



Low Intake of Dietary Fiber in Indian Diet

KEYWORDS

Fiber, diet, obesity, health.

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ABSTRACT This paper was conducted to study the presence of dietary fiber in routine diet consumed by Indian population. A group of 30 volunteers were taken as sample and their dietary recall was observed to quantify the fiber content. Further, the fiber content in top 12 consumed dishes was observed alongside the dishes with highest content of dietary fiber. A gaping hole had been highlighted and the need to consume greater quantity of fiber in daily lives was emphasized.

Introduction

Obesity creates an enormous socio-economic as well as public health burden in developing countries. As per WHO the world health statistics 2012 report, one in six adults were obese, one in 10 diabetic and one in three had raised blood pressure (World Health Organization [who], 2014). Vrolix and Mensink had conducted research in 2010 on the effects of glycemic load on metabolic risk markers and had stated that there exists a great potential in diets and dietary components as a first-line of intervention, in the prevention and treatment of metabolic syndrome.

"Functional and metabolic effects of dietary fiber are recognized by the scientific, clinical and nutritional experts". It has been recognized that high intake of dietary fiber can significantly lower the risks for developing coronary heart disease, hypertension, diabetes, obesity and certain gastrointestinal diseases (Anderson et al; 2009). Dietary fiber exhibits one or more of either laxation i.e, fecal bulking and softening, increased frequency and/or regularity, blood cholesterol attenuation, and/or blood glucose attenuation (Indian Council of Medical Research [ICMR],2009). Additionally, dietary fiber (DF) has viscous and gel-forming properties of soluble fiber which inhibits macronutrient absorption, reduces postprandial glucose response and beneficially influences specific blood lipids. Colonic fermentation of high fiber foods is also attributed to soluble DF. Insoluble cereal DF and whole grains have consistently been associated with reduced diabetes risk. DF consumption contributes to improvement of insulin sensitivity, modulation of the secretion of certain gut hormones, and effects on various metabolic and inflammatory markers that are associated with the metabolic syndrome. (Weickert and Pfeiffer, 2008). Thus to counter obesity and various other diseases consumption of right quantity of dietary fiber is essential. Recommended intake of dietary fiber is 40 g/2000 kcal to be consumed per day, this is rationalized in all communities based on their recommended energy intake. (ICMR, 2009).

Aim: This research was conducted to quantify the presence of dietary fiber in a routine Indian diet.

Methodology

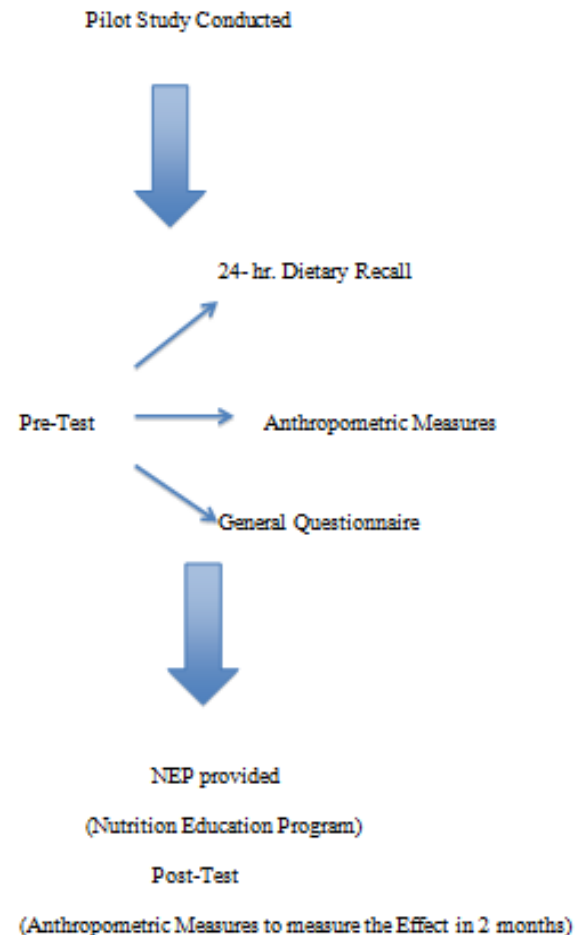
The study was conducted on 30 educated individuals in their natural environment.

