

Comparison on fiber rich food consumption in urban and rural areas of Khulna region

Abstract

This comparative study represents the fiber rich food consumption in urban and rural areas of Khulna region. This study was conducted among 100 peoples of selected areas. 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. Results reveal that, about 96% of urban and 94% of rural people intake fibrous food. Among them, about 90% of urban and 82% of rural people like fiber food. There is no doubt that fibrous food is good for health and here 80% urban and 50% rural people know it. About 78% urban people know that fibrous food keeps weight in control, 80% knows it controls constipation. About 98% urban and 88% rural people keeps good knowledge about contaminated food. The higher proportion people in urban areas like and regularly intake fibrous food in their daily food habit by comparing the consumption of fibrous food in rural and urban areas. Now a day's rural people are conscious about intake of fibrous food.

Key Words: Consumption, Fibrous foods, Rural and Urban

Introduction

Dietary fiber is the indigestible portion of plant foods. Overall, fiber represents a very broad class of structurally complex compounds (Saghafian et al 2021). It has several physiological functions and benefits including reduced appetite, lower variance in blood sugar levels, reduced risks of heart disease, metabolic syndromes, diabetes, colorectal cancer and constipation (Li and Komarek, 2017).

A higher consumption of foods with a high fiber content could help prevent mental disorders (Xu et al, 2018; Gangwisch et al 2015 and Kim et al., 2015). In addition, the fermentation of dietary fiber produces short-chain fatty acids that improve the

inflammatory response (Maslowski et al., 2009) as a basic way to treat depressive symptoms (Berk et al., 2013). Fiber consumption could also control postprandial hyperglycemia, reduce oxidative stress and thus inhibit inflammatory processes (Qi and Hu 2009 and Dickinson et al., 2008).

Life expectancy can improve by eating more fibrous food for those with diabetes and save them of dying from COVID-19 (Anonymous, 2020). Dietary fiber protects us from the risk of ischemic stroke (Tong et al., 2020). The USDA's recommended for adults up to age 50 is 25 grams for women and 38 grams for men per day and the older than 50 women and men should have 21 and 30 grams, respectively (Katherine et al., 2019). In Dhaka city, the respondent's intake dietary fiber 7.87 g/day, that is far below the recommended level (25-35 g/day or 10 g/1000 Kcal (Rahim and Choudhury, 2006).

Eating fiber could improve the composition of the intestinal flora (Selhub et al., 2014). The flora could communicate with the central nervous system (Maslowski et al 2009). The dietary fiber avoids certain gastric syndrome and obesity by inducing satiety and decreasing excess energy intake. It also lowers blood cholesterol concentrations, reduces blood pressure, enhances insulin sensitivity, promotes regularity, aids in weight loss by increasing the ability to regulate energy intake, and appears to improve immune function. In the colon, fermentable fibers increase bacterial mass with some acting as prebiotics to promote health-promoting bacteria such as lactobacilli and bifid bacteria. (Ahmed et al., 2013). In general (85.9%) adults (4,787 women and 4,586 men) had complete stool consistency (Markland et al., 2013)

Fiber is two type, a) Insoluble (does not dissolve in water) found in whole grains, wheat cereals, and vegetables such as carrots, celery and tomatoes. b) Soluble (dissolves in water) found in barely, oatmeal, beans, nuts, and fruits such as apples, berries, citrus fruits, and pears. Different food contains different level of dietary fiber such as Indian spinach (2.18 ± 0.17 g), Spinach (2.92 ± 0.21 g), Eggplant (2.28 ± 0.34 g), Sweet pumpkin (1.14 ± 0.88 g), Mango ripe (3.65 ± 0.30 g), Jackfruit (5.14 ± 1.06 g) Banana (1.90 ± 0.16) per 100g respectively (Islam et al., 2010)

Khulna city is the 3rd largest city of Bangladesh and urbanization rate of Khulna city is too high. The knowledge of intake of fibrous food in rural and urban areas of Khulna region is meager. Till today no researcher has yet been conducted this type of survey on

that areas. Therefore, the present study was undertaken to assess the socio characters and the consumption situation of fiber rich foods in selected urban and rural areas of Khulna.

