

Food Consumption Pattern of a Sample of Primary School Teachers in Bangladesh

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Abstract

A cross-sectional study was conducted among the urban and rural primary school teachers to assess their food intake pattern and health status. The sample included 150 primary school teachers. A combination of quantitative (24-h food record) and qualitative (food frequencies) food intake methods was used simultaneously to collect data. 24-h dietary recall shows significantly higher intake of protein and fat ($P<0.01$), and low calorie ($P<0.01$), carbohydrate and B-vitamins ($P<0.05$) by the urban teachers. Females in the urban area had lower calorie intake compared to their male colleagues ($P<0.01$). Reported frequencies of food consumption shows better habitual intake pattern among the urbanites. Intakes of eggs, meat, fish, milk, milk products and fruits were found at higher frequencies in their meal ($P<0.01$). Though salary scale did not vary between the groups but gross monthly income vis-à-vis expenditure was reported significantly higher among the urban teachers ($P<0.01$). This income difference was reflected by their habitual food intake pattern. Nutritional status as expressed by BMI did not differ between the groups.

Key words: Food intake, food pattern, diet, primary school teachers

Introduction

For people engaged in formal or non-formal job, the level of job satisfaction and nutritional status are the two prime factors responsible for their subjective well-being. Quality of life is the product of the interplay among social, health, economic and environmental conditions, which affect human and social development¹. The World Health Organization defines quality of life as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity². Changes in nutritional status contribute to the quality of life alterations^{3,4}. Life style is influenced by occupation and it has an important influence in the relationship of nutrition with physiological characteristics. Both physiological and psychological stresses influence food intake⁵. Psychological stress producing changes in food behaviour that in turn affects nutritional status and physical well-being⁶. Teachers at the primary level though shoulder the responsibility and burden of educating the future generation of the country, but are always confronted with their livelihood. In

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Bangladesh about 316483 teachers have been rendering their services for teaching in the primary schools⁷. A great discrepancy exists between the urban and rural primary schools in respect of teaching, learning as well as other physical facilities. Teachers working in the rural primary schools are usually overburdened with tutorial and extra-tutorial activities, and are not well paid. They therefore adapt to such an extent so as to lie within the realm of what the individual perceives to be possible.

With the recognition of stress inherent in the teaching job, and the potential physical, emotional and attitudinal exhaustion experienced in the job, the present study was designed to measure the overall nutritional and health status of the primary school teachers, both urban and rural, and to look for the differences, if exists, between the groups.

Methods

Study site and selection of subjects

The study was conducted in the Dhaka Metropolis and the rural areas of Mirzapur upa-zilla under Tangail district. Subjects were 150 primary school teachers (69 male and 81 female). Prior the start of the study a list of the primary schools in the Dhaka City and Mirzapur upa-zilla of Tangail district was collected from the office of the Department of Primary Education to facilitate the study⁸. Using simple random sampling technique four thanas (Lalbag, Mohammadpur, Tejgaon and Ramna) were selected from the greater Metropolitan Dhaka City. From these four thanas, thirteen schools were selected through stratified random sampling procedure. The aim and objectives of the proposed research were explained to the participating respondent prior starting the study. Seventy-five subjects were selected from among the 471 teachers who volunteered for the study through simple random technique. An equal numbers of rural schools were selected randomly in the upa-zilla Mirzapur. From 410 teachers seventy-five teachers were selected following the same method applied for the urban area. The survey was performed in the form of personal interviews. Confidentiality of the responses and their identities were assured to them. They were interviewed at their convenience.

Data collection

Two sets of structured questionnaire were used to collect information covering socio-economic and nutritional (dietary and anthropometric) aspect of the individual. The questionnaire were pre-tested and modified where necessary through pilot study.

- a. Socio-economic characteristics. Socio-economic data included age, level of education, salary, monthly family income and expenditure, marital status, family composition etc.
- b. Nutritional status. **Diet history/ dietary intake assessment.** 24-h food record served as the referent method of dietary intake assessment, and the repeated frequency of food consumption record for assaying individual's usual or habitual

food intake pattern. 24-h recalls. Foods eaten over the past twenty-four hours were recorded. Cooked foods were converted into their raw equivalents. Energy and nutrient intakes were calculated from food tables⁹ by using a computerized database and analyses program. Habitual food intake pattern. Habitual or usual intake is defined as 'the individual's mean intake over an extended period of time (months or even year)'. A history of the typical or habitual diet information was gathered by using food frequency questionnaire developed by Block G et al¹⁰. This questionnaire uses an open-ended format providing subjects with options of answering different food groups in terms of frequency per day, week or month. Food frequency estimates were converted to times consumed per month. Information gathered helped to identify the basic components of the meal pattern on a daily, weekly and monthly cycle.