Tools and Techniques used:

Anthropometric measures

Height
Weight
Waist Circumference
Hip Circumference
Body Mass Index (BMI)
Waist to Hip Ratio (WHR)

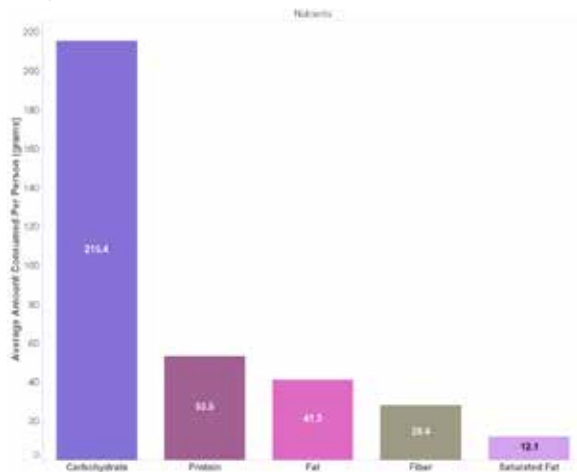
Schematic Representation



Results & Discussion

	N	Mean	Std. Deviation	Skewness
Calories	30	1438.78	355.26	0.21
Carbs	30	215.43	54.23	0.35
Fat	30	41.18	13.18	0.75
Protein	30	53.50	16.14	0.63
Fiber	30	28.37	9.59	-0.34
Saturated Fat	30	12.10	5.98	1.67

Table 1 Average Calorie and Nutrient Intake in 24-hr dietary recall.



Graph 1 Average nutrient intake in 24-hr recall by all participants.

As can be seen in table1 the mean consumption of calories in a day by all the subjects was 1438.78 ± 355.26 kcal. Macronutrients depicted in graph1 showed that mean carbohydrate intake was 215.43 ± 54.23 grams(g) per person per day with the mean protein intake being 53.50 ± 16.14g, similarly the mean fat consumed was 41.18 ± 13.18g. Amongst the total fat, mean saturated fat was calculated to be 12.10 ± 5.98g.

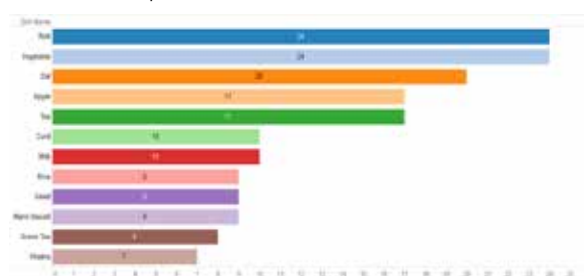
Mean dietary fibre consumed was however 28.37 ± 9.59g whereas, evidence from epidemiological studies have suggested that there exists an inverse relationship between intake of dietary fibre with weight gain and obesity, while fibre consumption is said to be associated with increased satiety and decreased energy intake. It has also been proposed that dietary fibre increases fecal energy loss. Viscous fibre is thought to exert the greatest effect on appetite regulation, but studies using wheat bran have also reported a reduction in food intake following a test meal with wheat bran, but it is not clear whether this effect is long-lasting in terms of management of obesity (Freeland et al, 2009).

According to Anderson et al, in 2009 individuals with high intakes of dietary fiber are significantly at lower risk for developing CVD, stroke, hypertension, diabetes, obesity, and certain gastrointestinal diseases. Increasing fiber intake lowers blood pressure and serum cholesterol levels. Increased intake of soluble fiber improves glycemia and insulin sensitivity in non-diabetic and diabetic individuals. Fiber supplementation in obese individuals significantly enhances weight loss. Increased fiber intake even benefits a variety of gastrointestinal disorders like GERD, duodenal ulcer, diverticulitis, constipation, and hemorrhoids. Prebiot-

ic fibers appear to enhance immunefunction. Dietary fiber intake provides similar benefits for children as for adults. He further commented that effective communication and consumer education is required to enhance fiber consumption from foods or supplements.

