
A comparative study of dietary fiber awareness, diseases & drugs interaction in rural and urban areas of Bangladesh

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Abstract: This comparative study represents the dietary fiber awareness among the two selected areas of Bangladesh, especially urban & rural areas to detect the situation about knowledge, attitude and practices (KAP) of dietary fiber. This study is conducted among 100 people of two areas and shows that knowledge about dietary fiber is higher among the respondents of urban (96%) than the respondents of rural (74%). This study also represents that the attitude to prefer drugs, using laxative is higher among the respondents of urban area. But the curiosity of more intake of dietary fiber is higher among the rural people. This study also shows that among the rural people, the tendency of buying dietary fiber containing foods and intake of fresh dietary fiber foods is higher than urban. But practice of habiting of dietary fiber in fiber content foods stuffs is very much conscious among the respondents of both areas.

Keywords: Dietary Fiber, Knowledge, Rural and Urban People, Diseases

1. Introduction

Dietary fiber (DF) is the edible portions of plant foods (all polysaccharides and lignin, oligosaccharides, such as inulin, and resistant starches) which are not digested by human digestive enzymes in the GI tract and absorbed by the small intestine^[1-5]. According to the Institute of Medicine (IOM), dietary fiber may be defined as non-digestible carbohydrates and lignin that are intrinsic and intact in plants, including the “plant non-starch polysaccharides (e.g., cellulose, pectin, gums, hemicelluloses, β -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”^[6]. American Association of Cereal Chemists (AACC) also defined dietary fiber as carbohydrate polymers with more than a three degree polymerization which are neither digested nor absorbed in the small intestine^[7,1]. FAO/WHO also defined it as a polysaccharide with ten or more monomeric units which is not hydrolyzed by endogenous hormones in the small intestine^[8]. Dietary fiber and whole grains are rich source of bioactive components including resistant starches, vitamins, minerals, phytochemicals such as phenolics,

carotenoids, lignans, beta-glucan, inulin and antioxidants^[1]. Depending on their solubility in water, DF can be classified in 2 major groups: soluble (natural gel-forming fibers eg. pectins, gums, mucilages, inulin-type fructans and some hemicelluloses) that are easily fermented by the microflora of the large intestine and insoluble (structural or matrix fibers eg. lignins, cellulose, and some hemicelluloses) that have bulking action but may only be fermented to a limited extent in the colon^[9-10, 5]. The recommended dietary fiber intakes for children and adults are 14 g/1000 kcal^[11,9]. Koh-Banerjee *et al.* reported that daily intake of 40 g whole grain would reduce 1.1 lbs weight whereas 20 g/day bran intake decrease 0.8 lbs weight gain^[12]. Diets high in soluble fiber decrease total and LDL cholesterol by increasing the rate of bile excretion^[13-14] but water-insoluble wheat fiber and cellulose have no effect unless they displace foods supplying saturated fats and cholesterol^[15]. Increased intake of water soluble dietary fiber may reduce the risk for developing coronary heart disease^[16-19], stroke^[20], hypertension^[21], diabetes^[22-24], obesity^[25-26, 9]. It is assumed that dietary fiber prevents certain gastrointestinal disorders^[27] and obesity by inducing satiety and decreasing excess energy intake^[28]. Furthermore, it also lowers blood

