

A Comparative Study on the Nutritional Status of Females belonging to Two Different Socio-Economic Groups

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Introduction

Malnutrition is the major public health problem in Bangladesh. It has been recognized that infants, growing children, pregnant and lactating women constitute vulnerable segments from the standpoint of nutrition. In poor socio-economic groups in many developing countries the nutritional status of women in the reproductive period is unfortunately far from satisfactory. Their dietaries are usually deficient in calories and many essential nutrients. Thus, even before they become pregnant these women are at a disadvantage from the nutritional standpoint¹.

Since 1962, the Institute of Nutrition and Food Science, Dhaka University has undertaken several national nutrition surveys to investigate the nutritional status of rural and urban populations. It can be concluded from those surveys that the intakes of different nutrients of Bangladeshi people are decreasing day by day²⁻⁴. Average energy intake in 1981-82 was 1943 kcal. It was 2094 kcal in 1975-76 and 2301 kcal in 1961-62. Protein intake decreased from 58g in 1975-76 and 1962-64 to 48g in 1981-82. About 70% of our population are anaemic.

Precise information regarding the daily nutrient intake, and blood haemoglobin, total proteins, albumin and mineral levels in females residing in Dhaka University Halls belonging to high socio-economic group and those of the working women belonging to low socio-economic group are scarce in the literature. The objective of the present study was to collect those information from females residing in Dhaka University Halls and compare with those working in a garment factory at Dhaka.

Materials and Methods

All apparently normal resident girl students of Dhaka University belonging to high socio-economic group, and non-pregnant non-lactating (NPNL) women working in a garment factory belonging to the low socio-economic group were offered an opportunity to participate in the present study. Forty seven girl students and 52 female garment workers voluntarily agreed to join in this study. The resident girl students were selected in such a way that they reside in the hall for at least one year. A standard questionnaire was developed in which information on name, level of education, money spent for food per month, age, height, body weight, daily food intake

etc. were collected by direct interview. Dietary history was obtained by recall method. Height and body weight were measured using DETECTO-MEDIC weighing scale in which a height scale was also attached. Daily intakes of calorie and protein were calculated by using food exchange list. Blood was drawn from vein for the analysis of haemoglobin, total proteins, albumin, calcium, magnesium, sodium and potassium.

Blood haemoglobin was measured by total haemoglobin test kit (Sigma Diagnostics, Catalog No. 525-2) according to the method of Green and Teal⁵. Serum total protein was determined by a commercially available kit (Test-Combination Total Protein, Boehringer Mannheim, West Germany) by the method of Weichselbaum⁶. Serum albumin was assayed by Albumin kit (bio Merieux, France) according to the method of Doumas⁷. Serum calcium, magnesium, sodium and potassium were determined by atomic absorption spectrophotometer (Pye Unicam, fitted with single element hollow cathod lamp, a three slit burner and air-acetylene flame). After proper dilution with demineralized water sample was directly aspirated into the flame⁸. Standards obtained from Sigma Chemicals were run simultaneously. All glass apparatus used for the purpose of mineral analysis were of metal free.

Results

Age, height and body weight of two different socio-economic groups studied are mentioned in Table 1. Although the mean height was 3.6% higher but average body weight was found 8.2% more in the resident girl

students (high socio-economic group) than in the female garment workers (low socio-economic group).

Dietary survey indicates that the average daily dietary intake of high socio-economic group was 1640 calories and 52.7g of protein (Table 2). These values were 1561 calories and 46.6g of protein in the case of low socio-economic group. Although the intake was higher by 13.1%, there was only 5.1% more calorie intake in the high socio-economic group compared to low socio-economic group. Average amount of money spent for food was also higher in the high socio-economic group (Tk. 586 per month in the high socio-economic group to Tk. 336 per month in the low socio-economic group).

