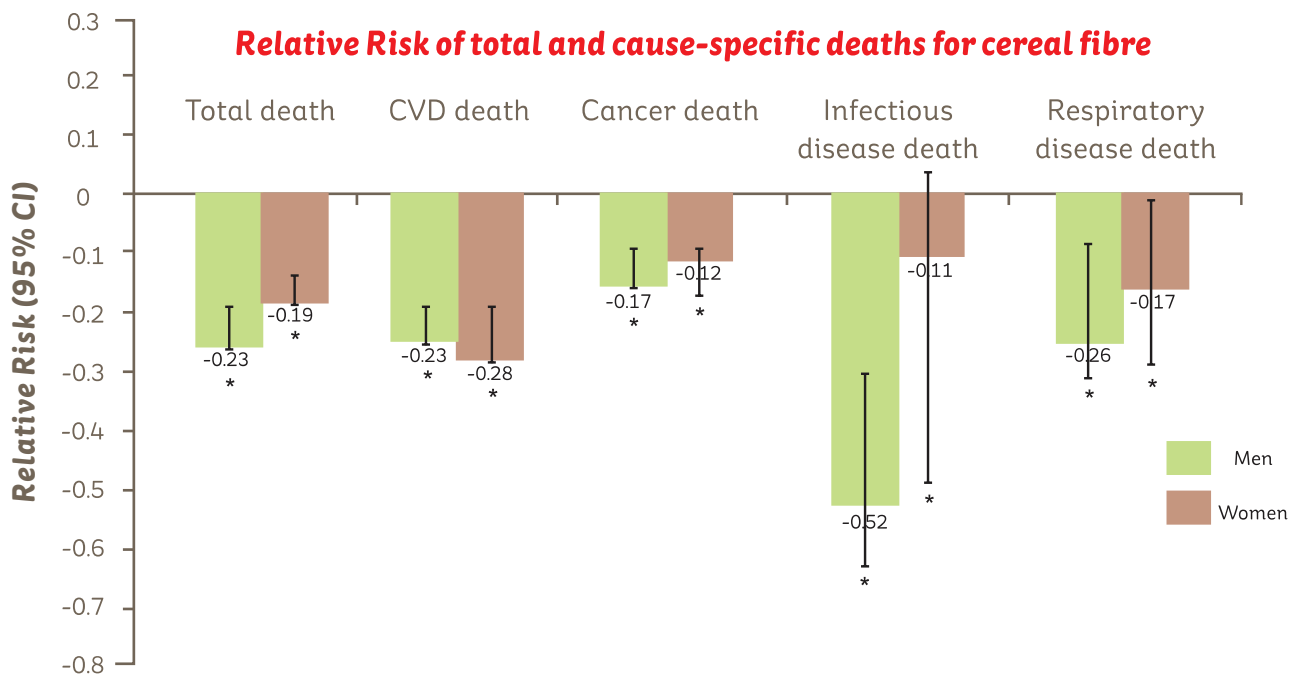


Fig 1. Multivariate relative risk of total and cause-specific deaths comparing the highest with the lowest quintile of fibre from cereal fibre. CI indicates confidence interval; CVD, cardiovascular disease. * P for trend, <.05.

Adapted from: Park Y, Subar AF, Hollenbeck A, Schatzkin A. Dietary fiber intake and mortality in the NIH-AARP diet and health study. Arch Intern Med. 2011 Jun 27;171(12):1061-8. Epub 2011 Feb 14.

Cereal Fibre and Type 2 Diabetes



Diabetes is a serious and increasing public health burden globally. In India, around 66.8 million cases of diabetes were reported in 2014 and the number is increasing alarmingly. According to IDF 2014 update, prevalence of diabetes in adults (20-79 years) is 8.6 % in India.⁸

Since primary prevention is key, what evidence-based recommendations should we be making to reduce the risk of developing it?

Cereal fibre reduces diabetes risk

Results from the European Prospective Investigation into Cancer and Nutrition (EPIC)-InterAct Study, showed that higher intake of total dietary fibre compared with a low intake was associated with an 18% lower risk of incident type 2 diabetes when adjusted for lifestyle and dietary factors. The risk reduction was strongly supported by intake of cereal fibre and vegetable fibre, and not fruit fibre.⁹

Further, the authors also found an inverse association between total fibre and cereal fibre and risk of type 2 diabetes independent of BMI as a result of the meta-analysis conducted of all published prospective studies (19 cohorts).⁹

Two systematic reviews and meta-analyses of prospective cohort studies show that cereal fibre consistently and significantly reduces the risk of developing type 2 diabetes.^{10,11}

The Cochrane systematic review and meta-analysis reported that a high cereal fibre intake, after adjusting for confounding variables such as body mass index and family history of diabetes, reduces the risk of developing type 2 diabetes by 28-37%.¹⁰

Importantly, the findings indicate that risk reduction is achievable through approximately 8 gram greater intakes of cereal fibre, an amount which can be attained with consumption of readily available foods.

