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ABSTRACT

New findings on fiber intake in children

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Fibre is an essential component of the human diet that is crucial for human health, the physiological and functional effects of dietary fibre are associated with a wide range of short-term and long-term health benefits. Fibre provides an energy source for the gut microbiome. The fermentation of fibre by the gut microbiome results in the production of a variety of compounds with short-term and long-term health benefits that extend beyond the gut, to the immune system and organs such as the liver, kidneys and even the brain. The short-term benefits include supporting the immune system, especially within the gut itself, preventing or ameliorating autoimmune diseases such as diabetes, inflammatory arthritis, inflammatory gastrointestinal disorders and allergic disease. The longer-term benefits include a reduction in the risk of developing diabetes, obesity, hypertension stroke and coronary heart disease in later life conversely, a lack of fibre in the diet has been associated with several disorders in children including constipation, irritable bowel syndrome, allergies and other immune-related disorders. Just like other essential nutrients, fibre should be included in the diets of all children.

Finn et al in the USA found that the young children in this nationwide survey fell short on dietary fiber. Very few children met the current IOM recommendation of 14 g/ 1000kcals. Young children with dietary fiber intakes of around 10.5 g/1000kcals per day had improved intakes of several key nutrients. Children with higher intakes of dietary fiber consumed at least 75% of grains as whole grains and consumed greater amounts of fruits, vegetables, nut butters, and legumes. Huysentruyt, K et all. in Belgia found that energy and protein intakes are too high, while fat and fibre intakes are too low in Belgian infants and toddlers. Fibre intake was below the RDI of 15 g/d for 93.1 % of the oldest and 83.5 % of the middle age group ($p < 0.01$). Our study in Jakarta and its surrounding cities, Indonesia, found that the mean intake of fibre among toddlers (7–36) m.o were 9 ± 3.7 grams/day at the mean age of 26 ± 7 m.o, none of the children met the national recommendation.

The Institute of Medicine, Food and Nutrition Board defines dietary fibre as 'nondigestible carbohydrates and lignin that are intrinsic and intact in plants',

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including the “plant nonstarch polysaccharides (e.g., cellu- lose, pectin, gums, hemicelluloses, b-glucans, and fibers contained in oat and wheat bran), plant carbohydrates that are not recovered by alcohol precipitation (e.g., inulin, oligosaccharides, and fructans), lignin, and some resistant starch.” In 2009, the WHO and the Codex Alimentarius Commission adopted a definition of dietary fibre as ‘carbohydrate polymers with ten or more monomeric units, which are not hydrolysed by the endogenous enzymes of the small intestine of humans’.

Current recommendations for daily fibre intake for children vary and are largely extrapolated from recommendations for adults . In 1995, Williams *et al* recommended a (minimum) daily intake of fibre for children equivalent to age plus 5g/day fibre intake of 14 g per 1000 kcal consumed for healthy adults. Based on this recommendation for healthy adults, the recommended intake was extrapolated to 19g/day for children aged 1–3 years, and 25g/day for children aged between 4 and 8. In Indonesia the recommendation are 10 grams/day for 7 to 11 m.o, 16 gram/day for 1–3 y.o and 22 grams/day for 4–6 y.o children.

Studies have highlighted that healthy children are consuming far less fibre than recommendation. There are several factors that may contribute to the under consumption of fiber rich foods among young children. Whole grain intake has been positively correlated with family income. Vegetable consumption in children has been linked to parental consumption, frequency of vegetable offerings, and the sensory characteristics of the vegetable. Infrequent fruit and vegetable consumption during complementary feeding is associate with the same behavior at 6 years of age. Encouraging frequent offerings of fruit, vegetables, and whole grains during complementary feeding and early childhood may be key to increasing fiber consumption among children.

Keywords: children, fiber, intake