International Journal of Natural and Social Sciences
Print: 2617-6637 < ISSN > Online: 2313-4461

Contribution of fish to animal protein consumption in daily diet

Sharmin Akter[1], Chayanika Pondit[2], M. A. Salam[3], M. Mamnur Rashid[3]

[1]Senior Upazila Fisheries Officer, Bogura Sadar, Bogura
[2]Extension Officer, National Agricultural Technology Program, Phase-2 (NATP-2), Department of Fisheries, Dhaka
[3]Department of Aquaculture, Bangladesh Agricultural University, Mymensingh

ARTICLE INFO

Article history

Received: 07 February 2022
Accepted: 23 February 2022

Keywords

Fish, Animal protein, Daily diet, Socio-demographic characters

Corresponding Author

Sharmin Akter
sharmin.dof@gmail.com

ABSTRACT

A comparative study was under taken to know the availability, composition and contribution of fish, beef, mutton, chicken, egg, dal, milk, vegetable, shak and fruits to human health in Bangladesh Agricultural University campus and near-by villages in Mymensingh sadar Upazilla. Data were collected purposively from the four group of people like teachers, officers, poor people and male and female students of Bangladesh Agricultural University, Mymensingh using individual questionnaire interview, key informant interview, focus group discussion (FGD) and individual case study. Secondary data from the Government and non-government organizations and published materials were collected for this study. The data showed that the fish consumption was found to be average 26.76 Kg per capita per year in the study area. Consumption of other protein rich food such as meat, egg and milk were found to be 7.71 Kg, 138 no., and 18.24 liter per capita per year, respectively. Average per capita intake of fish, meat, egg and milk were 73.31 g, 21.12 g, 0.38 no. and 49.97 ml per day respectively. Ninety nine percent respondents of all groups preferred dry fish. The intake of animal protein in the form of fish, egg and milk had increased significantly in the region due to availability, comparatively cheap than the other protein sources and financial ability of the respondents. Among the sources, fish was found to be contributed more in protein consumption than meat, beef, mutton, milk and egg. Protein contribution of fish was 59%. On the other hand, protein contribution of meat, egg and milk were 23.83%, 9.14% and 7.95%, respectively. The study revealed that the expenditure for food was the major part of the total expenditure of the respondent's family, teachers, second class officers, poor people and students spent about 50.23%, 57.22%, 81.29% and 52.76% of the total expenditure on food items, respectively. However, food consumption pattern is closely related to the respondent's income level, their food preference and a1so their educational status.

INTRODUCTION

Fish provides major contribution to the survival and health of a significant portion of the World's population. Fish is especially important in the developing world. Often referred to as "rich food for poor people," fish provides essential nourishment, especially quality proteins, fats, vitamins and minerals. For those involved in fisheries, aquaculture and fish trade, fish is a source of income (Nongmaithem and Ngangbam, 2009).

Despite the dilemma of huge population and extreme poverty, Bangladesh is blessed with vast fisheries resources due to favorable climatic condition and geographical location of the country. It is situated in the tributaries of the deltaic rivers the Ganges (locally known as Padma), the Brahmaputra and the Meghna. The inland fisheries resources of Bangladesh are considered to be one of the richest in the world, which are in the form of haors, baors, beels, rivers, coastal areas, ponds and floodplains (Ashraf et al., 2010).)

In developing countries fish is still very much essential food and a main source of protein which is easily digestible with high biological value (Nongmaithem and Ngangbam, 2009).

On a fresh weight basis, fish contains a good quantity of protein, about 18 -20%, and contains all the eight essential amino acids including the

How to cite this article: Akter S, Pondit C, Salam MA and Rashid MM (2021). Contribution of fish to animal protein consumption in daily diet. International Journal of Natural and Social Sciences, 8(4): 08-19. DOI: 10.5281/zenodo.6349079

sulphur containing lysine, methionine, and cysteine (Table 1).

