

Dietary intake pattern of lactating mother and under five children in selected districts of southern Bangladesh

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Abstract

Food diversity is an important aspect of a healthy diet that reflects the various sources of nutrients that are consumed. Consumption of various food groups is used as a proxy indicator to assess the overall dietary intake and micro nutrient adequacy of studied population. The present study was undertaken to assess the dietary intake pattern of under-five children and lactating women from five upazilas of Satkhira, Khulna and Barisal districts, the most impoverished regions of southern Bangladesh. The study was cross-sectional in design where lactating (129) and under-five children (162) were selected as the target population. A two stage cluster sampling was used and information on food consumption was collected using a 24-hour dietary recall. The lion portion of lactating women's diet was from plant source (560g) whereas animal sources contributed insignificant portion (67g). For lactating women energy intake fulfilled less than half of the RNI (41%) while protein and carbohydrate intake fulfilled almost half of the RNI (51% and 48% respectively). Fat intake was found severely low, fulfilling 11% of RNI. In under five children except protein all the macronutrient intake was considerably low. Protein intake fulfilled 98% and 107% of RNI for children of 6-23 months and 24-59 months respectively. In case of micronutrients only vitamin C fulfilled above 101% of RNI for lactating mother while no other micronutrient fulfilled half of the RNI. In under five children almost half of RNI was fulfilled for vitamin A, thiamine, riboflavin, vitamin B6 and vitamin C. Findings of the present study revealed that the diet of lactating mother and under five children in southern part of Bangladesh is inadequate both in quantity and quality.

Key words: Lactating mother, Under five children, Dietary intake, Dietary diversity.

Introduction

Being a developing country Bangladesh has made tremendous progress in providing food to its mammoth population, yet the country has been facing challenges in reducing gaps between the food intake for a person per day and the minimum requirement for nutrient from diet. The Southern districts of Barisal and Khulna division are engulfed with high level of poverty, food insecurity and malnutrition. They are among the worst affected districts by the impact of climate change and natural disasters. The cyclone SIDR in 2007 devastated the southern region of Barisal with visible impacts on agriculture, livelihoods, nutrition and health. Similarly Khulna was also affected and more specifically experienced torrential rains that resulted in prolonged water logging. Due to vulnerability to floods, cyclones and storm surges, agriculture, livestock and aquaculture activities in these region are at stake. Along with natural disaster vulnerability according to

Household Income and Expenditure Survey (2010) a large portion of these people is living below the poverty line, 39.4% and 32.1% for Barisal and Khulna division respectively¹. More than 2 billion people of the World are estimated to be deficient in key vitamins and minerals, particularly vitamin A, iodine, iron and zinc². As a consequences, situation is critical for rural Bangladeshi women and children^{3,4}. The scenario is more critical in districts of southern Bangladesh which is a matter of great concern.

Women and children are especially vulnerable to poor nutrition because of their physiological needs and socioeconomic characteristics. The first five years of life is of great importance for optimal growth, health, and development. Unfortunately, this period is often marked by protein-energy and micronutrient deficiencies that hinder the optimal physical growth and cognitive development. In the first 2 years of life children get their nutrient from their mother through

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breast milk along with complementary feedings from 6 months of age. So in these crucial moments of life both lactating mother who provides nutrient to her baby through breast milk and under five children requires proper nutrition. According to Bangladesh Demographic and Health Survey, 2014, the prevalence of stunting (36%), wasting (14%) and underweight (33%) were observed⁵. The Nutrition, Health and Demographic Survey of Bangladesh, indicates that 24% of women age 15-49 years are undernourished (BMI <18.5 kg/m²)⁶, a low BMI is strongly related to the delivery of low-birth weight babies. Although maternal under-nutrition has decreased in Bangladesh during the last decade, it is still a matter of concern to ensure a healthy future generation. Again 51% of children age 6-59 months and 42% of women age 15-49 years are anemic⁶.

