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Study of the Nutritional Status of High School Students from Medinipur Sadar Subdivision, Paschim Medinipur District, West Bengal, India

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Abstract:

Prevalence of malnutrition among adolescent children is very high in India especially in rural areas one of the major problems facing the developing countries. To relate the daily nutritional intake and the prevalence of health status of high school going children aged between 12 to 15 years in the Medinipur Sadar subdivision, Paschim Medinipur district, West Bengal present cross sectional study was performed. Present study also engaged to estimate the prevalence of socioeconomic factors associated with their malnutrition, if any. A total of 154 high schools were included in the study. Out of the total 12,342 student population, 8320 students (4756 boys and 3564 girls) were selected depending on their attendance on the day of assessment using convenience and simple random sampling methods. To assess the nutritional status relative to age, body mass index (BMI) of the target subjects was determined using anthropometric measurements and compared with WHO reference (2007). The study revealed that overall prevalence of malnutrition in the selected subdivision was high with 24.00% and 25.01% of the children being obese and overweight, 7.80% and 8.09% been lean or severely lean while 35.10% were normal. The incidence of malnutrition was prevalent among boys than girls. Majority (73.89%) of their parents had some formal education while 26.11% was illiterate. Their economical background was not well established. The high incidence of malnutrition may be attributed to their improper dietary habits, unawareness of balanced diet, poor prenatal nutrition along with low family income and poor educational background of their parents.

Keywords: Body mass index, dietary habits, malnutrition, Midnapore, nutritional status

1. Introduction

Malnutrition among children especially among school age children is one of the major issues facing the world today. It streams from severe under-nutrition (underweight, stunted and wasted) to over-nutrition. General inefficiency of educational systems stimulates the progress of this poor nutritional status among children during school age period (Afoakwa, 2007), which results in poor academic performance and physical development vice-versa (Karim et al., 1991; Upadhyaya et al., 2001; Sunita, 2005). Minister of Food and Agriculture in 2004 asserted that the Intelligent Quotient (IQ) of Indian children has generally reduced due to poor dietary composition of their food coupled with little attention paid to good nutrition and that the nation is likely to suffer the consequences of unintelligent generation (Fernstrom et al., 2001; Sorhaindo and Feinstein, 2006). UNICEF estimated that globally 226 million children are stunted, almost 67 million are wasted and 183 million are underweight (Nemapore, 1999; UNICEF, 2005). About 11% of the deaths in children worldwide constitute more than 34% of total deaths in India (Sunita, 2005). Protein energy malnutrition is major contributory factor in majority of these childhood morbidities and mortalities (Karim et al., 1991). In the developing countries it is especially chronic and more prevalent in rural than in urban areas (Otoo,

2008). Under nutrition among school children become an important public health issue in the rural sectors of India, including West Bengal which studied by many workers (Dolla et al., 2005).

Medinipur Sadar subdivision of Paschim Medinipur district, West Bengal, India consists of Midnapore municipality and six community development blocks: Medinipur Sadar, Garhbeta-I, Garhbeta-II, Garhbeta-III, Keshpur and Shalboni (Directory of District, Sub division, Panchayat Samiti/ Block and Gram Panchayats in West Bengal, March 2008, West Bengal. National Informatics Centre, India). In Midnapore, a study by Bisai et al.(2011) showed that the overall rates of underweight and stunting were 28.3% and 27.8% in Midnapore sadar north subdivision among rural school children having age 11- 18 years where female children were found more sufferer in respect to male children. Though various programmes running by Government of India to reduce the prevalence of malnutrition during last years no clear picture of present scenario has been revealed. The level of malnutrition in a child can be influenced by the mother's education supported by studies by other (Dolla et al., 2005).

In view of the prevalence of malnutrition in high school students of Paschim Medinipore district (Bose and Bisai,2008; Bisai et al., 2011) the objectives of present research were taken to estimate the body mass index (BMI) of the high school students students through anthropometric measurements and use it to determine their nutritional status as well as assessing factors that contribute to their nutritional status in the said subdivision.

2. Materials and Methods

A one time cross-sectional study was carried out among randomly selected high school students having ages between 12 to 15 years within the area of Midnapore sadar subdivision. The period of the study was 2012-2013 academic year. All the one hundred and fifty four (154) high schools (146 government-owned and 8 private-owned) with a student population of 12,342 were included in the study. Only students present in school at the time of the study were selected for the study. By this way, out of the total student population, 8320 students (4756 boys and 3564 girls) were selected for the study using convenience and simple random sampling methods. A pre-designed and pre-tested proforma was developed for the study. Anthropometric measurements (age, weight and height) were recorded for each subject. The accurate age of the subjects was recorded from the schools' admission books and confirmed from their Birth Certificate issued by Hospital, Municipality or Gram Panchayat authority.