Table 1: Amino acid content per 100 g of fish, milk, beef and eggs (Ashraf et al., 2010)

Amino acid	Fish	Milk	Beef	Egg
Lysine	8.89	8.1	9.3	6.8
Tryptophan	1.0	1.6	1.1	1.9
Histidine	2.0	2.6	3.8	2.2
Phenylalanine	3.9	5.3	4.5	5.4
Leucine	8.4	10.3	8.2	8.4
Isoleucine	6.0	7.2	5.2	7.1
Threonine	4.6	4.4	4.2	5.5
Methionine-cysteine	4.0	4.3	2.9	3.3
Valine	6.0	7.6	5.0	8.1

The fat content of fish varies depending on the species as well as the season but, in general, fish have less fat than red meats. The fat content ranges from 0.2% to 25%. However, fats from fatty fish species contain the polyunsaturated fatty acids (PUFAs) namely EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid, omega 3 fatty acids) which are essential for proper growth of children and are not associated with the occurrence of cardiovascular diseases such a coronary heart disease.

Fat also contributes to energy supplies and assists in the proper absorption of fat soluble vitamins namely A, D, E, and K (Ashraf et al., 2010).

Fish is a rich source of vitamins, particularly vitamins A and D from fatty species, as well as thiamin, riboflavin and niacin (vitamins B1, B2 and B3). Vitamin A from fish is more readily available to the body than from plant sources (Ashraf et al., 2010). The minerals present in fish include iron, calcium, zinc, iodine (from marine fish), phosphorus, selenium and fluorine. Fish is soft and recommended food for almost all diseased person.

At national level, the fisheries sector in Bangladesh contributes significantly to nutrition, employment, household income and foreign exchange earnings. Fish provides 63% of the animal protein intake in Bangladesh. Fish and fishery products are the country's second largest export commodity contributing about 5.2% of national GDP or 20% of the agriculture GDP (DoF, 2003 and Shah, 2003).

In Bangladesh, fisheries and aquaculture play a pivotal role in alleviating protein deficiency and malnutrition, in generating employment and foreign exchange earnings. Little work is found to assess the contribution of fish to animal protein consumption in human diet. Hence the objectives of the study were to find out per capita fish intake and to calculate the percentage of yearly fish protein contribution human diet.

MATERIALS AND METHODS

The study was based on fish contribution to animal protein consumption in daily diet. The survey work was conducted in a participatory way where individual questionnaire interview, key informant interview, focus group discussion (FGD) and individual case study were employed. A pre-tested questionnaire was used in this regard. The qualitative and quantitative data were collected randomly with cross checking covering different respondents group.

Selection of the study area

This study was conducted in Mymensingh district mainly Bangladesh Agricultural University campus and its surrounding areas). The survey was conducted among teachers, students, employees of the Bangladesh Agricultural University and some poor people in nearby villages.

Selection of target groups and sampling procedure

In the present study, the target groups were students, teachers, employees of BAU and some poor people from nearby villages. Data was collected from 30 teachers, 30 employees of BAU, 30 male students, 30 female students and 30 poor people randomly. Both statistical and tabular techniques will be followed to analyze the collected data to achieve the objectives of the research (Table 2). In addition, 12 focus group discussions (FGD) were also carried out, 3 from each respondent group involving 6-12 persons in each session.

Table 2: Distribution of target groups to for data collection in BAU campus and its nearby villages

Types of respondents	Residential area of BAU	Hall of BAU	Nearby villages of BAU
Teachers of BAU	30	0	0
Students of BAU	0	60	0
Employees of BAU	30	0	0
Poor people	0	0	30
Total respondents	60	60	30

Questionnaire preparation and pre-test

In this research, a structured questionnaire was prepared. A questionnaire is a set of questions which are generally used to conduct a study to get in-depth knowledge in a specific matter (Mellenbergh, 2008). The major advantage of this method is that it is less expensive and its coverage is much wider. The questionnaire consists of qualitative and quantitative information. The questions were made to characterize their family (their name, occupation, earning member, household member, age, and education level), their consumption pattern, their food preference, income and expenditure level. The questionnaire was finalized after necessary testing and corrections. After that the questionnaire was used for survey work.

Period of the study

The data were collected from April to August, 2010- Several visits were made during the period of collecting necessary data from selected area.

Secondary sources of information

The study was supported by secondary information from various sources. Secondary information were collected from DoF, FAO, BBS human nutrition related publications.

Data processing and analysis

After collecting, data were sorted, edited and encoded. All the collected data were summarized and scrutinized carefully and entered in to Microsoft Excel. All the collected information were accumulated and analyzed by MS-Excel and presented in textual, tabular and graphical forms.