This study is an attempt to identify the current consumption patterns and dietary diversity of the vulnerable group including lactating mother and under-five children in the selected southern districts of Bangladesh. This study is based on the baseline study of a project namely "Integrated Agriculture and Health Interventions for Improved Food and Nutrition Security in Selected Districts of Southern Bangladesh", which is focused on a multi-sectoral and integrated approach to strengthen and sustain scaling up of nutrition programs and ultimately lead to improvements in maternal and child nutrition. Consumption of various food groups is used as an indicator to assess the overall dietary and nutritional status of community. Information on their dietary pattern will provide a picture of the prevailing daily food intake patterns in the rural areas of Bangladesh. This can be used as a tool to target an integrated intervention program that will help achieve sustainable food security and therefore, improved nutritional status of people living in the southern districts.

Methodology

Study area

The study was designed to focus on the most poor, vulnerable and food insecure upazilas in the divisions of Khulna and Barisal in southern Bangladesh that are not yet reached through other initiatives in the country. For sample collection, Khulna and Barisal divisions of southern Bangladesh were selected. From Khulna division, Satkhira (Assasuni and Shyamnagar Upazilas) and Khulna (Dacope and Koyra upazilas)

districts were selected whereas only Barisal district (Muladi upazila) was selected from Barisal division.

Study population

A total of 129 lactating mothers (15-49 years) and 162 under-five children (6-59 months) were selected to assess their dietary consumptions.

Sampling

A two stage sampling design was used to provide a representative sample per union. In the first stage of sampling each union was divided into 4 to 8 clusters of 94 to 192 households according to the population size of each union. In the second stage of sampling, data enumerators randomly selected households based on the household composition and the location, targeting a total of 129 lactating mothers and 162 children under five years, to assess their dietary and nutrient intake.

Dietary data collection

Data was collected during May-June 2013. Information on food consumption was collected using 24-hour Multi Pass Recall Method. During the recall, the respondents were asked to recall all food items that they have consumed on the last day prior to interview. In case, the previous day was a festival day, dietary information of the preceding day was collected. The quantity of food consumed at the individual level was estimated using standard measuring cups, spoons and weighing machine (kitchen scale). Raw weight in grams of the food items were also measured where there was no standard measure. For cooked foods and recipes individual ingredients were either weighed in kitchen scale or calculated by probing the respondents to recall the amount of each ingredients during cooking.

Data processing and analysis

After data collection was completed, all data were edited and cleaned by checking and rechecking for inconsistencies and errors. Data entry and analysis were done by using SPSS 16 software. The actual amount of food was calculated for individual questionnaires from portion size or serving size. The food intake data was converted into raw food using conversion factors. Nutrient intake was computed by using the most updated food composition table of Bangladesh⁷ (2013).

Result and discussion

In present study per capita daily food and nutrient intake of lactating mother and under five children in selected districts of southern region of Bangladesh were assessed. Due to effect of climate change, frequent natural disasters, salinity intrusion and land degradation the people of southern Bangladesh has low availability of different food groups and their income level is also low. The socioeconomic status of the study population has been depicted in Table 1, which shows that about 35% of households had total income less than 5000 BDT (62.5 USD). Again 31% households head have never attended school.

Table 2 shows the mean daily food intake from different food groups and their respective contribution

to energy intake among lactating mother. Lactating mother's diet was dominated by plant foods (559.6g) whereas animal food contributed only a minor portion 67.4g of food intake. Further cereal intake contributed 337.3g. Intake of vegetables and fruits was found to 145.3 g which was far below the recommended level (400g) suggested by Desirable Food Intake for Bangladeshi Population (2013)⁸. Fish intake was found to be 37.8 g constituting half of the animal food intake.