Methodology

This study was conducted in 100 respondents of all socioeconomic groups living in urban and rural areas of Khulna region in 2021. Among the total study population 50 respondents were collected randomly from urban and another 50 were from rural areas. The selected study area was Khulna City Corporation and Batiaghata upazila in Khulna district.

Data collection: A pretest questionnaire including the benefit knowledge on fiber rich food consumption, sources of fiber rich food collection, Problem of intake fiber food consumption and their nature were modified and standardized to collect the data. Statistical package for social science (SPSS® version 16.0) was used for entry and data analysis. Entry errors were checked and corrected. Microsoft excel (version 2016) was used for graphs and chart.

Results

Total respondents were randomly selected from urban and rural areas and each area contain equal number of respondents.

Most of the respondents were in age 26-50 years and the percentages were urban (68%) and rural respondents (54%) (Table 1). Majority of the urban respondents (40%) was businessmen but those of the rural were housewife (60%) followed by housewife (30%) in urban and day labor (22%) in the rural areas. In this table we can observed that the majority of the respondents consisted of medium sized family in urban (60%) and rural (54%) followed by small sized family (38% urban and rural 46%), respectively.

In table 2, it was found that, about 96% of urban and 94% of rural people intake fibrous food. It was also observed that, about 90% of urban and 82% of rural people like fiber food. It was found that 40% respondents in rural area and 26% in urban area cited that intake of fiber food was problematic. It was revealed from the table 2 on the regularity of taking fiber food intake that 86% of the urban respondents regularly take fiber food and 62% of the rural respondents eat fiber contained food regularly.

Table 1. Selected characteristics of the respondents

Age Group	Score (years)	Respondents (N=50+50; rural + urban)			
		Frequency		Percentage	
		Urban	Rural	Urban	Rural
Young aged	Up to25	5	18	10	36
Middle aged	26-50	34	27	68	54
Old aged	>50	11	5	22	10
Small	<4	19	23	38	46
Medium	4-8	30	27	60	54
Large	>9	1		2	
Student		2	1	4	2
Service holder		12	3	24	6
Businessman		20	5	40	10
Housewife		15	30	30	60
Day labour		1	11	2	22
Total		50	50	100	100

Table 2. Distribution of respondents according to consume, regular intake and problems of taking of fiber food

Response of the respondents	Respondents (N=50+50; rural + urban)			
	Frequency		Percentage	
	Urban	Rural	Urban	Rural
Intake of fibrous food				
Yes	48	47	96	94
No	2	3	4	6
Like	45	41	90	82
Dislike	5	9	10	18
problems of taking fibrous food				
Yes	13	20	26	40
No	37	30	74	60
Regular intake of fiber food				

Yes	43	31	86	62
No	7	19	14	38
Total	50	50	100	100

It was revealed from the table 3, on the health benefits of fibrous food, urban (80%) respondents were four times more aware than rural (20 %). It was found that 78% urban respondents know that fibrous food keeps the body weight in control and 80% knows it controls constipation. Rural people were also aware but in a less ration. It is believed by 48% of urban people that fiber contained food controls heart disease whereas rural 8% only. Regarding Stroke, 84% urban people thinks fibrous food is beneficial but 14% rural people thinks the same. About 20% urban respondents think it lessen cholesterol but the rurals think it only 4%. Almost 52% urban respondents think it prevents cancer at the same time 10% rurals think the same. Only 34% rural respondents were aware whereas 66% urban respondents know that fiber food was full of vitamin and mineral.