RESULTS

Family size and age composition

The family size of a respondent was measured by the total number of respondent's family members including himself, his wife, children and other dependents eating and staying together and age of the respondent was measured in terms of years from birth to the time of interview on the basis of his response. Table 3 depicts detailed family size and age composition of the respondent households of different studied groups. In this study average family size of teachers, second class employees of BAU, poor people of nearby villages of BAU and students of BAU were 3.3, 3.6, 5.1 and 4.3 respectively. Age composition of the households was classified into four categories: children, adolescents, working age and old. Age of the respondents was an important factor in involvement in any income generating activities. The age of the respondent was between 19 to 50 years which indicates earning groups.

Table 3: Detailed family size and age composition of the respondent households

Age (Years)	Teacher (n=30)		Second class service holder(n=30)		Poor people (n=30)		Male Student (n=30)		Female Student (n=30)	
	M	F	M	F	M	F	M	F	M	F
0-6	5	2	5	6	10	12	0	0	1	0
7-18	10	9	19	18	25	20	10	10	5	12
19-50	32	31	38	33	40	37	54	42	52	43
Above 50	6	3	4	3	6	4	14	2	12	2
Family size	1.8	1.5	1.9	1.7	2.7	2.4	2.6	1.8	2.3	1.9
Average	3.3		3.6		5.1		4.4		4.2	

Earning member of the respondent's family

Earning member means the person who earns money for their family. Figure 2 shows average earning member of different respondent's family. In this study poor people had more earning member than other groups.

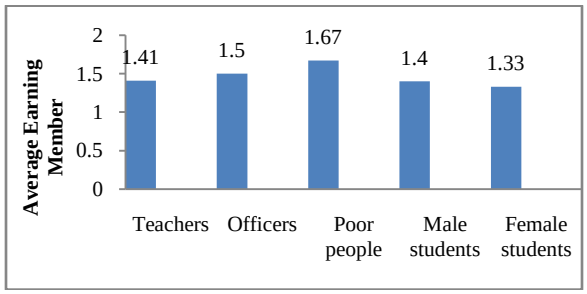

Figure 2: Average earning member of the respondent's family

Literacy level

The literacy level of the respondent's family reflects the pattern of the respondent's family. Literacy level of the respondent was classified into seven categories: Illiterate, Can only sign, Primary, SSC, HSC, Graduate, Post graduate and above. In this study only poor people had "illiterate" (27.92%) and "can only sign group" (30.52%). There was no such group in other respondent's family. On the other hand, teacher had more percentage of "post graduate and above group" (43.82%) than other groups. Table 4 shows percentage of literacy level of the respondent's family.

Income level

Household income is defined as the material return in kind or in cash in exchange for goods and services by the household earners. The Income level of the respondent's family reflects the consumption pattern of the respondent's family. Table 5 shows percentage of income level of the respondent's family per month. In this study 100% student's income level was below BDT 5000 per month. Actually they got their money from their family. About 13.33% poor people's income level was below BDT 5000 per month. On the other hand, about 63.33% teacher's income level was above BDT 30,000 per month.

Table 4: Percentage of literacy level of the respondent's family

Literacy level	Teachers	Officers	Poor people	Male Students	Female students
Illiterate	0	0	27.92	0	0
Can only sign	0	0	30.52	0	0
Primary	16.85	34.29	35.06	3.01	7.58
SSC	6.74	29.52	6.49	23.31	18.94
HSC	7.87	14.29	0	18.05	12.12
Graduate	17.98	6.67	0	38.35	34.09
Post graduate and above	43.82	3.81	0	18.05	26.52

Table 5: Percentage of income level of the respondent's family per month

Income Level (BDT)	Teachers (n=30)	Officers (n=30)	Poor people (n=30)	Male students (n=30)	Female students (n=30)
Below 5,000	0	0	13.33	100	100
5,001-15,000	0	69.67	86.67	0	0
15,001-30,000	36.61	30.33	0	0	0
Above 30,000	63.33	0	0	0	0

Table 6: Type of expenditure of the respondent's family per month

Expenditure level	Teachers	Officers	Poor people	Students
Food expenditure	12,833 (50.23)	6,433 (57.22)	4,266 (81.29)	1,786 (52.76)
Housing expenditure	6,286 (24.61)	1,996 (17.76)	60 (2.73)	0
Educational expenditure	2,866 (11.22)	1,206 (10.73)	287 (5.46)	1,076 (31.93)
Clothing expenditure	1,283 (5.02)	569 (5.00)	167 (3.31)	203 (6.05)
Medicine expenditure	740 (2.9)	380 (3.48)	155 (2.96)	0
Others	1,536 (6.02)	656 (5.8)	223 (4.25)	310 (9.3)

Note: Parentheses indicates the % of expenditure level of the respondent's family per month.