The food consumption pattern of the lactating mother in present study was dominated by cereals which was in agreement with another study from northern part of Bangladesh⁹ which reported cereals contributing about up to 80% of the total dietary energy. Fish intake of lactating mother in the present study was found to be 37.8g which was higher than fish intake (23.3g) by

Table 1: Socio-economic characteristics of household

Socio-economic parameters		Percentage of household head (n=1536)
Level of education	No education	31.0
	Less than primary	19.5
	Above primary	50.5
Level of income (Taka)	<5000	34.4
	5000-10000	47.6
	>10000	17.9
Amount of land in decimals	1-50 decimals	99.0
	51-250 decimals	1.0

Table 2: Mean daily food and energy intake (g% of total) of lactating mother from different food groups

Food items	Mean food intake in gram
Plant food	559.5
Cereals	337.3
Pulses	5.1
Other vegetables	60.0
Leafy vegetables	45.4
Roots and tubers	48.9
Fruits	39.9
Animal food	67.4
Fish	37.8
Meat	9.6
Egg	7.6
Milk and milk products	28.0

lactating women of northern region of Bangladesh but lower than the recommended level of fish intake 60g⁸.

The mean per capita daily macro and micronutrient intake and adequacy (as % of RNI) among lactating women is presented in Table 3. Macronutrient intake distribution of lactating women revealed that mean energy and protein intake of lactating mother was 1236 Kcal and 35g respectively fulfilling 41% and 51% of RNI. Calorie intake of lactating mother (1236

Kcal) in present study was found to be lower than lactating mother of northern region of Bangladesh (1609 Kcal)⁹ and lactating mother of poor rural household of Bangladesh (1609 Kcal)¹². Similarly protein intake of lactating mother found in the present study (35g) was higher than protein intake (33g) from poor rural household of Bangladesh¹² but lower than the lactating mother (42g) of northern region of Bangladesh⁹.

Table 3: Macro and micronutrient intake (mean ± SD) and adequacy (% of RNI) among lactating women

Nutrients	Intake (mean SD)	% of RNI*
Macronutrient		
Energy (Kcal)	1236±261	41
Fat (g)	9±7	11
Protein (g)	35±13	51
Carbohydrate (g)	232±45	48
Fiber (g)	15±5	57
Micronutrient		
Calcium (mg)	202±162	20
Iron (mg)	6±4	21
Zinc (mg)	6±2	31
Vitamin A (µg)	366±417	43
Vitamin D (µg)	1±1	20
Thiamin (mg)	0.9±0.3	21
Riboflavin (mg)	0.6±0.4	35
Vitamin B6 (µg)	0.9±0.3	45
Folate(µg)	122±77	24
Vitamin C (mg)	71±93	101

*Source of RNI: WHO^{10,11}

Table 4: Per capita daily mean food intake (g) from different food groups of children between 6-23 and 24-59 months of age

Food items	6-23 months (n=71) (from complementary food only)	24-59 months (n=42) (from regular meal)
Plant food	223.4	358.6
Cereals	101.3	177.9
Pulses	0.8	2.3
Other vegetables	36.2	43.0
Leafy vegetables	27.8	44.0
Roots and tubers	19.7	30.6
Fruits	37.6	60.8
Animal food	62.1	252.1
Fish	12.1	23.6
Meat	17.5	32.4
Egg	32.5	36.8
Milk and milk products	0.0	159.3

Intake of Calcium, Iron, Zinc, Vitamin D, Thiamin and Folate was very low among lactating mother fulfilling less than one-third of RNI while intake of Vitamin A and vitamin B6 covered 43% and 45% of RNI respectively (Table 3). Mean vitamin C intake was found to be 71 mg/day which fulfilled more than 100% of the RNI for lactating women.

Table 4 shows per capita daily food intake of children 6-23 months and 24-59 months of age. Food intake pattern of children of 6-23 months of age was dominated by cereals and intake of animal foods which are rich source of good quality protein was found to be low. Animal food intake particularly egg (36.8g) and milk and milk products (159g) was found to be relatively high as compared to children from northern region of Bangladesh which was reported to be 23.3g and 5.4g of milk and egg respectively⁹. Per capita leafy vegetable and fruits intake of children of 24-59 months was found to be 44g and 60.8g (Table 4) while study from northern region of Bangladesh reported a higher leafy vegetable intake (53.3g)⁹. Whereas, a very low fruits intake (4.5g) was observed among children under-five years of age⁹.