Mean blood haemoglobin level was 11.97g/dl in the low socio-economic group, which was 11.4% lower than the value of high socio-economic group (13.34g/dl) (Table 3). Serum total protein and albumin levels were also higher in the high socio-economic group as compared to the respective values observed in low socio-economic group (Serum total protein, 7.59g/dl vs. 6.65 g/dl; serum albumin, 4.13g/dl vs. 3.02g/dl).

None of the subject belonging to high socio-economic groups has blood haemoglobin level below 10g/dl (Table 4). However, 5.77% of the female garment workers has haemoglobin levels of less than 10g/dl. Furthermore, about 54% females in the low socio-economic group had haemoglobin levels above 12g/dl. It was 89.4% in the case of

subjects belonging to high socio-economic group.

Table 5 indicates values for serum calcium, magnesium, sodium, and potassium in the two groups studied. There were no remarkable differences observed in different minerals analyzed between the two different socio-economic groups. However,

slightly higher levels of calcium and potassium were found in the females belonging to high socio-economic group than in the low socio-economic group. On the other hand, mean serum magnesium and sodium levels were observed slightly higher in the low socio-economic group compared to girl students belonging to high socio-economic group.

Table 1. Age, height and body weight of the two different groups

Variables	Low socio-economic group (n=52)	High socio-economic group (n=47)
Mean age (yrs)	16.9 ± 2.8	21.8 ± 1.9
Mean height (cm)	148.4 ± 5.0	153.7 ± 4.9
Mean body weight (kg)	41.6 ± 6.7	45.0 ± 6.7

Values are mean ± S.D.

Table 2. Comparison of calorie and protein intake between two different socio-economic groups.

Variables	Low socio-economic group (n=52)	High socio-economic group (n=47)
Daily average calorie intake (Kcal)	1561 ± 319	1640 ± 242
Daily average protein intake (g)	46.6 ± 9.5	52.7 ± 8.2
Average amount of money spend for food (per month)	336.0	586.0

Value are mean ± SD

Table 3. Blood haemoglobin, total protein and albumin levels in two different socio-economic groups

Parameters	Low socio-economic group (n=52)	High socio-economic group (n=47)
Blood haemoglobin (g/dl)	11.97 ± 1.36	13.34 ± 1.16
Serum total protein (g/dl)	6.65 ± 0.93	7.59 ± 0.65
Serum albumin (g/dl)	3.02 ± 0.46	4.13 ± 0.50

Values are mean ±SD

Table 4. Blood haemoglobin by number

Haemoglobin level (g/dl)	Low socio-economic group (n=52)	High socio-economic group (n=47)
Belew 9	1 (1.92%)	-
9-10	2 (3.85%)	-
10.1-11	6 (11.54%)	1 (2.1%)
11.1-12	15 (28.84%)	4 (8.5%)
Above 12	28 (53.85%)	42 (89.4%)
Total	52 (100%)	47 (100%)

In parenthesis per cent subjects mentioned

Table 5. Serum minerals in two different socio-economic groups

Minerals	Low socio-economic group (n=52)	High socio-economic group (n=47)
Calcium (mg/dl)	9.41 ± 0.68	9.90 ± 0.88
Magnesium (mg/dl)	1.96 ± 0.25	1.72 ± 0.22
Sodium (mg/dl)	333.1 ± 15.1	326.3 ± 19.1
Potassium (mg/dl)	12.7 ± 1.2	13.2 ± 1.6