Expenditure level

Household expenditure refers to the household consumption expenditure defined as the value of goods and services finally consumed by resident households. Table 6 shows average expenditure level of the respondent's family per month. In this study food expenditure was the major portion in the total expenditure. Poor people spent about 81.29% of their total expenditure for food and teacher spent 50.23% of their total expenditure for food.

Amount of food consumed by respondents

Food is any substance, composed of carbohydrates, fats, proteins and water that can be eaten or drunk by animals, including humans, for nutrition or pleasure. Items considered food may be sourced from plants, animals or other categories such as fungus. Table 7 shows average amount of food (Kg) of the respondent's family consumed per week and Table 8 shows food consumption pattern of respondents. In this study food items included fish, beef, mutton, chicken, egg, dal, milk, vegetable, shak and fruits. Fish was the best source of protein for human. In this study average 3.42 Kg fish was consumed by each teacher's family per week. On the other hand poor people took average 1.67 Kg fish per week.

Table 7: Average food (Kg) consumption of the respondent's family per week

Food items	Teachers	Officers	Poor people	Students
Fish	3.42	2.20	1.67	0.33
Beef	0.92	0.34	0.17	0.09
Mutton	0.142	0.033	0.02	0.002
Chicken	2.05	1.03	0.43	0.38
Egg	12.83	6.63	0.27	5.80
Dal	0.70	0.52	0.48	0.75
Milk (liter)	2.67	1.70	0.80	0.17
Vegetable	4.38	4.10	3.63	1.15
Shak	1.77	1.27	1.27	0.25
Fruits	1.37	1.19	0.27	0.25

Food consumption per capita per year

Table 8 shows consumption of different food items per capita per year. Fish, meat, milk and egg were protein rich food. In this study, per capita fish intake, meat, milk and egg (no.) were 26.76 Kg, 7.71 Kg, 18.24 liter and 138 pieces per year respectively. On the other hand, per capita fish, meat, milk and egg consumption was 17.02 Kg, 8.5 Kg, 7.9 liter and 81.9 (no.) respectively per year in 2005-06 (BBS, 2008).

Table 8: Food consumption pattern of respondents

Categories	Weekly fish consumption by family (Kg)	Family size	Per capita per week (Kg)	Per capita per year (Kg)	Per capita per day (g)
Amount of fish consumption					
Teachers	3.42	3.30	1.03	26.76	73.31
Officers	2.20	3.60	0.60		
Poor people	1.67	5.10	0.30		
Students	0.33	1.00	0.33		
Amount of meat consumption					
Teachers	1.04	3.30	0.31	7.71	21.12
Officers	0.47	3.60	0.13		
Poor people	0.21	5.10	0.04		
Students	0.16	1.00	0.16		
Number of egg consumption					
Teachers	12.83	3.30	3.89	138	0.38
Officers	6.63	3.60	1.80		
Poor people	0.27	5.10	0.05		
Students	5.80	1.00	5.80		
Amount of milk consumption					
Teachers	2.67	3.30	0.80	18.24	49.97
Officers	1.60	3.60	0.40		
Poor people	0.80	5.10	0.15		
Students	0.17	1.00	0.17		

Protein contribution

In the study, protein contribution of fish, meat, egg and milk was 59%, 24%, 9% and 8% respectively (Figure 3).