cholesterol concentrations^[29], reduce blood pressure^[30-33], enhance insulin sensitivity^[34-36], promotes regularity^[37], aids in weight loss by increasing the ability to regulate energy intake^[38-40, 1], and appears to improve immune function^[41], decrease pro-inflammatory cytokines such as interleukin-18, C-Reactive protein (CRP)^[42-44]. Fruit and vegetable intake is associated with a lower risk for ischemic stroke^[45]. In the colon, fermentable fibers increase bacterial mass with some acting as prebiotics to promote health-promoting bacteria such as lactobacilli and bifidobacteria^[46]. Insoluble fibers are especially effective in increasing fecal mass and promoting regularity^[47]. For long-term dietary fiber intake, the strength of the association between dietary fiber and all-cause mortality decreased with increasing age^[48]. DF consumption affects the secretion of various gut hormones that may act as satiety factors^[49]. Epidemiological and clinical studies demonstrate that consumption of dietary fiber and whole grain intake is inversely related to the development of several types of cancers including colorectal, small intestine, oral, larynx and breast^[50, 1]. Pectin plays an important role for the prevention of cancer. Nangia-Makker *et al*^[51] proposed that citrus pectin binds and decrease tumor growth and cancerous cell migration in rats. Dietary fiber may also help to prevent cancer by rapid transit and elimination of the feces or may help to bind cancer producing chemicals and make them ineffective. There are several mode of actions for the activity of dietary fiber. i) dietary fiber (DF) interfere digestion in the small intestine and thus allowing it to enter in the large intestine where it is fermented and produce short chain fatty acids, which have anti-carcinogenic properties^[52]. ii) DF increases fecal bulking and viscosity, thus it takes less time between potential carcinogens and mucosal cells. iii) It helps to bind between bile acids and carcinogens. iv) DF also increases antioxidant. v) DF may increase the amount of estrogen excreted in the feces due to an inhibition of estrogen absorption in the intestines^[53]. Some studies have been shown that there are no relation between diabetes and soluble fiber^[54-56]. Jenkins *et al.*^[57] also proposed that wheat bran had no effect on glycemic control in diabetic patient. A high dietary fiber intake (60gm/day) can produce abnormal distension and pain, flatulence and diarrhea and with a high phytate content. Again a high dietary fiber intake requires a high intake fluid intake. Not consuming enough fluid with dietary fiber can leave the stool very hard making lamination difficult and painful. Intestinal blockage has occurred in people who consume great amounts of wheat bran and oat bran. Large amount of dietary fiber can also bind important minerals (especially calcium, zinc, iron) and make them less available to the body. High fiber diets can decrease the absorption of iron (Fe). As a result pregnant woman and young children and other groups are at risk of anemia. Most developed countries people intake little amount of dietary fiber as a result they suffer many diseases such as constipation, appendicitis, piles, diverticulosis, irritable bowel, obesity, hyper tension, especially constipation and piles. In spite of a lot of progress done for the elimination of dietary fiber less intake disorders in Bangladesh, there are no

specific information about the knowledge attitude and practice (KAP) of dietary fiber of the whole country. To reduce prevalence of constipation, piles, KAP are most important program with other suitable programs. So, the general objective of this study was to assess the situation of knowledge, attitude & practices (KAP) of dietary fiber in selected urban & rural areas of Bangladesh.

2. Methodology

This study was conducted in 100 people of all socioeconomic groups living in urban & rural areas of Bangladesh within the time 16th September to 15th December 2012. Among the total study population 50 people were collected randomly from urban and another 50 were from rural areas.

Data collection: A pretest questionnaires including knowledge about dietary fiber, their sources, deficiency disorder, relationship between dietary fiber and mineral absorption and problems of excess intake of dietary fiber were modified and standardized to collect the data. Statistical package for social science (SPSS) was used for entry and data analysis. Entry errors were checked and corrected. Microsoft word was used for graphs and chart.

3. Results

In our study, total 100 respondents were randomly selected from urban and rural areas and each area contain equal number of respondents.

Table 1 Shows, most of the respondents were in the age group between 21-30 years and the percentage were 55% where 56% were urban people. In our study, we consider below 20 to up 41 years aged person as a sample people.

Table 2 represents, 60% people were in middle class where 70% people lived in urban areas. On the other hand, 15% and 25% people were high and low socio-economic status respectively.

This table also shows that 67% of the respondents were healthy where 21% were under weight and 12% were over weight. Only 8% obese people lived in rural areas and intake less dietary fiber.

Table also depicts 96% of the urban people gave the correct answer in compare to rural people when asked them about dietary fiber but 15% people have no knowledge about fiber. On the other hand, 42% people have knowledge about the role of dietary fiber in human body in all stages of life especially in the disorder like constipation and obesity but 58% have no idea. 85% people comments carrots, vegetables, fruits and wheat as a source of dietary fiber where 11% indicate milk, meat and fish. Only 4% people told sugar, rice and water are the source of dietary fiber. Knowledge about the sources of dietary fiber was higher among the urban people (94%) than rural people (76%).

Table1: Distribution of the respondents by ages.

Age in year (range)	Urban (%)	Rural (%)	Total (%)
20≤	11(22)	10(20)	21 (21)
21-30	28(56)	27(54)	55 (55)
31-40	5(10)	6(12)	11 (11)
≥41	5(10)	7(14)	12 (12)
Total	50(100)	50(100)	100 (100)

Table3: Distribution of the respondents based on their knowledge about common problems due to dietary fiber.

