Nutritional Status of Primary School Children in Pauri Garhwal District of Uttarakhand

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ABSTRACT

The present study was conducted to assess nutritional status of primary school children. Three primary schools of block Pabou were purposely selected. All the students *i.e.* 138 (63 girls and 75 boys) present on day of survey were enrolled for the study. Height and weight measurements were recorded and Body Mass Index was calculated (BMI). Nutritional status was assessed using different indices based on height and weight of children. Results revealed that about 61.96 per cent of school children (57.14% boys and 67.44% girls) in the age group of 6-8 yr were underweight. About 55.43 per cent children (55.10% boys and 55.81 % girls) were stunted in the age group of 6-8 yr. In the age group of 9 - 10 yr, about 47.83 per cent of children (42.31% boys and 55.00% girls) were stunted. Prevalence of thinness was 36.96 per cent (42.31 % boys and 30.00 % girls). Findings indicate that undernourishment i.e. underweight, stunting and thinness was high and required immediate intervention.

Key Words: Children, Malnutrition, Nutritional status, Stunning, Thinness.

INTRODUCTION

In India malnutrition is one of the major problems inflicting school age children. In fact India has the highest percentage of undernourished children of all countries in the world. Age six to ten years, also known as primary school age, is a dynamic period of physical growth as well as mental development. Foundations of health and sound mind are laid during school age period. Out of 667 million children under age of 5 years worldwide, 159 million are too short for their age and 50 million do not weigh enough for their height (Global Nutrition report, 2016). In India, percentage of underweight and stunted children was 43 and 48 in 2006; which decreased to 36 and 38, respectively (NFHS, 4).

Pauri Garhwal, a district of Uttarakhand state encompasses an area of 5540sq. km and situated between 29^0 45'to 30^0 15' Latitude and 78^0 24' to 79^0 23' E Longitude. In district Pauri Garhwal, percentage of stunted, wasted, severely wasted and underweight children below five years was 22.90, 25.10, 16.90 and 27.10, respectively (NFHS, 4).

Growth monitoring is used to assess the nutritional and health status in children. Anthropometric examination (measurements of body weight, height, circumference of arm calf, triceps, skin fold) is relatively inexpensive, easy to perform and a non- invasive process. World Health organization, 2011 has provided different indices based on height and weight of children to assess nutritional status *i.e.* stunting, underweight and thinness have been suggested to describe malnutrition in children of 6-10 yr of age. Stunting is the result of long-term nutritional deprivation and often results in delayed mental development, poor school performance, reduced intellectual capacity and small body size in adulthood. Underweight in young children is highly correlated with an increased risk of morbidity and mortality. Thinness in school-aged children can result in delayed maturation, deficiencies in muscular strength and work capacity, and reduced bone density later in life. The data regarding nutritional status of school children in block Pabou of district Pauri Garhwal in the age group of 6-10 yr

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were scarce. Keeping this in mind present study was undertaken with the objective to assess nutritional status of primary school children.

MATERIALS AND METHODS

Assessment of nutritional status

The present study was conducted in block Pabou of district Pauri Garhwal. School children from three primary schools were purposely selected to study the nutritional status. Informed oral consent was obtained from parents or guardians of each subject before data collection.

Sample size: A total of 138 (63 girls and 75 boys) students present on day of survey in the month of September, 2017 were enrolled for the study. Each child's height and weight were measured in the metric system, using standardized technique. A measuring tape was used to assess height of the subjects. The subject was made to stand without footwear with the feet parallel and with heels, buttocks, shoulders, touching the measuring tape, hands hanging by the sides and head was held comfortably upright. A portable balance with an accuracy of 100g was used to record the weight of the subjects. Children were instructed to stand on the balance with light clothing and without footwear and with feet apart and looking straight. Weight was recorded to the nearest value. Nutritional status was assessed using different indices based on height and weight of children according to World Health Organization (WHO). Height and weight measurements of the children, taking age and sex into consideration were expressed in terms of Z scores relative to National Centre for Health Statistics (NCHS) reference data recommended by World Health Organization (WHO). Those below -2 standard deviations of the NCHS median reference for height-for-age, weight-for–age are defined as stunted and underweight. For children of age 9 and 10 yr, BMI (weight/height in meter^2) were calculated and BMI- for-age below -2SD of reference data was considered as thinness (WHO, 2011). Analysis of data was done qualitatively and quantitatively by using frequency distribution and percentage.

