

## Original Article

# Food Consumption And Energy Intake In Rural Areas of Bangladesh

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### Abstract

**Background:** Food supply at national level is satisfactory in Bangladesh though per capita energy intake and diversity of food are important concerns with food security in rural areas.

**Objectives:** This nutritional survey was carried out to observe the food diversity at household level and to estimate per capita energy intake in rural areas for assessing the existing situation.

**Methodology:** A total 648 households were surveyed in three villages selected by cluster sampling technique. Informations were collected on the basis of 24 hours' recall of respondents about the food items and the amount consumed at the household on the previous day and eating occasions by structured partially close ended questionnaire.

**Results:** Food diversity was on the 'Border line' (3-6 score) at 65.28% of the household. Rice and oil were consumed at every house but per capita intake of meat, fish, fruits and vegetables were 64.67, 62.07, 20.11 and 57.78 gram respectively where those were consumed. Per capita food energy intake per day was 2695 kcal from 150.45 gram (616.85 k cal) of protein, 397.50 gram (1590.01 k cal) of carbohydrate and 52.49 gram (488.13 k cal) of fat from all sources giving 22.89%, 59.00 % and 18.11% of the dietary energy respectively.

**Interpretation & Conclusion:** Diversity of foods and consumption of animal protein, vegetables and fruits intake were lower in amount.

**Recommendation:** Recommendation was made to initiate health education program for inclusion of varieties of food and increase daily consumption of animal protein, fruits and vegetables.

### Introduction

Diets of populations around the world are primarily determined by the availability of local food and food practices<sup>1</sup>. A balanced diet with adequate in energy from carbohydrate, protein, vitamins and minerals, can satisfy both perceptible and hidden hunger. Food security implies intake of required calorie containing sufficient amount of proximate principles. The suggested important indicators for measuring the development at household level include increased number of eating occasions per day, increased number of different foods or food groups consumed (dietary diversity) and increased percentage of households consuming

minimum daily caloric requirements. Over the last decades, Bangladesh has made considerable progress in increasing national level food availability and individual level energy intake. Nevertheless, the intake of energy and other essential nutrients is still far below the nutrient requirements and recommended dietary allowances. Diets are largely imbalanced with the staple food cereals contributing around 73% of total energy intake and a substantial proportion of dietary protein<sup>2,3</sup>. A value of 2310 kcal/day, recommended by FAO has been in use for a long time though some organizations have suggested alternative figures<sup>4,5,6</sup>. Such differences arise because it is difficult to draw a minimum-

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requirement line below which people will not function as healthy human beings. In Bangladesh, the national food consumption surveys were carried out in 1962 - 1964, 1975 - 1976, 1981 - 1982 and in 1995 - 1996<sup>7,8</sup>. Results from these surveys suggest that nutritional status improved from 1975 - 1976 to 1981 - 1982 but remained unchanged during the last two decades and intakes of energy and macronutrients in rural Bangladesh had declined from 1962 - 1964 to 1981 - 1982 and 1995 - 1996.

Majority of the Bangladeshi are the rural people and a remarkable section is living in hard core poverty. This study was designed to assess the present status of diet and energy intake among rural people at the household level for maintaining their health and making daily life comfortable

## Methodology

The present retrospective study was carried out in this study. This nutritional survey was carried out in the rural area of Shahjadpur sub-district (field research area of Khwaja Yunus Ali Medical College) under district Sirajgonj, Bangladesh as a part of Residential Field Site Training Program (RFST) for 4th year MBBS students in the second week of April 2014. Three villages (Jugnidah, Moshipur and Tetierkanda) were selected by cluster sampling and all the households were brought under study. Sixty one medical students collected data under the direct supervision of the authors from 661 households and among them 648 household data (containing information of 3118 persons) found complete were brought under study and analyzed. Respondents were the household women related with cooking and household keeping.

Partially closed ended questionnaire (Schedule) was used for data collection. The students collected the information on the basis of 24 hours' recall of respondents about the different food items and their amounts cooked and consumed by all household members of the family on the previous day eaten in total eating sessions.

The Schedule for data collection and 'Food Diversity Data Sheet' (FDDS) were developed by the authors and 'Proximate Nutrients Composition Sheet' (PNCS) were edited as per knowledge of the availability of food items in those areas in that season<sup>9</sup>. Protein, Fat and carbohydrate contents in the food were estimated by using PNCS and Energy derived from those were calculated by multiplying the amounts (in gram) of protein, Fats and Carbohydrate by 4.1, 9.3 and 4.0

respectively. Microsoft excel was used for data entry and calculations. Analysis was done using SPSS 23 v software.