Fruit and vegetable fibre were not significantly associated with diabetes risk reduction. "Cereal fibre intake was inversely associated with diabetes risk reduction."¹¹



Cereal Fibre and Heart Disease

Many observational and experimental studies have examined the relation between dietary fibre and total CVD risk or risk factors—such as hypertension, central obesity, insulin sensitivity, and elevated plasma cholesterol. Also, CHD is at the forefront when it comes to studying diet-disease relationship.^{12,13}

A recent systematic review and meta-analysis of prospective studies consisting of 22 cohorts showed that a significantly lower risk of 9% for both CVD and CHD with every additional 7 g/day of total dietary fibre consumed. High fibre intake—specifically from cereal or vegetable sources and rich in insoluble fibre—are significantly associated with lower CHD and CVD risk.¹⁴

High fibre diet was significantly associated with reducing the risk of developing heart disease. Each 10 g increase in dietary fibre consumption resulted in a risk reduction of 14%.¹⁵



Type of fibre matters

Evidence from intervention trials shows that soluble cereal fibre from oats and barley modestly lowers total and LDL cholesterol.¹²

A meta-analysis of 67 controlled trials showed that a soluble cereal fibre intake of 6g/d was associated with a small but significant LDL cholesterol lowering effect of around 5%. This translates to an estimated reduced coronary heart disease risk of about 9%.¹⁶

In Aragon Workers' Health Study (AWHS) cohort, an inverse association was observed between soluble fibre intake with triglycerides and apolipoprotein B100. While insoluble fibre intake was inversely associated with total cholesterol, triglycerides, apolipoprotein B100 and ratio TG/HDL.¹⁷

Cereal Fibre and Colorectal Cancer

Colorectal cancer is the tenth leading cancer in India. Several reports have documented a relatively high occurrence of this cancer in the young age (40-45 yrs).¹⁸

Yet, it is also said to be one of the most preventable cancers.¹⁹

The European Prospective Investigation into Cancer and Nutrition (EPIC) - a multicenter prospective study carried out in 10 European countries found an inverse association of high intake of dietary fibre.²⁰