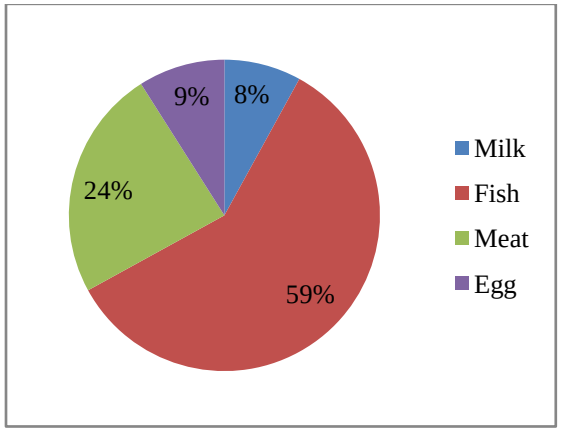

Figure 3: Percentage of protein contribution of different food items

Different food items consuming days per week

Food is any substances or materials eaten or drunk to provide nutritional support for the body or for pleasure. It usually consists of plant or animal origin that contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals were ingested and assimilated by an organism to produce energy, stimulate growth, and maintain life. For nutrition, human needed a regular supply of verities of food in their body. All types of food items were not eaten everyday in a week. Consuming days of different food items in a week varied according to the consumer and also their economic condition. Table 9 shows average consuming days of different food items of the respondent's family per week. In this study teachers ate fish on an average 5.47 days per week. On the other hand, poor people took fish on an average 4.23 days per week.

Table 9: Different food items consuming days per week by the respondent's family

Food items	Teachers	Officers	Poor People	Students
Fish eaten days per week	5.47	5.43	4.23	4.5
Beef eaten days per week	1.20	0.59	0.18	1.36
Mutton eaten days per week	0.17	0.33	0.008	0.07
Chicken eaten days per week	2.63	1.34	0.63	2.48
Number of eggs eaten days per week	6.70	4.03	2.03	4.65
Dal eaten days per week	6.93	5.86	6.80	3.09
Liter of Milk drink days per week	6.80	4.97	2.40	0.9˜5
Vegetable Shak Fruits	7.00	6.30	6.93	6.49

Table 10: Cost for different food items that required for respondent's family per week in average (Tk)

Food items	Teachers	Officers	Poor people	Students
Fish	1060	451.67	235	74.14
Beef	236.5	88.95	41.08	30.31
Mutton	49.67	21.67	12.15	-
Vegetable	169.33	165.67	141.87	57.84
Egg (no.)	84	42.73	28.57	49.55
Dal	76	51.19	49.83	13.01
Chicken	263.2	134.58	5633	42

Money spent for food items per week

Money for different food items was directly related to the respondent's income. Table 10 depicts average amount of money needed for different food items of the respondent's family per week. In this study, teachers spent average BDT 1,060.0 per week for fish which is the highest than other food cost. Second class service holder spent average BDT 451.7 per week for fish. On the other hand, poor people spent average BDT 235.0 per week for fish.

Individual preference of the respondents

Every person had different food preferences. Table 11 shows the percentage of individual preferences of the respondents. In the study, some one preferred fish or beef or chicken. About 50% teachers and 46.67% second class service holders preferred fish. On the other hand about 40% poor people and 20% student preferred fish (Figure 4).

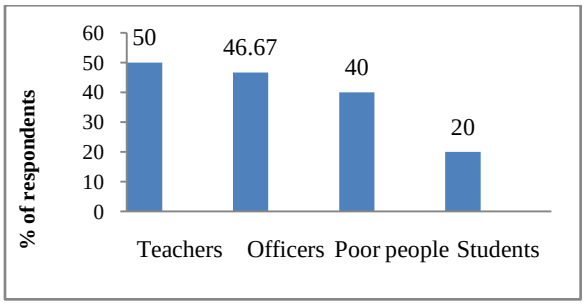

Figure 4: Percentage of the individual preferences of respondents (Fish)

Food offering to guests

Like other animal, human being required energy for their life. This energy came from their food. So they took food regularly. But when some guests came in home then the host tried their best to offer varieties of dishes to their guests. About 46.67% teachers offered four food items, 50% teachers offered three food items and 3.33% teachers offered two food items. In this study four food items included meat, fish, vegetable and dal; three food items included meat or fish vegetable and dal; two food items included meat or fish, vegetable or dal; one food items included meat or fish (Table 11).