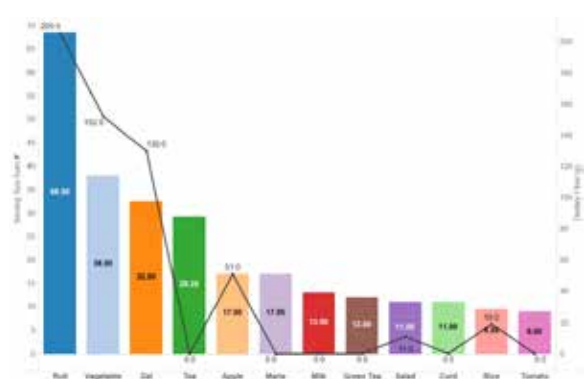
Since there is such a marked difference in the average consumption of dietary fiber and minimum daily intake, it has become essential to increase the intake of dietary fiber in our population as a whole.

Further we shall see the 12 most consumed dishes and moreover compare its fiber content.



Graph2 Top12 dishes consumed by the participants.

As can be seen in graph2, roti has been eaten by 24 of the 30 subjects whereas, marie biscuit and rice and salad are eaten by 9 people. However, the calorie and the macro as well as micro nutrient count of the dishes were found to differ due to the number of servings of the particular dish. Hence, total serving sum has been used in the graph given below.



Graph3 Top 12 dishes as per serving consumed vs. their dietary fiber.

In graph3 it can be observed that roti, vegetable and dal with 68.5, 38 and 32.5 serving sizes provide 205.5g, 152g and 130g dietary fiber respectively. While tea, marie biscuit, milk, green tea and others being consumed with high intakes provided 0.0g of dietary fiber. Thus, 6 dishes out of top12 in serving sizes provided 0.0g dietary fiber.

Dietary fiber has many functions in diet, one of which is to aid in energy intake control and reduced risk for development of obesity. The role of dietary fiber in energy intake regulation and obesity development is related to its unique physical and chemical properties that assists in early signals of satiety and enhanced or prolonged signals of satiety. Early signals of satiety may be induced through cephalic- and gastric-phase responses related to the bulking effects of dietary fiber on energy density and palatability, whereas the viscosity-producing effects of certain fibers may enhance satiety through intestinal-phase

events related to modified gastrointestinal function and subsequent delay in fat absorption (Dias, 2102). In another study it was determined that women who consumed larger quantities of dietary fiber gained an average of 1.52 kg less than those with small increase in intake of dietary fiber (8). Hence, it is necessary to increase the quantity of fiber intake in its natural form.



Graph4 Dishes with highest dietary fiber count.

Graph 4 represents the top12 dishes consumed by the subjects with the highest fiber content per serving. The size of squares denotes the quantities of dietary fiber in the dish per serving hence, larger the box higher is the fiber content of the specific dish. Thus, according to graph4, from the participants daily food habits museli has the maximum fiber content with 20g/serving followed by sambhar and then oats museli with 14g and 9g respectively. As can be noticed none of the dishes amongst the top12 according to participants choice could be observed in graph4 of the dishes showcasing the highest content of dietary fiber.

This observation highlights that there exists an essential requirement to intentionally include foods with high fiber content in our daily lives. Since, individuals with high intakes of dietary fiber are at a significantly lower risk for developing coronary heart disease, stroke, hypertension, diabetes, obesity, and certain gastrointestinal diseases. Increasing fiber intake lowers blood pressure and serum cholesterol levels. Increased intake of soluble fiber improves glycemia and insulin sensitivity in non-diabetic and diabetic individuals (Anderson et al, 2009). Increasing dietary fiber in our daily lives thus is the need of the hour and requires to be acted upon speedily and steadfastly.

Conclusion

Fiber supplementation in obese individuals significantly enhances weight loss. Increased fiber intake is beneficial for various diseases as well. It is evident that the fiber content in most frequently consumed food dishes is low, resulting in inadequate intake of dietary fiber and thus creates the necessity to consume higher quantities of dietary fiber naturally for better health and improved lifestyle.

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