Table 5 shows macro and micro-nutrient intake and fulfillment of requirement (expressed as % of RNI) by under five children in southern region of Bangladesh. Macronutrient composition in the diet of children in terms of their contribution to the total energy intake varied greatly between children of 6-23 months and 24-59 months of age. In the diet of children of 6-23 months age, fat contributed 52% and carbohydrate contributed 58% of the RNI while macronutrient intake pattern among children of 24-59 months of age showed a less contribution of carbohydrate (47%) to the RNI. Total calorie intake for both age group was found 527 and 585 Kcal respectively covering only 63% and 50% of RNI for their respective age. For both the age group mean daily protein intake was found to 11.7g and 17.3g respectively covering 98% and 107% of RNI for their age.

The analysis of micro-nutrient intake shows that the diets of children (both under-two and under-five) are deficient in all nutrients except vitamin C. Intake of iron, zinc and vitamin D was found to be very low meeting less than one-third of RNI for both 6-23 months and 24-59 months children. Although breast

Table 5: Macro and micronutrient intake (mean \pm SD) and adequacy (% of RNI) among children of 6-23 months and 24-59 months of age

Nutrients	6-23 months (n=73) (from complementary food only)		24-59 months (n=41) (from regular meal)	
	Intake (mean \pm SD)	% of RNI	Intake(mean \pm SD)	% of RNI
Macronutrient				
Energy (Kcal)	527 \pm 168	63	585 \pm 242	50
Fat (g)	18.6 \pm 4.6	52	10.1 \pm 7.1	34
Protein (g)	11.7 \pm 4.9	98	17.3 \pm 6.5	107
Carbohydrate (g)	63.8 \pm 29.4	58	94.4 \pm 46.6	47
Fiber (g)	2.2 \pm 1.9	20	6.2 \pm 3.4	39
Calcium (mg)	176.5 \pm 79.1	38	146 \pm 116	20
Iron (mg)	2.0 \pm 2.4	13	3.2 \pm 2.5	30
Zinc (mg)	2.4 \pm 1.5	26	2.9 \pm 1.6	32
Vitamin A (μ g)	322 \pm 170	75	258 \pm 280	48
Vitamin D (μ g)	0.83 \pm 0.63	15	0.72 \pm 0.90	14
Thiamin (mg)	0.25 \pm 0.29	60	0.51 \pm 0.70	43
Riboflavin (mg)	0.25 \pm 0.14	51	0.36 \pm 0.24	54
Vitamin B6 (μ g)	0.23 \pm 0.29	45	0.40 \pm 0.30	72
Folate(μ g)	50.25 \pm 32.61	40	67.4 \pm 40.5	34
Vitamin C (mg)	33 \pm 25.3	102	44.8 \pm 39.8	137

Source of RNI: WHO^{10,11}

milk is a major contributor of nutrients in first two years of life yet in this study contribution of nutrients from only complementary foods were taken into consideration while children of 24-59 months age group's diet were from regular meal. Mean vitamin A, iron and zinc intake of 6-23 months old children were 322 μ g, 2mg and 2.4mg respectively where 24-59 months old children were 258 μ g, 3.2mg and 2.9mg while National Micronutrient Survey of Bangladesh revealed that intake of vitamin A, iron and zinc intake of rural pre-school children to be 291 μ g RE, 4.77mg and 22.4 mg respectively¹³.

Conclusion

Findings of the present study revealed that for both lactating mother and under five children, plant foods dominate the diet, for which the quality of protein in diet is low. Energy requirement covered merely 40% for lactating women and 60% for under-five children. Such prolonged dietary energy deficiency would lead to Chronic Energy Deficiency (CED) which would

negatively affect health, work productivity and care practices of lactating mother while low energy intake in early stage of life has negative effect on child's growth and development and will eventually lead to chronic under nutrition. Micronutrient requirements were not covered in case of all micronutrients except vitamin C which could be due to the consumption of seasonal fruits. The present study findings indicate inadequate food consumption with lack of dietary diversity in lactating mother and under-five children living in the southern part of Bangladesh. Therefore, an integrated intervention program is required to help in achieving sustainable food security along with dietary diversity to improve nutritional status of people particularly under-five children and lactating mother living in the districts of southern region of Bangladesh.

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