Table 3. Distribution of respondents according to their response on benefits and problem of intake fibrous food

Response to the respondents	Respondents (N=50+50; rural + urban)			
	Frequency		Percentage	
	Urban	Rural	Urban	Rural
Yes	40	25	80	50
No	10	25	20	50
Benefit category				
Weight control	39	9	78	18
Diabetes control	19	12	38	24
Cancer control	26	5	52	10
Heart disease control	24	4	48	8
Constipation control	40	25	80	50
Osteoporosis	9	4	18	8
Obesity	18	10	36	20

Lower cholesterol levels	10	2	20	4
Lower blood pressure	30	10	60	20
Stroke	42	7	84	14
Vitamins & minerals	32	17	64	34

Table 4 shows the problems to intake fiber contained food. The main problems are adulteration and high price. Among the respondents, 100% of urban people think food is adulterated. 34% of urban residents and 42% of rural residents suffer from gastric problem. About 72% urban and 66% rural people think food price is high. Almost all the respondents cited that scarcity of land and time to cultivate food is big problem. Other main causes were unavailability, hard to digest, perishable etc.

In figures 1 and 2 shows that respondents of the area mainly eat rice and bread as their main food. Most of the rural people take rice (30%) as their main meal whereas in urban area, majority of them take bread (26%). Besides, they consume vegetables, pulse, egg, milk, meat, and fruits. Fish is taken in moderate amount, but intake of vegetables (20%) was higher in rural.

Table 4. Distribution of respondents according to their problems of confrontation.

Problem	Citation Number		Percentage	
	Urban	Rural	Urban	Rural
Not always available	20	18	40	36
Price is high	36	33	72	66
Food is adulterated	50	23	100	46
Children are not willing to take	17	8	34	16
Not easy to digestible	15	28	30	56
Not easy to collect	11	17	22	34
Unavailability of cultivation	41	23	82	46
Scarcity of time for cultivation	44	13	88	26
Not easy to cook	6	8	12	16
Perishable	40	16	80	32
Gastric problem	17	21	34	42

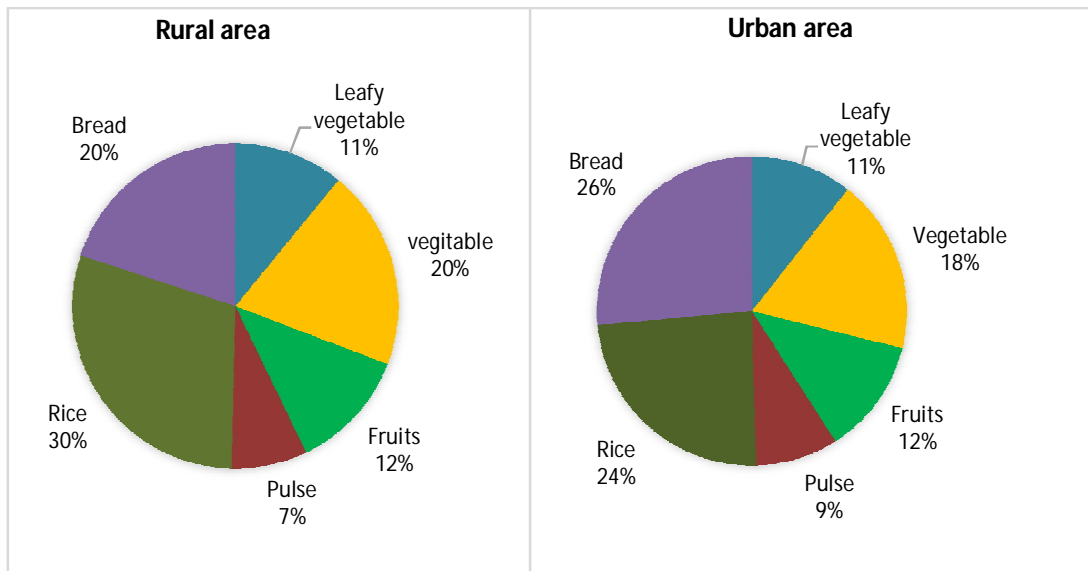


Figure 1. Percentage of fibrous food intake by respondents in rural areas. Figure 2. Percentage of fibrous food intake by respondents in urban areas.