## Results

Majority (83.0%) of the respondents were female and 52.31% belonged to lower age groups [18-37 years]. Families consist of 3-4 and 5-6 members were 41.98% and 37.19% respectively in the total studied houses. A very large majority (83.18%) of the household had had three meals per day. Food diversity score on the (previous) day of data collection was on the border line scale (3-6) in the majority (65.28%) house hold. Rice and oil was used at all households (648,100.00%) followed by the potato at 82.10 % houses.

**Table 1:** Meal and Food Diversity Score (FDS) at the households

| Sl No | Description                   | Household |         |
|-------|-------------------------------|-----------|---------|
|       |                               | Number    | Percent |
| A.    | Number of meals daily         |           |         |
|       | Two                           | 65        | 10.03   |
|       | Three                         | 539       | 83.18   |
|       | Four                          | 44        | 06.79   |
|       | Total                         | 648       | 100.00  |
| B.    | Food diversity score (daily). |           |         |
|       | 3-6 Score (Border line)       | 423       | 65.28   |
|       | 7-9 Score (Acceptable low)    | 207       | 31.94   |
|       | 10 and above (Acceptable)     | 18        | 02.78   |
|       | Total                         | 648       | 100.00  |

Per capita protein consumption was 150.45 gram including 106.83 gram from animal origin and 43.62 gram from plant source. Per capita total carbohydrate consumption was 397.50 gram. Per capita total fat, animal fat and plant fat consumption values were 52.49, 24.58 and 27.91 gram respectively in the study.

**Table 2:** Consumption of Proximate principles of food at household level

| Sl No | Total Consumption of Proximate principles of food from all sources (in gram) |                                     | Households (= 648) (Population = 3118) |         |
|-------|--|-------------------------------------|--|---------|
|       | Type   | Amount                              | Number                                 | Percent |
| 1     | Carbohydrate   | < 250                               | 74                                     | 11.42   |
|       |  | 250- <350                           | 180                                    | 27.78   |
|       |  | 350- <450                           | 191                                    | 29.47   |
|       |  | 459- <550                           | 101                                    | 15.59   |
|       |  | 550- <650                           | 60                                     | 09.26   |
|       |  | 650                                 | 42                                     | 06.48   |
|       |  | Total                               | 648                                    | 100.00  |
|       |  | Per capita consumption =397.50 gram |  |         |

|   |         |  |     |        |
|---|---------|--|-----|--------|
| 2 | Protein | < 50   | 205 | 31.64  |
|   |         | 50 - <100  | 254 | 39.20  |
|   |         | 100 - <200                                       | 40  | 6.16   |
|   |         | 200 - <300                                       | 36  | 5.56   |
|   |         | 300 - <400                                       | 43  | 6.65   |
|   |         | 400 - <500                                       | 24  | 3.70   |
|   |         | 500 - <600                                       | 20  | 3.08   |
|   |         | ≥ 600  | 26  | 4.01   |
|   |         | Total  | 648 | 100.00 |
|   |         | Per capita total protein consumption=150.45 gram |     |        |
| 3 | Fats    | < 25   | 131 | 20.22  |
|   |         | 25 - <50   | 239 | 36.89  |
|   |         | 50 - <75   | 139 | 21.45  |
|   |         | 75 - <100  | 61  | 9.41   |
|   |         | 100 - <125                                       | 38  | 5.86   |
|   |         | 125 - <150                                       | 14  | 2.16   |
|   |         | ≥ 150  | 26  | 4.01   |
|   |         | Total  | 648 | 100.00 |
|   |         | Per capita total fat consumption=52.49           |     |        |

The total per capita energy consumption was 2695.00 kcal. Among the total consumed energy, 616.85 kcal was derived from the protein source contributing 22.89% of the dietary energy consumption. Per capita energy consumption from carbohydrate was 1590.01 kcal that contributed for 59.00% of the total energy consumed. And fat contributed for 488.14 kcal that supports 18.11% of the total dietary energy. Plant fat energy contributed for 53.18% of the total fat energy of the diet.