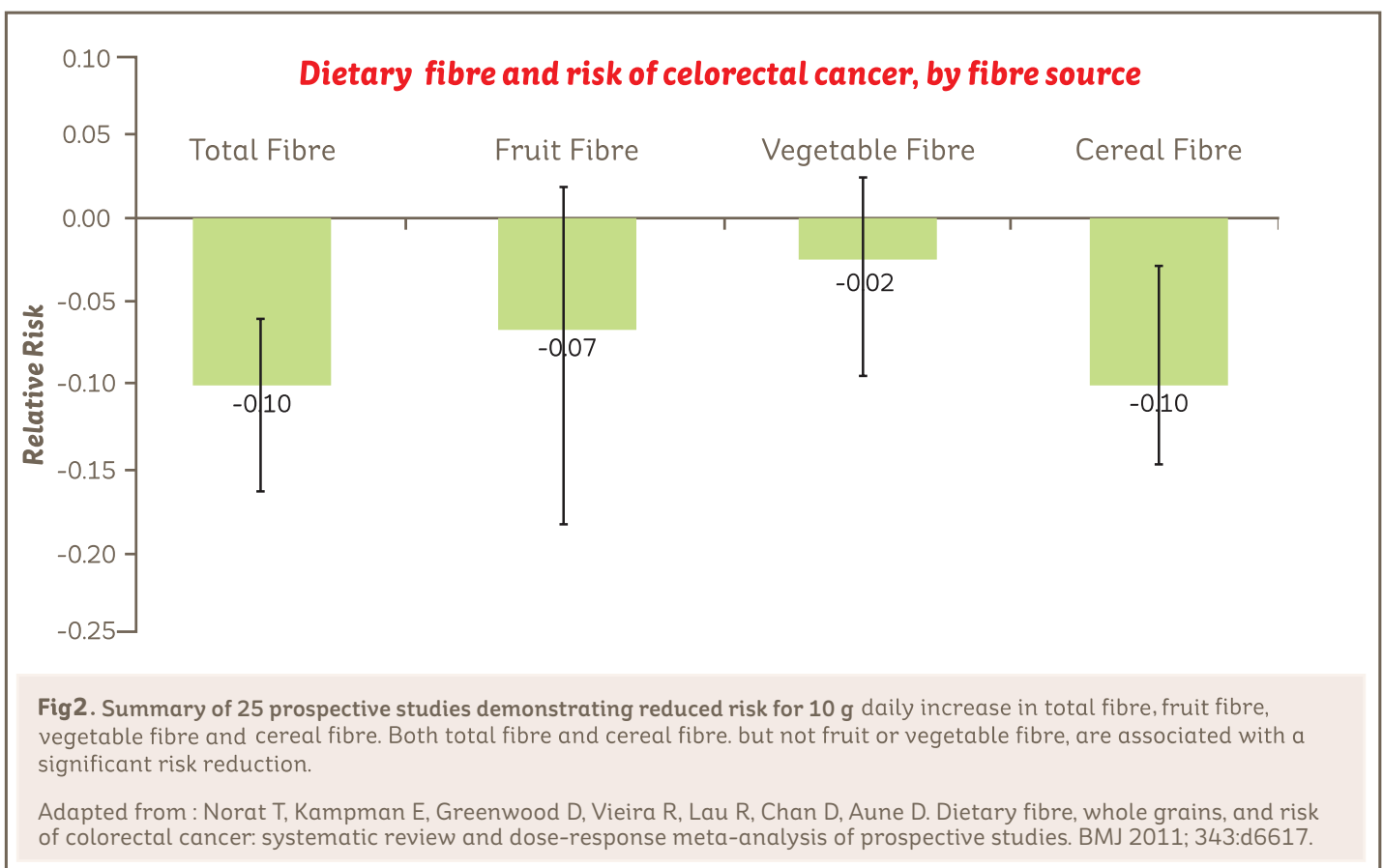
A 'convincing' protective effect

In 2011, the World Cancer Research Fund upgraded the evidence for the protective effect of dietary fibre to colorectal cancer as 'convincing'. That makes dietary fibre the only nutrient that has a convincing protective effect.²¹

But not all fibre types appear to be equally protective.

Only cereal fibre reduces the risk

A 2011 systematic review and meta-analysis of 25 prospective cohort, case-cohort, or nested case-control design studies analysed the risk reduction for different fibre types. The review, which included more than 1.9 million participants, found a significant protective effect for cereal fibre.²²



Each 10 gram increase in cereal fibre is estimated to reduce the risk of colorectal cancer by 10%. Contrary to popular dietetic advice, the relative risk reduction for fruit, vegetable and legume fibre was not significant.²²

Cereal Fibre and Weight Management



Maintaining weight loss over the long-term is challenging. 90 to 95% of persons who lose weight subsequently regain it.²³

Placing the focus on preventative efforts that reduce the common 'kilo creep' is increasingly being recognised as an essential part of management.²⁴

Epidemiological studies have shown inverse associations between cereal fiber intake and BMI, weight gain and body fat.^{25,26}

High fibre eaters gain less weight over time.

In the Nurse's Health Study, which tracked the diets of 74,000 healthy women over 12 years, those with a higher fibre intake gained less body weight. A 12 gram increase in total fibre intake was associated with 3.5 kg less weight gain over 12 years.⁴

This association has also been found in men. The Health Professionals Follow-Up study found that fibre intake in men was significantly associated with a reduction in weight gain. A 20 gram increase in total fibre intake was associated with 5.5 kg less weight gain over 8 years.²⁶



Cereal fibre is associated with reduced body weight and waist circumference

A recent European prospective cohort study that is part of the DiOGenes project recently followed close to 90,000 participants. After adjustment for potential confounders, total fibre intake was found to be inversely associated with both body weight and waist circumference change over 6.5 years.²⁷

But not all fibre types were equally effective.