Weight and height of the subjects were measured in-situ at the time of visit. A bathroom scale which was regularly calibrated against known weights was used to measure the weights of the subjects. The zero error of the weight was daily checked for and removed if present. Weight was taken with minimum clothing (only school uniform) since adequate privacy was not available. Their weight was recorded to the nearest 'Killogram' unit. Height was measured by affixing a metric tape to a wall perpendicular with the floor and sliding a right angle down to the child's crown. All the subjects stood against the wall without foot wear and with heels together and their heads positioned so that the line of vision was perpendicular to the body. Height was recorded to the nearest 'centimeter' unit. To assure consistency in the method of measurement of anthropometric data, all surveyors were supervised by the authors. The criterion set for assessing nutrition status in this study was Body Mass Index (BMI) for age in relation to the 2007 WHO growth charts with labels. The BMI for age was calculated from the formulae below: $BMI (Kg/m^2) = Weight (Kg)/Height (m) \times Height (m)$ (Bisai et al., 2011). Subjects were asked for their parents or guardians education background and occupation. Responses were recorded and presented in figures. Ethical consideration permission was obtained from the heads of the respective schools before conducting the study.

3. Results

Out of total 8320 school children aged between 12 to 15 years incorporated in this study, 4756 (57.16%) were boys while 3564 (42.84%) were girls. The age group distribution of the students is shown in Table 1.

Age Group (years)	Boys (Number and %)	Girls (Number and %)	Total number of children
12	1176 (24.73%)	926 (25.98%)	2102 (25.14%)
13	1182 (24.85%)	855 (23.99%)	2037(24.48%)
14	1224 (25.74%)	911 (25.56%)	2135(25.67%)
15	1174 (24.68%)	872 (24.47%)	2046 (24.59%)
Total	4756 (100%)	3564 (100%)	8320 (100%)

Table 1: Distribution of school children according to age

The average anthropometric measurement of the school children in terms of weight and height did not differ greatly (Table 3) among the various age groups but on the average those age 13 years were heavier (48.39 ± 10.40 Kg) compared to the other age groups.

Age Group (years)	No of children	Weight (Kg)	Height (m)	BMI (Kg/m ²)
12	2102	47.46 ± 10.30	1.51 ± 0.09	20.81 ± 4.97
13	2037	47.56 ± 10.10	1.51 ± 0.09	20.86 ± 4.93
14	2135	48.39 ± 10.40	1.52 ± 0.09	20.94 ± 5.04
15	2046	47.69 ± 10.30	1.52 ± 0.09	20.64 ± 5.06

Table 2: Anthropometric measurement of the school children

The education background of the children's parents/guardians as shown in Figure 1.0 depicts that majority (73.89%) have had some formal education with 26.11% been illiterates. It is noteworthy that despite their normal education most parents/guardians educational background were low with few had tertiary (3.43%) and Diploma/Vocation (13.74%) education.

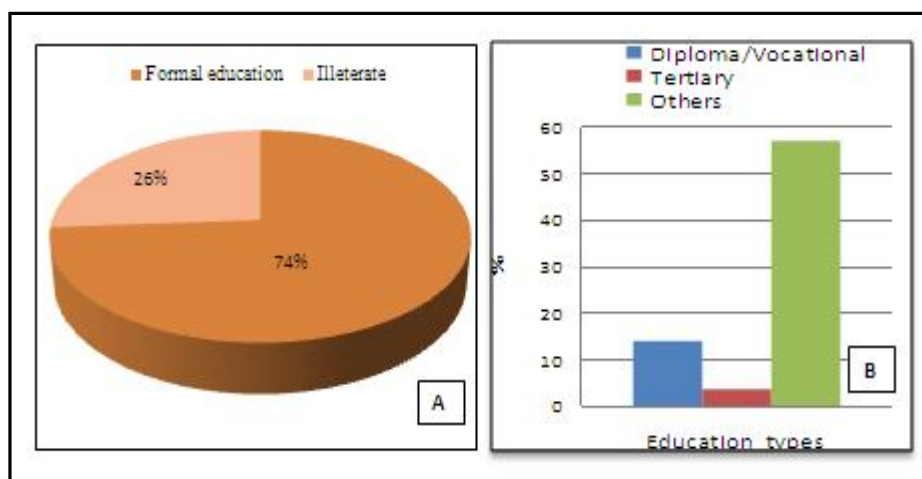


Figure 1: Pie diagram [A] showing educational background of student’s parents/guardians. Bar diagram [B] showing educational patterns of parents/guardians with formal education

Majority of the parents of the children were farmers (33.15%) and traders (21.45%), while 8.63% of them were found unemployed. Others were engaged with teaching (2.76%), health sector assistant (8.55%), businessmen/women (16.14%) and transporters (9.32%) respectively (Figure 2).