Anthropometry. The subject's heights and weights were determined and mean body mass index (BMIs: kg/m²) were calculated. The subjects were weighed to the nearest 0.5kg with a Uni-scale, without shoes and wearing normal clothing. Height was measured to the nearest 0.1 cm by using a wall-mounted stadiometer.

Statistical analyses

Data entry was done using dBase software. FORTRAN software package was used for dietary data analyses. Statistical analyses used SPSS for Windows (Version 10.0; SPSS Inc, Chicago). Results are given as means ± sd. Difference between means was established using Student's t-test.

Results

Subjects

Subject characteristics are summarized in Table-1. The age, educational level, salary category and family composition among the groups (urban-rural) were not different. Monthly gross income as well as expenditure of the urban teachers was significantly higher compared to their rural counterpart (P<0.01). Fifty-seven percent of the urban teachers' monthly income was recorded more than Tk.10,000, but it was sixty three percent of the rural teachers whose earning was less than Tk.10,000 per month (data not shown). The expenditure pattern shows the similar trend.

Dietary outcomes (energy and nutrient intake)

Energy intakes obtained by using 24-hr food records are shown in Table-2. Significant higher energy intake was observed among the rural teachers (P<0.05). The energy requirement was calculated by multiplying BMR and PAL of the participants as per FAO/WHO/UNU recommendation¹¹. Percentage fulfillment of energy requirement by the primary school teachers were well above 90% except for the urban female teachers who only fulfilled 70% of their requirement. Within group analyses no gender differentials in nutrient intake among the rural population were seen, but marked difference in the intake of energy, carbohydrate, protein, iron,

thiamine, riboflavin and zinc was observed between the male and female teachers in the urban location (Table-3). The female teachers exhibited poor food consumption. Locational difference among the same sex group was pronounced more among the urban females (Table-4). Higher energy, iron, thiamine, niacin and zinc intake was observed more by the rural group except for vitamin A. Significantly higher protein and fat intake was observed among the male teachers in the urban area.

Table 1: Group characteristics of the study population

Characteristics	Urban (n=75)	Rural (n=75)
Age (years)	44.6 ± 6.90	44.17 ± 8.60
Sex		
Male (n=69)	28	41
Female (n=81)	47	34
Educational level**	2.04 ± 0.92	2.05 ± 0.96
Salary*	5355 ± 970	5067 ± 1158
Total Income*	12732 ± 5540	9215 ± 3471 [‡]
Expenditure*	11759 ± 5038	9042 ± 3787 [‡]
Household composition	5.04 ± 1.58	5.01 ± 2.27

*Monthly (In Taka); [‡]P < 0.01 ** SSC=1 HSC=2 Graduate=3

Table 2: Mean daily intakes, and standard deviations, of energy and nutrients of primary school teachers

	Urban	Rural
Energy (kcal)	1674 ± 500	1937 ± 511 [†]
Carbohydrate (gm)	287 ± 103	362 ± 106 ^{**}
Protein (gm)	62 ± 20	60 ± 20
Fat (gm)	19 ± 11	16 ± 10 [†]
Iron (mg)	19 ± 11	20 ± 12
Calcium (mg)	530 ± 395	615 ± 360
Vitamin-A (µg)	333 ± 484	229 ± 233 [†]
Vitamin-C (mg)	44 ± 28	47 ± 54
Thiamine (mg)	1.24 ± 0.42	1.47 ± 0.46 [†]
Riboflavin (mg)	0.79 ± 0.31	0.87 ± 0.34
Niacin (mg)	15.82 ± 5.59	19.18 ± 7.02 [†]
Zinc (mg)	8.07 ± 2.79	9.29 ± 2.99 ^{**}