Characteristics	Urban (%)	Rural (%)	Total (%)
<i>Knowledge about common disordered</i>			
Constipation, CVD, Obesity, Piles	45 (90)	40 (80)	85 (85)
Scurvy	2 (4)	3 (6)	5 (5)
Peptic Ulcer	1 (2)	2 (4)	3 (3)
Diarrhea	2 (4)	5 (10)	7 (7)
<i>Knowledge of the problems occur excess intake of dietary fiber</i>			
Diarrhea	30 (60)	14 (28)	44 (44)
Loss of appetite	4 (8)	7 (14)	11 (11)
Cancer	1 (2)	1 (2)	2 (2)
Gas formation	15 (30)	28 (56)	43 (43)

Table2: Distribution of the respondents according to their nutritional and socio-economic condition and their knowledge about fiber.

Characteristics	Urban (%)	Rural (%)	Total (%)
<i>Socio-economic status</i>			
Higher class	5 (10)	10 (20)	15 (15)
Middle class	35 (70)	25 (50)	60 (60)
Lower class	10(20)	15(30)	25(25)
<i>Nutritional status</i>			
Under weight	5(10)	16(32)	21(21)
Healthy	37(74)	30(60)	67(67)
Over weight	8(16)	4(8)	12(12)
<i>Knowledge about dietary fiber</i>			
Yes	48(96)	37(74)	85(85)
No	2(4)	13(26)	15(15)
<i>Knowledge of the role of dietary fiber</i>			
Yes	30 (60)	12 (24)	42 (42)
No	20 (40)	38 (76)	58 (58)
<i>Knowledge about sources of dietary fiber</i>			
Carrots, Vegetables & Fruits, Wheat's	47 (94)	38 (76)	85 (85)
Milk, Meat, Fish	2 (4)	9 (11)	11 (11)
Sugar, Rice, Water	1 (2)	3 (6)	4 (4)
<i>Knowledge of daily requirement of dietary fiber</i>			
Yes	15 (30)	6 (12)	21 (21)
No	35 (70)	44 (84)	69 (69)
<i>Knowledge of dietary fiber more require for the following ages groups</i>			
Pregnancies Period	7 (14)	10 (20)	17 (17)
Lactating Period	1 (2)	3 (6)	4 (4)
Childhood	3 (6)	6 (12)	9 (9)

Surprisingly, only 21% people have the knowledge about the daily requirements of dietary fiber but in compare with urban people, 84% rural people have no knowledge about daily requirements. This table also shows that 70% people declared dietary fiber is essential for all age groups where 9%, 17% and 4% people told childhood, pregnancy and lactating period respectively.

the problems occur due to excess intake of dietary fiber in human body in all the stages of life especially diarrhea. Table 3 shows that 85% people gave the exact answer when we asked them about the common disorder due to less intake of dietary fiber and the knowledge about these were higher among the urban people than rural people. This table also depicts that 60% and 28% of the respondents of the urban and rural areas respectively had the knowledge about On the other hand, 56% rural people complain about acidity but only 2% people told about cancer when intake excess amount of fiber.

Table 4 shows that 92% people have a tendency to learn about dietary fiber and urban people were more curious than rural people. About 41% people acquire knowledge from books and papers where 21%, 16% and 22% people collect information from radio/TV, friends, and physicians respectively. Overall urban people prefer Books/Papers and rural people prefer Radio/TV. 90% urban people take decision while they will take dietary fiber or not during disease condition but 31% people have no comments especially rural people (52%).

Table4: Distribution of the respondents according to their attitude and practices of dietary fiber.

Characteristics	Urban (%)	Rural (%)	Total (%)
<i>Attitude to more learn of dietary fiber</i>			
Yes	47(94)	45(90)	92(92)
No	3(6)	5(10)	8(8)
<i>Attitude of knowing information</i>			
Radio/TV	7 (14)	14 (28)	21 (21)
Papers/Books	30 (60)	11 (22)	41 (41)
Friends/Neighbors	5 (10)	11 (22)	16 (16)
Health Center/Physicians	8 (16)	14 (28)	22 (22)
<i>Attitude of avoiding & advising dietary fibers during diseases</i>			
Yes	45(90)	24(48)	69(69)
No	5(10)	26(52)	31(31)
<i>Practice as laxative</i>			
Yes	45 (90)	30 (60)	75 (75)
No	5 (10)	20 (40)	25 (25)
<i>Practice it to increase the activities of insulin</i>			
Yes	47 (94)	17 (34)	64 (64)
No	3 (6)	33 (66)	36 (36)

This table also shows that 75% people use dietary fiber as laxatives where 90% are urban people. On the other hand, 94% urban people believe that dietary fiber increases insulin activity where 66% rural people are not.

