Increasing fibre in South Asian Diets
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Abstract
South Asian population is facing rapid changes in dietary pattern with a shift from healthy traditional high fibre diet to calorie-dense low fibre. This has resulted in epidemic of lifestyle disorders including diabetes, obesity and cardiovascular disease in these populations. High fibre diet has shown to decrease risk of these lifestyle disorders as well as many gastrointestinal disorders including colorectal cancer. There is an urgent need to increase fibre component in the diet of these populations to prevent the lifestyle disorders. This review focusses on health benefits of high fibre diet and ways to increase fibre in South Asian diet.

Introduction
Developing countries, particularly South Asian and South-East Asian, are undergoing rapid nutrition transition with a shift from healthy traditional high fibre, vitamins and minerals rich diet towards increased consumption of calorie-dense foods containing high refined carbohydrates, saturated fats, and less fibre.1,2 These changes in dietary patterns have resulted in significant increase in incidence of obesity, cardiovascular disease, metabolic syndrome, and type 2 diabetes mellitus (T2DM) especially among the younger population.3,4

Types of Fibre
Dietary fibres are constituted by complex carbohydrates which are remnants of edible part of plants and analogous carbohydrates that are resistant to enzymatic digestion in the human small intestine with complete or partial fermentation in the large intestine. Dietary fiber includes polysaccharides, oligosaccharides, lignin, and associated plant substances.

Dietary fibres can be characterized by their source, solubility in water and exposure to enzymatic or chemical treatments Soluble fibres like guar gum and pectin are found in legumes, oats, fruits and some vegetables; while insoluble fibres like cellulose, lignin, and hemicellulose are found in cereals, seeds, beans bran, and also certain fruits and vegetables.

Fibre Content of Various Food Items
Cereals like whole grains, millets, ragi, barley, and whole pulses are comparatively fibre rich than refined or de-husked ones. Similarly, some vegetables and fruits like green leafy vegetables, lotus stem, beans, brinjal, apple, guava, and pomegranate contain more fibre. Milk and milk products, fats, oils and sugar do not contain fibre.

Culinary Effects on Fibre
Precooking such as washing, cutting, and chopping can change the amount of fibre value of food items. Similarly, cooking processes can also change the amount of fibre value.5 Processed, preserved and ready-to-eat foods are generally refined and a majority of them are rich in fat or salt/sugar, and are calorie dense. They lack dietary fibre and micronutrients.

Nutritional Implications
The consumption of whole grains and fibres lowers total cholesterol and low density lipoprotein (LDL) cholesterol levels, improves insulin sensitivity, and promotes weight loss.3 By retaining absorbed water, high fibre diet increases faecal volume, transit time, excretion of bile salts and causes formation of short chain fatty acids (SCFA) which enhances absorption of water and electrolytes in the large bowel.6 Fibre delays and retards absorption of carbohydrates and fats and increases the satiety value. It reduces chronic constipation, diverticular disease, and haemorrhoids. In fact, insoluble fibre (bran and cellulose) are good laxatives. High dietary fibre intake is also associated with reduced risk of colorectal cancer.7

The major cause of concern for excessive fibre intake (> 60 grams/day) is impairment of mineral absorption, particularly calcium, zinc, and iron Excessive fibre may cause irritation in bowel and excessive gas formation leading to flatulence and abdominal discomfort.6

Recommended Daily Intake
The adequate intake recommended is 14 grams fibre per 1,000 kilo calories or total of 25 grams for adult women and 38 grams for adult men.8,9 Indian Council of Medical Research, 2010 recommends consumption of

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approximately 20-35 grams dietary fibre/day.10

Problems in South Asian Diets and Suggestions to Increase Fibre Intake

Typical South Asian diets include traditional cereals (chapatti, rice and paratha) with vegetable curries contributing most towards energy intake. The consumption of full fat milk and fruit juices is observed more among toddlers and school children.11 Certain tips for increasing fibre intake in South Asian diets are summarised in Table.

Conclusion

It is advised to increase fibre intake to recommended dietary allowances. Minimising the consumption of refined, processed and preserved foods with adoption of healthy dietary patterns can lead to prevention of many non-communicable diseases.

References