[†] P < 0.05 ^{**} P < 0.01

Table 3: Energy and nutrient intake differentials by location

	Urban		Rural	
	Male (n=28)	Female (n=47)	Male (n=41)	Female (n=34)
Energy (kcal)	1979 ± 421	1493 ± 456 ^{***}	1945 ± 498	1926 ± 532
Carbohydrate (gm)	349 ± 97	250 ± 89 ^{***}	368 ± 104	355 ± 109
Protein (gm)	72 ± 17	56 ± 19 ^{***}	57 ± 19	63 ± 21
Fat (gm)	21 ± 12	18 ± 9 ^{***}	15 ± 11	16 ± 8
Iron (mg)	24 ± 14	16 ± 7 ^{***}	20 ± 21	19 ± 10
Calcium (mg)	627 ± 558	471 ± 244	555 ± 375	687 ± 331
Vitamin-A (µg)	314 ± 657	339 ± 311	227 ± 208	234 ± 259
Vitamin-C (mg)	48 ± 33	41 ± 25	44 ± 36	50 ± 71
Thiamine (mg)	1.51 ± 0.37	1.08 ± 0.35 ^{***}	1.50 ± 0.51	1.42 ± 0.38
Riboflavin (mg)	0.83 ± 0.33	0.76 ± 0.30 ^{***}	0.82 ± 0.31	0.93 ± 0.36
Niacin (mg)	20 ± 5	41 ± 25	44 ± 36	50 ± 71
Zinc (mg)	10 ± 3	7 ± 2 ^{***}	9 ± 3	10 ± 3

^{*}P<0.05 ^{**}P<0.01

Table 4: Energy and nutrient intake differentials by sex group

	Male		Female	
	Urban (n=28)	Rural (n=41)	Urban (n=47)	Rural (n=34)
Energy (kcal)	1979 ± 421	1946 ± 498	1493 ± 457	1926 ± 352 ^{***}
Carbohydrate (gm)	349 ± 97	368 ± 104	250 ± 89	354 ± 109
Protein (gm)	72 ± 17	57 ± 19 ^{***}	56 ± 19	62 ± 21
Fat (gm)	21 ± 12	15 ± 11 ^{***}	18 ± 9	16 ± 8
Iron (mg)	24 ± 14	20 ± 13	16 ± 7	21 ± 12 ^{***}
Calcium (mg)	627 ± 558	555 ± 375	471 ± 244	687 ± 331 ^{***}
Vitamin-A (µg)	314 ± 657	227 ± 277 [*]	339 ± 513	234 ± 287 [*]
Vitamin-C (mg)	48 ± 33	45 ± 36	41 ± 25	50 ± 71
Thiamine (mg)	1.51 ± 0.38	1.50 ± 0.51	1.08 ± 0.35	1.43 ± 0.39 ^{***}
Riboflavin (mg)	0.84 ± 0.33	0.82 ± 0.31	0.76 ± 0.30	0.93 ± 0.37
Niacin (mg)	20 ± 5	19 ± 6	13 ± 4	19 ± 8 ^{***}
Zinc (mg)	10 ± 3	9 ± 3	7 ± 2	10 ± 3 ^{***}

^{*}P<0.05 ^{**}P<0.01

The contributions of various food groups to total consumption are illustrated in Tables 5-6. Marked difference in the food intake pattern was observed between the urban and rural groups (Table-5). Low frequencies of egg, meat and milk product

consumption was observed in both the locations. Significantly higher intakes of bread, meat, fish, fruit, milk, milk products ($P<0.01$) and eggs ($P<0.05$) by the urban teachers suggestive of accessibility to and practice of better food intake which covers the major types of available foods. On the other hand the food intake pattern of the rural teachers is poor, non-varied and monotonous. Gender variation within the location was non-remarkable except for the female urban teachers who consume fruits more than their male counterparts ($P<0.05$). The difference that noted for meat intake among the female teachers than the males in the rural area probably misclassified due to higher s.d. value. Habitual intakes of meat, fruits, milk are significantly poor among the rural females than the urban females ($P<0.01$) -Table-6.

Table 5: Frequencies of food consumption reported (frequency per month)