"Our finding may support a beneficial role of higher intake of dietary fibre, especially cereal fibre, in prevention of body-weight and waist circumference gain."²⁷



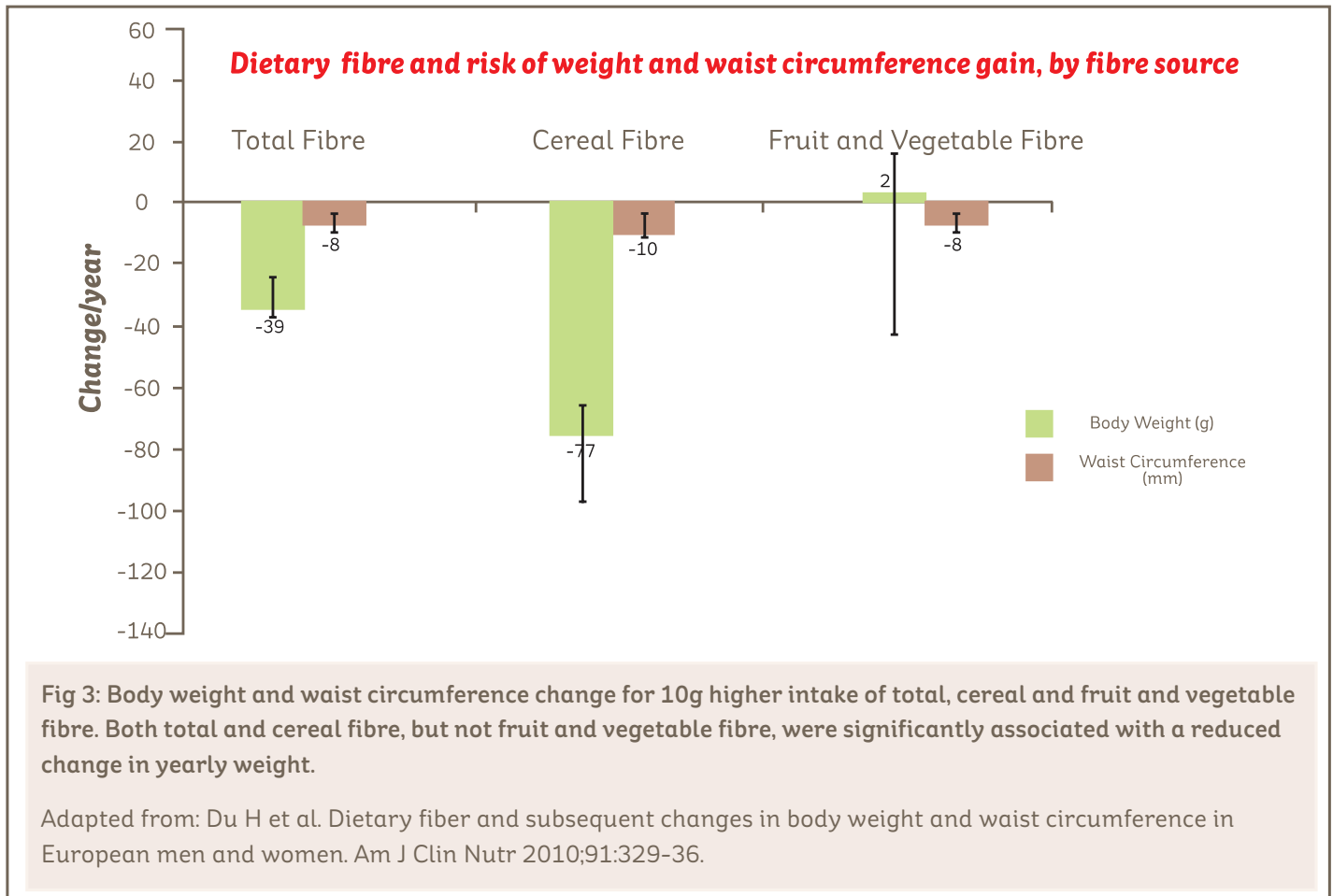
The change in weight per year for each of the types of fibre was²³:

-39g/y for total fibre (95% CI, -71, -7 g/y)

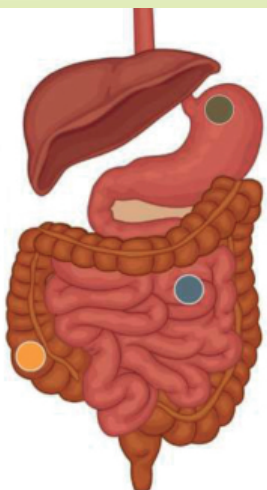
-77g/y for cereal fibre (95% CI, -127, -26 g/y)

+2g/y for fruit and vegetable fibre (95% CI, -40, 44 g/y).