Table 11: Percentage of respondents offer different food items to guests

Category	Four types food items	Three types food items	Two types food items	One types food items
Teachers	46.67	50	3.33	-
Officers	3.33	53.33	43.33	-
Poor people	-	53.33	46.67	-
Students	-	35	53.33	11.67

Table 12: Percentage of respondent's opinion about healthy food items

Category	**Food items**					
	Fish	**Beef Mutton**	**Vegetable**	**Egg**	**Dal**	**Chicken**
Teacher	63.33	-	26.67	6.67	-	3.33
Officers	46.67	-	36.67	10	3.33	3.33
Poor people	26.67	-	63.33	-	3.33	6.67
Student	51.67	-	25	20	3.33	-

Healthy food in ones perception

A healthy diet is one that helps maintain or improve health. It is important for the prevention of many chronic health risks such as: obesity, heart disease, diabetes, and cancer. Table 12 shows percentage of the healthy food in respondent's perception. In the study 63.33% teachers, 46.67% second class service holders, 26.67% poor people and 51 % students thought that fish was a healthy food. On the other hand, 26.67 % teachers, 36.67 % second class service holders, 63.33 % poor people and 25% students thought that vegetable was a healthy food. A healthy diet involves consuming appropriate amounts of all nutrients. Nutrients could be obtained from many different food items. Fig. 10 shows percentage of respondent's opinion about healthy food (fish).

Dry fish consumption

Dry fish was very tasty food item in Bangladesh. Dry fish preferred by all groups of respondents. In this study, about 99% respondents of all groups preferred dry fish. Some poor people ate more dry fish than other groups. Dry fish had good flavor and also highly nutritious food. Now various chemicals were used during fish drying which was very harmful for human health.

Children's food preference

Children were little but important family member. They could not take all food items. On the other hand, different children had different food preference. Most of the rich family (teacher) could prepare food according to their children preference. Small number of second class service holder's family could prepare food according to their children preference. On the other hand, most of the poor people could not prepare food according to their children preference. This thing mainly depended on the economic condition of respondent's family.

Minimum expenditure in a day

Sometime respondent's family wanted to pass a day cheaply. In this case, rich people passed a day cheaply by taking fish and vegetable. Second class service holders passed a day cheaply by taking fish or egg and vegetable. Poor people passed a day cheaply by taking dry fish or vegetable and dal. On the other hand, students passed a day cheaply by taking egg and vegetable.

Fish preference

Various types of fish were eaten by respondents. Most of the respondents preferred llish, Chingri, Boal, Shing etc. as these fishes were very tasty.

List of consumed fish

Fishes consumed by teachers, second class service holders, poor people and students are given in Table 13. This table shows fish consumed by the respondents groups.

Table 13: List of fish that consumed by respondents

Sl No.	Name of fish	Scientific name of fishes	Teachers	Officers	Poor people	Students
01	Tilapia	*Oreochomis niloticus*	√	√	√	√
02	*Rui*	*Labeo rohita*	√	√	√	√
03	Catla	*Catla catla*	√	√	-	-
04	Mrigal	*Cirrhinus mrigala*	√	√	√	√
05	Silver carp	*Hypophthalmichthys molitrix*	-	√	√	√
06	*Koi*	*Anabus testudineus*	√	√	√	√
07	*Shol*	*Channa striatus*	√	√	-	-
08	Taki	*Channa punctatus*	√	√	√	√
09	Pungus	*Pangasius pangasius*	√	√	√	√
10	Boal	*Wallago attu*	√	√	-	-
11	Tangra	*Mystus vittalus*	√	√	√	-
12	Gulsha	*Mystus cavasius*	√	-	-	-
13	Tara baim	*Mastacembelus aculeatus*	√	√	-	-
14	Chitol	*Chitola chitola*	√	√	-	-
15	Sarpunti	*Puntius sarana*	√	√	√	√
16	Ilish	*Hilsa ilisha*	√	√	√	√
17	Shing	*Heteropneustes fossilis*	√	√	-	-
18	Magur	*Clarias batrachus*	-	√	√	√
19	Common carp	*Cyprinus carpio*	-	√	√	-
20	Air	*Mystus aor*	√	-	-	-
21	Chingri	*Palaemon sp*	√	√	√	√
22	Prawn	*Macrobrachium sp.*	√	-	-	-
23	Kalibaush	*Labeo rohita*	√	√	√	√
24	Mola	*Amblypharyngodon mola*	√	√	√	√
25	Darkina	*Esomus danricus*	√	√	√	√
26	Bashpata	*Ailia coila*	√	√	-	-
27	Pabda	*Ompok pabda*	√	√	-	-
28	Chapila	*Gudusia chapra*	√	√	-	-

DISCUSSION

Family size and age composition

Family size was important to determine consumption pattern. In the study poor people had large family (5.1) and teachers (3.3) had small family. BBS (1995) reported that the average size of household was 5.48 persons and 57% population had household size between 4 to 7 members. Now people of Bangladesh became conscious about their family size. So, family size was reduced. Among the four categories age group, working group was most important for family earning. If this group became educated and got good job than they could lead a better life with their family. On the other hand, educated person had small family size and leaded a better life.