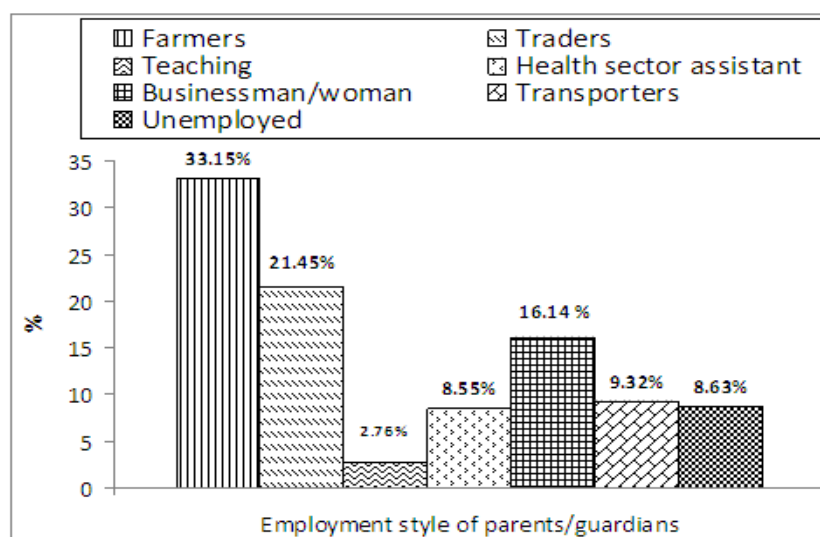


Figure 2: Occupation of student’s parents/Guardians

The nutritional status of the school children as shown in Table 3.0 depicts that 1679 (35.30%) and 1241(34.82%) of the boys and girls respectively were normal, while 1160 (24.39%) and 921(25.84%) were overweight. The results also showed that 1062 (22.33%) and 935(26.23%) boys and girls respectively were obese, while 649 (7.80%) and 673 (8.09%) children were found lean and severely lean.

Nutritional status	Boys Children (Frequency in Number and %)	Girls Children (Frequency in Number and %)	Total Children (Frequency in Number and %)
Severe leanness	466 (9.80%)	207 (5.81%)	673 (8.09%)
Leanness	389 (8.18%)	260 (7.30%)	649 (7.80%)
Normal	1679 (35.30%)	1241 (34.82%)	2920 (35.10%)
Overweight	1160(24.39%)	921 (25.84%)	2081 (25.01%)
Obesity	1062(22.33%)	935 (26.23%)	1997 (24.00%)
Total	4756 (100%)	3564 (100%)	8320 (100%)

Table 3: Distribution of the nutritional status of the school children

4. Discussion

Present study highlights magnitude of problem and some socioeconomic and educational factors associated with malnutrition among high school going children of rural area. Many research studies indicated that malnutrition including underweight and stunting constituted major

health problems among school children. In our present study majority of the children (35.10%) were with normal nutritional status and 25.01% children were found with overweight status. The results also showed that 24.0% children were obese, while 7.80% and 8.09% were exists either in lean or severely lean health status grade. This pattern of nutritional status has been reported by other, (PohSiang, 1990; Suvarna, 2007), where majority of the children belonged to normal nutritional status and 25 to 35 percent exhibited short and long duration malnutrition in all age groups. Another report showed 54% as lean in the rural area of Wardha (Deshmukh et al., 2006) and in Bangladesh found the prevalence of leanness to be 67% (Shahabuddin et al., 2000). All these studies show matter of under nutrition in all cases resembles our present study. In the present study under nutrition was significantly more prevalent in boys than girls, which is supported by report by other, (Venkaiah et al., 2002), where the prevalence of higher under nutrition in boys than girls has been found. Another report (Hasan et al., 2011) also revealed a higher incidence of malnutrition among boys than girls and commended that the high incidence of malnutrition among boys may be attributed to improper dietary habits and unawareness of balanced diet, high frequency of early age group pediatric diseases in boys than girls. Even though the study did not compare their nutritional status to their academic performance, other studies (Upadhyaya et al., 2001; Fernstrom et al., 2001) have revealed that malnourished children with poor physical growth perform poorly in intelligence test and emphasized that malnutrition during childhood can lead to irreversible impairment of mental function in later life.

5. Conclusion

The overall prevalence of malnutrition in the Medinipore sadar subdivision was high along with overweight, lean or severely lean health status among high school going children. The incidence of malnutrition was prevalent among boys than girls. Although the Government of India is still in the process of restoring the national health status of school going boys and girls, it does have national intervention programs such as the school feeding program, vitamin A supplement program and nutritional education aimed at improving nutritional status of children of school-going age. Expanding the coverage to include more beneficiaries is clearly necessary if rapid reductions in child mortality are to be gained over the next decade. However the study did not confirm the impact of these interventions on the nutritional status of the school children. The high incidence of malnutrition may be attributed to improper dietary habits, unawareness of balanced diet, high frequency of early age group paediatric diseases, poor prenatal nutrition, food insecurity and low family income.

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