Figure 1 represents that 68% people prefer diet during disease condition where 76% people were rural areas but 40% urban people prefer drugs. In our study, the rural people are more conscious to practice about the diet than urban people.

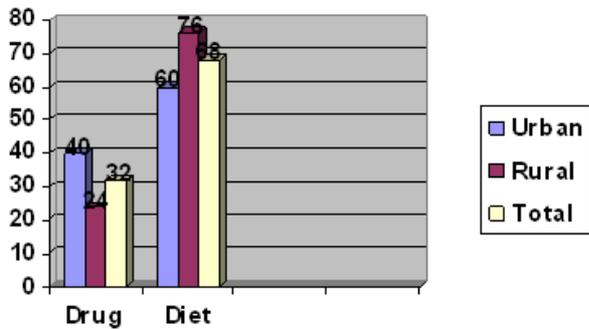


Fig.1: Compare between urban and rural population for preferring diet and drugs during various disease condition.

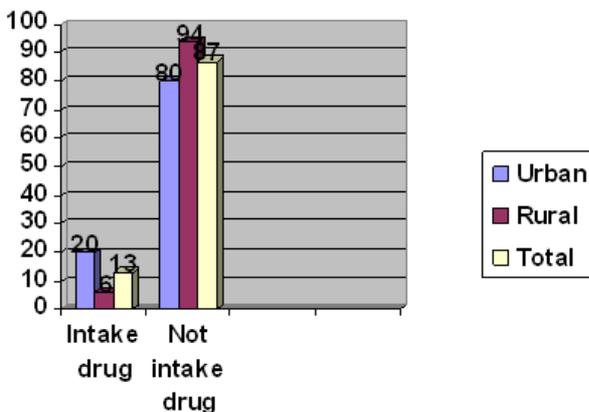


Fig.2: Practice of drug intake between urban and rural population during

4. Discussion

In this study, knowledge, attitude & practice (KAP) about dietary fiber among the people of the two selected areas of Bangladesh have been assessed. The knowledge about dietary fiber (DF) among the respondents in urban (96%) is higher than rural (74%) but 15% people have no idea about dietary fiber. Only 24% and 60% of the respondents of rural and urban people respectively know the role of dietary fiber in all stages of life especially in old ages. Among them 58% did not know the role of DF and 94% urban people told the correct answer about dietary fiber but only 76% rural people told that vegetables and fruits are good sources of dietary fiber. So it seems that their overall knowledge about dietary fibers are not satisfactory. Only 21% people know about their daily requirements of fiber and 17% respondents give emphasis on pregnancy period where only 4% people know the necessity of DF during lactation period. The major health problems of the people who intake less dietary fiber are constipation, piles, appendicitis, obesity, CVD, etc. that affects our national developments. About half of the respondents answered that it affects our mental and physical health. The knowledge about constipation and other related diseases among the respondents in both areas were very similar pattern (urban 90% and rural 80%). Only 60% respondents in rural and 90% respondents in urban had the knowledge about the benefit of dietary fiber as laxatives. Comparatively the respondents of urban had slightly better

knowledge about dietary fiber than the respondents of rural but the knowledge was not sufficient. Among the respondents 92% of both areas (urban 94% and rural 90%) showed positive attitude to learn more about dietary fiber as it is important in all stages of life. But practice as laxative regularly among the respondents in urban people (90%) are higher than rural (60%). About 68% respondents in both areas (Urban 60% and Rural 76%) consumed or practice diets regularly during diseases such as constipation. But 94% urban people and 34% rural people practice it to increase the activities of insulin. Only 31% people had a tendency to avoid it during disease condition and this tendency is higher in rural people (52%). Whereas the attitude to prefer drugs is higher among urban (20%) than rural people (6%). The authors concluded that the knowledge, attitude, & practices (KAP) of dietary fiber & laxative are higher among urban people than rural people but the overall conditions of KAP is not satisfied to eliminate the disease related to dietary fiber. Successfully nutrition education (formal & informal) with fruitful government policy is urgently needed to reduce the risk of diseases. As the rural areas of Bangladesh are less intake in dietary fiber and people are very less educated, applied nutrition programs in the large scale should be inaugurate immediately. Further a comprehensive study is needed in all geographical locations of the country to know the actual KAP of dietary fiber in whole Bangladesh.

5. Conclusions

In our study, urban people are more conscious about dietary fiber and its related diseases in compare to rural people but both people have a positive tendency to learn more about dietary fiber. So, more effective communication and consumer education is necessary to enhance fiber consumption from foods or supplements.

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