Earning member

In the study, poor people had more earning members (1.67) than the other groups. Because of their children engaged in different earning activities besides their parents. This result is similar to the report of Hosen et al. (2010) who reported that a nation had lost huge potential resource because of the employment activities of children. Every nation as well as family would like to make his or her children as a qualified person.

Although many reasons were involved in child labor but poverty were the main reason and this cause mostly appearing in Bangladesh. Poor people had large family size but their monthly income was very poor. So they needed more family members to earn money. For this reason poor people took more children willingly and those family members involved in different activities at their early age to earn money.

Literacy level

About 27.92% poor people were illiterate and 30.52% can only sign. On the other hand, only 6.49% could pass SSC examination but they can not go ahead. On the other hand, teacher had more percentage of "post graduate and above group" (43.82%) than other groups. Hosen et al. (2010) reported that poor people did not have enough ability to take all the responsibilities of their children. Majority of the parents could only afford to offer the food and lodging butthey could not afford the educational expenses of their children. BANBEIS (2010) also reported that national literacy rate was 54.8% (2009) in Bangladesh. It is observed that the literacy rate of studied area was higher than national literacy rate. Because the study area included a large educational institute (BAU) and it's students, teachers and employees.

Income level

There was no teacher who had income level below BDT 15,000 because their monthly salary started with BDT 18,000 and no poor people had income level above BDT 15,000 per month. Most of the second class service holder's income level between BDT 5,000 to 30,000 and all of the students used below BDT 5,000 per month. Because about BDT 5,000 was enough for single life. Income level directly affected expenditure level. Bangladesh Economic Review (2008) reported that per capita income reached $554. In the study this result agrees with available report. Monthly income level was increasing and per capita income was also increasing per year in Bangladesh continuously with time.

Expenditure level

The poor people spent most of their income in food. Poor people spent about 81.29% of their total expenditure for food and teacher spent about 50.23% of their total expenditure for food. Most of the poor people had income level below BDT 10,000 and most of the teachers had income level above BDT 18,000. According to BBS (2008) food expenditure of the people who had income level below BDT 15,000 was about 59.01% of the total expenditure and income level above BDT 20,000 was about 44.49% of the total expenditure in 2005-06. There was some difference between the tabular and calculated value because now life become more expensive. In the study educational expenditure of student was higher (31.93%) than other groups because higher education needed more money.

Food consumption per capita

Fish, meat, milk and eggs were protein rich food. In the study, per capita fish intake, meat, milk and eggs (no.) were 26.76 Kg, 7.71 Kg, 18.24 liter, 138 per year respectively and per capita intake of fish, meat, milk were 73.31 g, 21.12 g, 49.97 ml per day respectively. According to BBS (2008) reported that per capita fish, meat, milk and egg consumption were 17.02 Kg, 8.5 Kg, 7.9 liter and 81.9 (no.) respectively per year in 2005-06. It was observed that fish, meat, milk, eggs consumption had changed. According to BBS (2005) the average level of per capita intake of fish, meat, milk were, 42.1 gm, 20.8 gm, 32.4 ml per day at the national level. Huge amount of fish was produced in this area. So, per capita fish intake was increased per year. In case of egg, the respondent group, students mainly depended on egg for fulfilling their protein demand. On the other hand, teachers were highly conscious about their nutrition and consumed more eggs. So, egg consumption was diversely increased. As teachers, second class service holders and students were conscious about their nutrition. So, they consumed milk regularly. For this reason milk consumption was increased. In case of meat, students took very small amount of meat and teachers thought fish was healthy food than meat; thus took more fish than meat and poor people could not buy meat. So, per capita meat consumption was reduced.