Discussion

Dietary fiber is a good source of vitamins and minerals. Dietary fiber intake might have a role in preventing anxiety, depression, and distress (Saghafian et al 2021). In addition, Miharshahi et al. (8) have shown that lower intake of fruit was associated with depression in middle-aged women. The study was conducted in both rural and urban areas of which most of the respondents were middle aged. Among them, 30% urban and 60% rural women were housewife. The male respondents were service holder, businessman even day laborer and student. Most of them were literate. Only 6% urban and 12% rural respondents were illiterate. Respondents mainly took rice and bread as their main food. It was revealed that 80% rural areas respondents eat rice as their main meal. In urban area, rate of eating bread was high, (26%). Besides, they took vegetables, pulse, egg, milk, meat and fruits.

It was found that 96% urban and 94% rural areas respondents were took fibrous food and 90% Urban and 82% rural respondents liked fibrous food. Ahmed et al. 2013 also found that the knowledge about dietary fiber is higher among the respondents of urban (96%) than the respondents of rural (74%) which support this finding. Daud et al.

(2018) showed a significantly higher positive attitude of rural ($81.8 \pm 10.1\%$) compared to urban ($75.4 \pm 14.9\%$) in Malaysian adolescents that is the opposite scenario. They took standard amount of vegetable ranging 20-50 g. About 46% Urban and 50% rural respondents took medium number of fruits. Most of the rural and urban respondents took rice ranging from 51-100 g. But bread was taken in small amount mostly 31-50 g and few of them taken 51-60 g. Although fibrous food is good for health, respondents face some problems while taking high amount of fibrous food. The main problem was collection of food. Own source was very limited and 96% urban and 46% rural areas respondents collected their food from market. Most of the respondents took fibrous food regularly (86% in urban and 62% in rural). Urban areas respondents took fibrous food because they are aware of benefits of the fibrous food. Awareness was satisfactory range in urban areas, (80%) and (50%) in rural areas.

Urban respondents were significantly more aware compared to rural respondents. The respondents took vegetables, fruits and cereals but likes vegetables most. Although respondents like fibrous food, there were some problems to take them regularly. It was observed that 40% urban and 36% rural respondents mentioned that fibrous food were not always available. About 72% urban and 66% rural respondents said that price is high and the main reason for price hike was limited production of fibrous food. Additionally, food adulteration was a big problem. About 100% urban areas respondents think that food from market was adulterated. Among other problems, there had to digest, not enough time and space to cultivate, children unwilling to eat etc. although there were problems, people should eat fiber contained food as they want to keep healthy, full of vitamins and minerals.

Conclusions

Urban respondents were more conscious about dietary fiber foods and its health benefits in compare to rural respondents but both respondents have positive tendency to learn about dietary fiber foods. Urban respondents mainly take bread and rice whereas rural respondents take mainly rice. Respondents of the urban areas consume more fibrous foods than that of rural area.

References

- Ahmed, M.T., Rahman, S.S., Islam, M.S., Rana, A.Y.K.M. and Rahman, M.H. 2013. A comparative study of dietary fiber awareness, diseases and drugs interaction in rural and urban areas of Bangladesh. *Science Journal of Public Health*. 1(5): 194-200. doi: 10.11648/j.sjph.20130105.12
- Anonymous, 2020. Higher fiber saves lives, but food processing may remove benefits. University of Otago. ScienceDaily, 22 May 2020. <www.sciencedaily.com/releases/2020/05/200522113826.htm>. Accessed September 30, 2020.
- Berk M, Williams LJ, Jacka FN, O'Neil A, Pasco JA, Moylan S, et al.. So depression is an inflammatory disease, but where does the inflammation come from? *BMC Med.* (2013) 11:200. 10.1186/1741-7015-11-200 [[PMC free article](#)] [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
- Daud, M.N., Fadzil, N.I., Yan, K.L., Makbul, I.A.A., Yahya, N.F.S., Teh, A.H. and Rahman, H.A. 2018. Knowledge, attitude and practice regarding dietary fibre intake among Malaysian rural and urban adolescents. *Malaysian Journal of Nutrition*. 24(1): 77-88.
- Dickinson S, Hancock DP, Petocz P, Ceriello A, Brand-Miller J. High-glycemic index carbohydrate increases nuclear factor- κ B activation in mononuclear cells of young, lean healthy subjects. *Am J Clin Nutr.* (2008) 87:1188-93. 10.1093/ajcn/87.5.1188 [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
- Gangwisch JE, Hale L, Garcia L, Malaspina D, Opler MG, Payne ME, et al.. High glycemic index diet as a risk factor for depression: analyses from the Women's Health Initiative. *Am J Clin Nutr.* (2015) 102:454-63. 10.3945/ajcn.114.103846 [[PMC free article](#)] [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
- Islam, S.N., Khan, M.N.I. and Akhtaruzzaman, M. 2010. A food composition database for Bangladesh with special reference to selected ethnic foods. Dhaka: Institute of Nutrition and Food Sciences, University of Dhaka. National Food Policy Capacity Strengthening Programme, Final Report, p.101.