Values are mean ± SD

Discussion

Both height and body weight of the subjects belonging to high socio-economic group were found higher than those for low socio-economic group. However, the mean age of the former was more than the later. According to 1962-64 national nutrition survey of Bangladesh (then East Pakistan) the average height and weight for 17 years old females were 147.4 cm and 38.5 kg². In the present study we observed 148.4 cm. and 41.6 kg for 17 year old females. In the case of females aged between 18-30 years, the respective height and weight observed in that survey were 148cm. and 39.1 kg. We observed 153.7 cm and 45.0 kg in our present study for high socio-economic group female subjects. Irrespective of different socio-economic group the height and body weight found in our present study were higher than those observed in 1962-64 nutrition survey. At the same time the females belonging to high socio-economic group are better in terms of both height and weight than those belonging to low socio-economic group. This may be due to the fact that food habit, daily calorie and protein intake of the high socio-economic group subjects are better than for the females belonging to low socio-economic group (See Table 2). Gopalan and Rao¹ mentioned that there is a direct correlation between money spend for food and the intake of proteins and calories. This would indicate that the economic factor is the important determinant of the dietary pattern of these women. Again, according to the heights the desired body weights of our subjects

should be 46 and 43 kg for females belonging to high and low socio-economic groups respectively. So, both groups (high and low socio-economic) having 2.2 and 3.2% less weight than desired body weight according to their height.

In adult age body weight and activity are the two prime determinants of energy requirement. According to the suggestion of Bassett⁹ daily calorie requirements to maintain ideal body weight of our subjects belonging to high and low socio-economic groups are 1518 and 1419 kcal, assuming females from both the groups are moderately active (33 kcalxper kg body weight/day). Although daily average calorie intake of females belonging to high socio-economic group was 5.1% higher than that of low socio-economic group subjects, both groups taking calories not less than their daily requirement according to the suggestion of Bassett⁹ for daily calorie requirement. But as per present recommendation for daily calorie requirement both the groups are grossly inadequate in calories. Again, if we consider that the requirement of protein is 1g/kg body weight, then both groups taking sufficient protein although females belonging to high socio-economic group are taking more protein than that of low socio-economic group subjects. From dietary habit it was also observed that the high socio-economic group subjects are eating high quality protein rich foods and their diet is more balanced than those of subjects belonging to low socio-economic group and this was reflected in their blood biochemical parameters

From the results of the present study one question arises, whether Bangladeshi females particularly those residing in cities require less calorie for maintaining body weight or not? They are almost maintaining their ideal body weight by the amount of calories they are taking everyday. Actually energy requirement of a person derived from measurement on individual age, sex, body size and particularly activity¹⁰. At the same time there is a question of adaptation. So, we think calorie requirement of Bangladeshi people according to their age, sex, body size and activity should be reviewed. Recently Abdullah¹¹ also mentioned that calorie requirements of Bangladeshi rural population are actually less than that was mentioned in 1962-64 nutrition survey report.

It can be concluded from the results of present study that females belonging to high socio-economic group such as students of Dhaka University residing in halls having better nutritional status than those female garment workers belonging to low socio-economic group. However, if we compare their daily calorie intake with the present recommendation for calorie requirement their diet is grossly inadequate in calories. But on the basis of calculating calorie requirement according to Basset⁹ they are not deficient in their daily average calorie intake and this is supported by their body weight according to their height and blood biochemical parameters.

Summary

Body weight, diet intake, and blood biochemical parameters were

compared between subjects belonging from two different socio-economic groups. Although the mean age was less, both height and body weight of the females belonging to low socio-economic group (workers of a garment factory) were lower than those females from high socio-economic group (resident students of Dhaka University). Average Daily intakes of calorie and protein were found 1640 kcal and 52.7g in the high socio-economic group. They were 1561 kcal and 46.6g in the case of subjects belonging to low socio-economic group. Mean blood haemoglobin levels were 13.34g/dl and 11.97/dl in high and low socio-economic groups, respectively. Similarly, serum total protein and albumin levels were also higher in the former group than the later, but the values for both groups were within the normal range. Serum mean calcium, magnesium, sodium and potassium levels did not differ between the two groups studied. According to the present recommendation for daily calorie intake both groups diet is grossly inadequate in calories. But on the basis of height for weight, and energy requirement calculated according to 33 kcal/kg body weight/day for moderately active women, both the groups are not deficient in daily calorie intake. However, females belonging to high socio-economic group having better nutritional status than that of females belonging to low socio-economic group.

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