Food items	Urban			Rural		
	All	Male	Female	All	Male	Female
Rice	30 ± 0	30 ± 0	30 ± 0	30 ± 0	30 ± 0	30 ± 0
Ruti (bread)	22 ± 11	26 ± 8	24 ± 10	17 ± 13**	16 ± 12	18 ± 12
Meat	5 ± 4	6 ± 3	7 ± 4	3 ± 3**	3 ± 2	4 ± 4*
Fish	20 ± 9	23 ± 8	26 ± 8	17 ± 9**	20 ± 8	22 ± 8
Egg	8 ± 9	11 ± 9	13 ± 10	6 ± 7*	8 ± 7	11 ± 8
Leafy Veg.	17 ± 10	19 ± 11	17 ± 10	18 ± 9	22 ± 8	18 ± 9
Non-leafy Veg.	30 ± 2	30 ± 0	29 ± 4	30 ± 2	30 ± 0	30 ± 0
Fruits	20 ± 11	14 ± 9	23 ± 10*	12 ± 10**	11 ± 9	13 ± 11
Milk	18 ± 13	10 ± 11	14 ± 13	24 ± 10**	21 ± 12	24 ± 9
Milk products	5 ± 7	2 ± 2	4 ± 5	3 ± 4**	2 ± 2	4 ± 5

* $P<0.05$ ** $P<0.01$

Table 6: Food frequency (frequency per month): male-female (urban-rural)

Food items	Male		Female	
	Urban(n=28)	Rural(n=41)	Urban(n=47)	Rural(n=34)
Rice	30 ± 0	30 ± 0	30 ± 0	30 ± 0
Ruti (bread)	26 ± 8	16 ± 12**	24 ± 10	18 ± 12**
Meat	6 ± 3	3 ± 2**	7 ± 4	4 ± 4**
Fish	23 ± 8	20 ± 8	26 ± 8	22 ± 8*
Eggs	11 ± 9	8 ± 7	13 ± 10	11 ± 8
Leafy vegetables	19 ± 11	22 ± 8	17 ± 10	18 ± 10
Non-leafy Veg.	30 ± 0	30 ± 0	29 ± 4	30 ± 0
Fruits	14 ± 9	11 ± 9	23 ± 10	13 ± 11**
Milk	10 ± 1	21 ± 12**	14 ± 13	24 ± 10**
Milk products	2 ± 2	2 ± 2	4 ± 5	4 ± 5

* $P<0.05$ ** $P<0.01$

Anthropometry

Nutritional status or physical states of the teachers studied as expressed by BMI, calculated from weight and height are shown in Table-7. No significant locational difference for either sex was observed. In the rural area the male teachers were observed significantly thinner by their calculated BMI score than the female colleagues ($P < 0.05$).

Table 7: Anthropometric characteristics of subjects

	Male		Female	
	Urban	Rural	Urban	Rural
Weight (kg)	60.71 ± 7.45	57.88 ± 8.93	60.96 ± 7.35	58.82 ± 7.30
Height (cms)	160.0 ± 7.11	161.37 ± 7.22	151.94 ± 6.16	151.79 ± 6.53
BMI (kg/m ²)	19.0 ± 2.53	17.95 ± 2.75	20.10 ± 2.60	19.41 ± 2.57

Discussion

Studies on dietary habits and life style factors in free-living populations most often rely on self-reported information. The results presented here provided representative picture of the nutrition situation as well as nutrition related habits of the primary school teachers. The single 24-h recall is relatively easy to administer, but does not provide a valid reflection of an individual's usual diet. Therefore the food frequency questionnaire was the method used for assessing eating habits in the study as a quick and simple method to categorize subjects. In addition to the assessment of usual dietary intake, it provides group comparisons (pattern between genders or across groups) and ranking of individuals.

24-h diet records in this study reveal significantly higher energy and lower fat intake by the rural population groups. This difference in the energy intake was probably due to higher consumption of rice (carbohydrate) by the rural teachers, which also contributed to the higher intake of thiamine. In the urban areas higher dietary fat and vitamin A intake observed would be probably due to regular presence of animal food in their meal. Gender differentials in the intake of energy, protein, iron and the B-vitamins were noted in the urban location but not in the rural area. The female teachers lacked behind the males both in the intake as well as in fulfilling their demanded recommendation.

Gross differentials in the habitual food intake were observed by their reported frequencies of food consumption. Food frequencies counts are inherently an approximation¹², and though these counts are partly based on sample food likes and dislikes, but income factor poses as a strong determinant for food choice. The urban teachers reported gross higher monthly income as well as expenditure. As expected, the consumption of meat, fish, eggs, milk, milk products and fruits were more frequent among the urban teachers than their rural counterparts. Diverse food sources in the meal show a balanced look among the urban teachers.

The results presented here provide a representative picture of the nutritional condition of the primary school teachers in the country. It is suggested that this information will be constructively explored for appropriate measures in order to promote health, nutrition and thereby quality of life of the teachers in the primary level.

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