- Katherine, D. and McManus, M.S. 2019. Should I be eating more fiber? Harvard Health Publishing, Harvard medical school.
<https://www.health.harvard.edu/blog/should-i-be-eating-more-fiber-2019022115927>. Accessed September 30, 2020.
- Kim T-H, Choi J-y, Lee H-H, Park Y. Associations between dietary pattern and depression in Korean adolescent girls. *J Pediatr Adolesc Gynecol.* (2015) 28:533–7. 10.1016/j.jpag.2015.04.005 [PubMed] [CrossRef] [Google Scholar]
- Li, Y.O. and Komarek, A.R. 2017. Dietary fibre basics: health, nutrition, analysis, and applications. *Food Quality and Safety.*1(1): 47-59.
<https://doi.org/10.1093/fqsafe/fyx007>
- Markland, A.D., Palsson, O., Patricia, S., Goode, M.S.N., Kathryn, L., Whitehead, B.J. B. and Whitehead, W.E. 2013. Association of low dietary intake of fiber and liquids with constipation: evidence from the national health and nutrition examination survey. *American Journal of Gastroenterology.* 108(5):796-803.
- Maslowski KM, Vieira AT, Ng A, Kranich J, Sierro F, Yu D, et al.. Regulation of inflammatory responses by gut microbiota and chemoattractant receptor GPR43. *Nature.* (2009) 461:1282–6. 10.1038/nature08530 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- Qi L, Hu FB. Dietary glycemic load, whole grains, and systemic inflammation in diabetes: the epidemiological evidence. *Curr Opin Lipidol.* (2007) 18:3–8. 10.1097/MOL.0b013e328011c6e0 [PubMed] [CrossRef] [Google Scholar]
- Rahim, A.T.M.A and Choudhury, R. 2006. Perceived role of dietary fiber in healthy diet and its intake pattern among educated urban population. *Bangladesh Journal of Nutrition.* 18&19: 61-68.
- Saghafian F, Sharif N, Saneei P, Keshteli AH, Hosseinzadeh-Attar MJ, Afshar H, Esmailzadeh A, Adibi P. Consumption of Dietary Fiber in Relation to Psychological Disorders in Adults. *Front Psychiatry.* 2021 Jun 24;12:587468. doi: 10.3389/fpsy.2021.587468. PMID: 34248690; PMCID: PMC8264187.
- Selhub EM, Logan AC, Bested AC. Fermented foods, microbiota, and mental health: ancient practice meets nutritional psychiatry. *J*

PhysiolAnthropol. (2014) 33:2. 10.1186/1880-6805-33-2 [[PMC free article](#)] [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]

Tong, T.Y.N., Appleby, P.N., Key, T.J. and Dahm, C.C. et al. 2020. The associations of major foods and fibre with risks of ischaemic and haemorrhagic stroke: a prospective study of 418 329 participants in the EPIC cohort across nine European countries. *European Heart Journal.* 41(28): 2632-2640. doi: 10.1093/eurheartj/ehaa007.

Xu H, Li S, Song X, Li Z, Zhang D. Exploration of the association between dietary fiber intake and depressive symptoms in adults. *Nutrition.* (2018) 54:48–53. 10.1016/j.nut.2018.03.009 [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]

UNDER PEER REVIEW