Protein contribution

In the study, protein contribution of fish, meat, egg and milk were 59%, 23.83%, 9.14% and 7.95% respectively. DoF (2010) reported that protein contribution by fish was 58% in a year which is slightly lower than the present findings. Ashraf et al. (2010) reported that Asia's countries (Bangladesh, Cambodia) people derived as much as 75% of their daily protein from fish. Often referred to as "rich food for poor people," fish provided essential nourishment, especially quality proteins and fats (macronutrients), vitamins and minerals (micronutrients). AOAC, (in Aberoumad and Pourshafi, 2010) reported that fish was one of the main sources of protein in the developing countries.

Personal preference of respondents

There were different types of food items in one's daily diet. But all of those food items were not their favorites. Different respondents had different food preference. It depended upon respondent's own choice. About 50% teachers and 46.67% second class service holders preferred fish. In the study, most of the respondents preferred fish. Louka et al. (2004) reported that in recent years, fish became favorite foodstuff for the majority of people because of several health reasons. Fish were good source of protein, fat, vitamin and mineral. So, people prefer fish more than meat.

Healthy food conception

A healthy diet involved consuming appropriate amounts of all nutrients. Nutrients could be obtained from many different foods. So there were a wide variety of diets that might be considered healthy diets. In the study 63.33% teachers, 46.67% second class service holders, 26.67% poor people and 51.67% students thought that fish was a healthy food. On the other hand, 26.67% teachers, 36.67% second class service holders, 63.33% poor people and 25% students thought that vegetable was a healthy food. Teachers were highly educated group and they had good knowledge about nutrition. This result is similar the report of Louka et al. (2004) who reported that fish was safer and healthier food than beef, mutton, buffalo and chicken meat. Fish are good source of protein, fat, vitamin and mineral. Compared to other sources of protein, fish are well known to be excellent sources of protein which can be seen from amino acid composition and protein digestibility.

Meat consumption

Most of the respondent's family did not take meat for seven days in a week. Because of it was costly and highly fatty food. This result is similar the report of Louka et al. (2004) who reported that fish was safer and healthier food than beef, mutton, buffalo and chicken meat. This result is also similar the report of Nongmaithem and Ngangbam (2009) who reported that the polyunsaturated and saturated fatty acids in beef were 4-10% and 40-45%, respectively, of the total fatty acids present. So meat was not a healthy and safe food to take seven days in a week.

Fish consumption

Various types of fish were available in Bangladesh. Most of the respondent's family consumed fish for average 4 to 5 days in a week. Louka et al. (2004) reported that fish was safer and healthier food than beef, mutton, buffalo and chicken meat. Fish were good source of protein, fat, vitamin and mineral. Compared to other sources of protein, fish were well known to be excellent sources of protein which could be seen from amino acid composition and protein digestibility. This result is also similar to the report of Nongmaithem and Ngangbam (2009) who reported that approximately 50% of the fatty acids in lean fish and 25% in fattier fish were polyunsaturated fatty acids. In contrast, the polyunsaturated and saturated fatty acids in beef were 4-10% and 40-45%, respectively, of the total fatty acids present.

CONCLUSION

The contribution of fish was found to be important due to their higher nutritional value in terms of protein content, the presence of micronutrients, vitamins and minerals. In the study, food items included fish, beef, mutton, chicken, egg, dal, milk, vegetable, shak and fruits. Among these foods fish, beef, mutton, chicken, egg and milk were protein rich food. But fish contained good protein for human health. Amount of different

food items that consumed by various respondent's family were related to their income level and also their educational status. If income level was high then food consumption became high especially protein consumption.

Consuming days of different food items in a week varied according to the consumer's preference and also their economic condition. Amount of money for purchasing food also depended on the respondent's income level. If income level was high then food cost becomes high.

Fish consumption was found to be average 26.76 Kg per capita. The total fish consumption rate of Mymensingh district was higher than the nation average (17.52 Kg). Mymensingh city is clearly marked by the old Brahmaputra River flowing along its north. Huge amount of fishes are produced in Mymensingh. Various types of fish were available in study area. Dry fish is a good protein rich food. The intake of animal protein in the form of fish, egg and milk had increased significantly. Among these fish was found to be contributed more important role in protein consumption.

Proteins are important for growth and development of the body, maintenance and repairing of worn out tissues and for production of enzymes and hormones required for body processes. In the study, protein contribution of fish was 59%. The total protein contribution of fish in Mymensingh district was higher than the nation protein contribution (58%). Protein contribution of meat, egg and milk were 23.83%, 9.14% and 7.95% respectively.

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