**Table 3:** Daily Energy consumption at household.

| Sl No                                   | Per capita Energy consumption (kcal) |  | Households (=648) [Population =3118] |         |                   |
|---|--------------------------------------|--|--------------------------------------|---------|-------------------|
|   | Type                                 | Amount (kcal)  | Number                               | Percent |                   |
| 1.                                      | Total food energy                    | Up to 1000   | 9                                    | 1.39    |                   |
|   |                                      | 1001 - 1500  | 57                                   | 8.8 0   |                   |
|   |                                      | 1501 - 2000  | 122                                  | 18.8 3  |                   |
|   |                                      | 2001 - 2500  | 148                                  | 22.8 3  |                   |
|   |                                      | 2501 - 3000  | 104                                  | 16.0 5  |                   |
|   |                                      | 3001 - 3500  | 79                                   | 12. 19  |                   |
|   |                                      | 3501 - 4000  | 39                                   | 6.0 2   |                   |
|   |                                      | 4001 - 4500  | 22                                   | 3.4 0   |                   |
|   |                                      | 4501 - 5000  | 25                                   | 3.86    |                   |
|   |                                      | 5001 - 6000  | 26                                   | 4.0 1   |                   |
|   |                                      | ≥ 6001   | 17                                   | 2.6 2   |                   |
| Total                                   |                                      |  | 648                                  | 100.0 0 |                   |
| Total Per capita per day = 2695.00 kcal |                                      |  |                                      |         |                   |
| 2.                                      | Energy from Protein                  | Animal sources   | 438.01 kcal                          | 71.01   |                   |
|   |                                      | Plant sources  | 178.84 kcal                          | 28.99   |                   |
|   |                                      | Total per capita per day energy from protein = 616.85 kcal |                                      |         | 22.89             |
|   |                                      |  |                                      |         |                   |
| 3.                                      | Energy from fat                      | Animal sources   | 228.56 kcal                          | 46.82   |                   |
|   |                                      | Plant sources  | 259.57 kcal                          | 53.18   |                   |
|   |                                      | Total per capita per day energy from fat =                 |                                      |         | 488.14 kcal 18.11 |
|   |                                      |  |                                      |         |                   |
| 4.                                      | Energy from carbohydrate             | Total per capita energy from Carbohydrate =                |                                      |         | 1590.01kcal 59.00 |
|   |                                      |  |                                      |         |                   |

## Discussion

In this survey, per capita food energy consumption was 2695 kcal from 150.45 gram (616.85 kcal) of protein, 397.50 gram (1590.01 kcal) of carbohydrate and 52.49 gram (488.14 kcal) of fat providing 22.89%, 59.00 % and 18.11% of the dietary energy respectively from relatively fewer varieties of food reflecting the food intake situation in the rural areas of the country which was compatible with a lot of similar studies.

In this study, majority of the respondents were female and the household heads were male. In Bangladesh, most of the female are engaged mainly in cooking and housekeeping and male in income generation activities indicated the existence of gender discrepancy. About one third (33.18%) of the household head and 265 (40%) of the respondents were illiterate. The numbers of respondents in every categories of educational status were proportionately less than household heads indicated the less progress of women in the society.

A very large majority [83.18 % (539)] of the households consumed three meals everyday that reflect the norm of intake of three major meals in Bangladesh. Number of meals in a day reflected the better financial condition of the studied areas especially the textile cottage industries and the better employment of the people.

In this study, food diversity score was categorized differently from the conventional diversity score (score of 7 days with selective weights giving methods) calculation as our study defined diversity of one day. Information about 12 types of food consumption with amount was collected and recorded following the World Health Organization/ Food and Agriculture Organization (WHO/ FAO) classification of food.<sup>8</sup> Majority (65.28%) of the households was on borderline (below the mere acceptable level), reflecting the less food security and their diet deficient in quality that had consistency with some studies. Consumption amount of different food items and daily consumption of less animal protein and inclusion of less vegetable and fruits in daily diet had similarity with some studies.

Per capita energy consumption of 2695 kcal was an important finding in this study. Swindale, Anne and Punam Ohri-Vachaspati had recommended per capita energy requirement 2661 kcal following a Joint report of Food and Agriculture Organization, World Health Organization & United Nations University (FAO/WHO/UNU) of 2005<sup>7,10</sup>. It had close consistency with our study. In a lot of studies the energy consumption had been mentioned less than that in our study. But we think that our study had reflected true -

situation of Bangladesh because those studies were of about few years back and in the meantime the country has much progressed in financial and social sectors. Energy consumption from macronutrients [protein, carbohydrate and fat] was effectively consistent with the dietary goal recommended by WHO/FAO. Though energy derived from protein, fat and carbohydrate was within the limit range, yet the amount of intake of protein, fat and carbohydrate containing diet was less in amount, especially animal protein, vegetables and fruits. Our study findings have close similarity with similar finding of many other studies<sup>9,11</sup>.

## Conclusions

The impressive conclusion drawn from the study was that diversity of food intake was relatively low. Though per capita food energy consumption was adequate, yet a large section of house hold was not getting adequate energy. Consumption of animal protein was low at a remarkable section of households. Daily consumption of vegetables and fruit at most of the household was completely disappointing.

## Recommendations

The recommendations were made to initiate a health education program might help the villagers to select correct food and the amount, to increase consumption of animal protein, especially meat and fish in the diet and also vegetables and fruit in requisite amount to get sufficient vitamins and minerals. Creation of more income generating projects is essential to increase purchasing power of the villagers. More facilities of general education especially for women are more helpful in these aspects. Besides those, women empowerment is essential for involvement in family decision making.

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