Whilst this effect may appear small on the individual level, the authors state that the effect can be of public health significance: 77g/year represents 67% of the average weight change of this



Cereal Fibre and Digestive Disorders



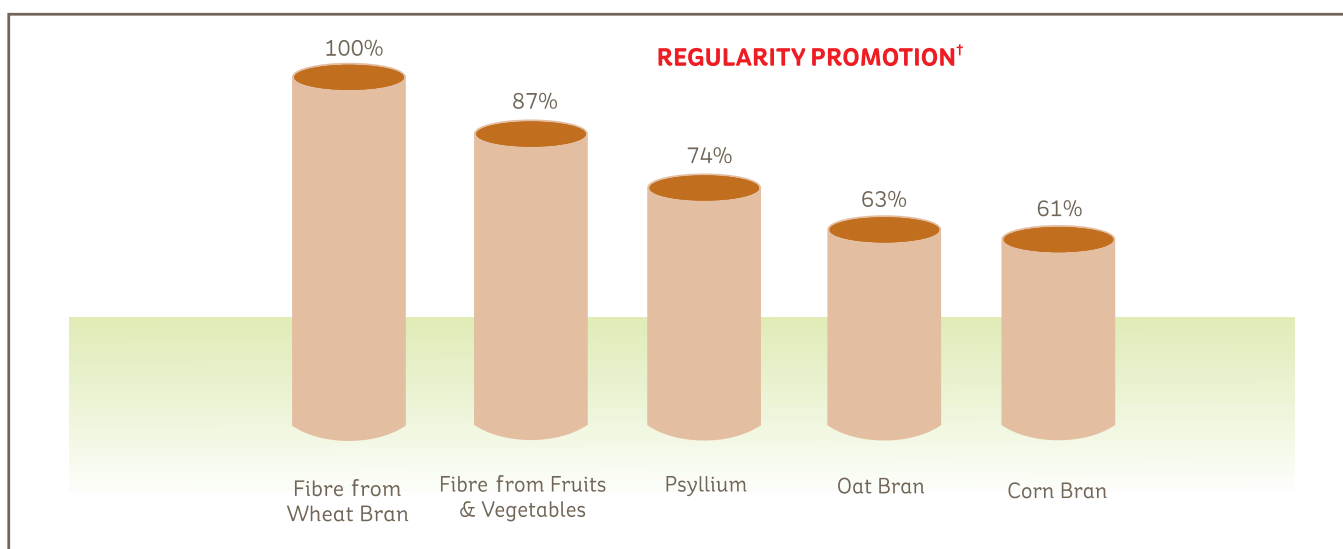
Dietary fibre has been advocated for improved bowel function since the early 1970s. It plays an important role in the relief of constipation. Soluble fibre is thought to increase stool bulk and weight and therefore stool frequency.

Insoluble fibre such as bran is thought to accelerate intestinal transit time, thereby increasing stool frequency.²⁸



Wheat Bran: The Best Fibre for Promoting Regularity

- Numerous scientific studies have shown that 'wheat bran is the gold standard' when it comes to promoting regularity²⁹
- It is one of the most studied and efficacious fibres at increasing faecal mass
- Health Canada uses wheat bran as the control treatment which other fibres are measured against to scientifically verify regularity effects³⁰
- European Food Safety Authority (EFSA) has an approved health claim on wheat bran which states - "Wheat bran fibre contributes to an increase in faecal bulk and reduction in intestinal transit time"³¹



A meta-analysis (over 100 studies) found that per gram of fibre, the effect of wheat bran is greater than that of fruit and vegetable fibre, oat bran, cellulose, corn, legumes and pectin. The average increase in faecal weight per gram of wheat bran fibre is reported to be 5.4g.³²



Lawton C, et al. found significant improvements in digestive health, digestive comfort and general psychological wellbeing in habitual low-fibre consumers during the 2-week intervention period. The study participants were fed one bowl of ready-to-eat breakfast cereal containing at least 5.4 g fibre (of which 70% is wheat bran fibre) for 2 weeks duration.

The physiological mechanism of action for the effect of wheatbran fibre on stool bulking and frequency is well-recognized, and relates to water absorption, the inability to digest cellulose and wheat bran fibre morphology.

However, the mechanism of action for the secondary benefits to psychological wellbeing, reported in the study, has not been established adequately.³³



Fibre and whole grains recommendations

The daily intake of total dietary fibre for Indian adults as suggested by the Indian Council of Medical Research (ICMR) is 40 g/2000 kcals or 12-14 g/1000 kcals energy.³⁴

WHO/FAO and EFSA recommend 25 g/d with their recommendations based on amounts needed for healthy laxation.³⁵

USDA Guidelines recommend making “half of all the grains eaten as whole grains” to reap the many health benefits of whole grains.³⁶



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