Fig 1: Height measurement **Fig 2:** Weight measurement

The United Nations Educational Scientific and Cultural organization (UNESCO) considers 6-11 yr as primary school age and 12-17 yr as secondary school age for statistical purposes. Under nutrition in this age group, if not addressed leads to growth and development impairments in adolescents. Good nutritional status affects cognitive and physical development of school children.

RESULTS AND DISCUSSION

Nutritional status of school children in age group 6-8 years

As per table 1, about 61.96 per cent of school age children (57.14 % boys and 67.44 % girls) in the age group of 6-9 yr were underweight. Similar findings were reported by Osei *et al* (2010) as 60.9 per cent of children underweight and 56.12 per cent as stunted in primary school children. Hasan *et al* (2011) reported 58.20 per cent (65.55 % boys and 47.26 % girls) underweight school children. Sasikala (2016) reported prevalence of underweight to be 63.08 per cent in boys and 62.78 per cent in girls of Karnataka. In present study, maximum percentage of underweight children was seen in 6 yr of age in both girls and boys and prevalence underweight was more in girls than boys. The reason might be unsupervised feeding in girls. Similar trend was reported by Ashok *et al* (2014) *i.e.* underweight prevalence was high among 6-7 yr of age group in both government and private school and was more

among girls than boys. In case of stunting, about 55.43 per cent children (55.10 % boys and 55.81 % girls) were stunted in the age group of 6-8 yr. In the present study maximum percentage of stunting was seen in the children of six years similar to that seen in underweight. Lower prevalence of underweight and stunting was reported by few studies. Srivastava *et al* (2012) found 35.80 per cent underweight children in the age group of 5-6 yr and 40 per cent in the age group 7-8 yr. They also reported 22.9 per cent stunting in 5-6 age group and 17.5 per cent in 7-8 yr. Best *et al* (2010) reported underweight to be 39±17 per cent and stunting to be 29± 18 per cent. Bisai *et al* (2008) reported prevalence of underweight and stunting to be 33.9 per cent and 26.10 per cent, respectively. Ashok *et al* (2014) reported 24.5 per cent underweight prevalence in school children. The variation in the prevalence of underweight and stunting in boys and girls in the present study might be due to different study settings, sample size and other biological and socioeconomic factors. Low height-for-age in school-aged children and adolescents primarily reflects deficits in linear growth that occurred before the age of 3 yr, deficits that cannot be recovered later in life.

Nutritional status of school children of 9-10 years

As per table 2, about 47.8 per cent of children (42.3 per cent boys and 55.0 per cent girls) were stunted in the age group of 9 and 10 yr. Hasan *et al*

(2011) reported over all prevalence of stunting to be 40.4 per cent (41.4 % in boys and 38.8 % in girls). A study conducted in rural Karnataka by Srivastava *et al* (2012) reported overall prevalence of stunting to be 38.6 per cent and 20.2 per cent stunting in the age group of 9-10 yrs of school children. In present study the prevalence of stunting was more compared to the above studies. This might be due to improper dietary habits, lack of knowledge of balanced diet in children, in parents. Thinness has been adopted by World Health Organization, as a more appropriate indicator than underweight in older children. It is indicative of relatively recent nutritional deprivation, such as insufficient dietary intakes of energy, protein, or several micronutrients, impaired absorption, or excess nutrient losses. A much higher prevalence rate i.e. 78.5 per cent overall stunting and 80.1 per cent wasting among primary school children in Garhwal Himalayas were reported by Dutta *et al* (2009). Maximum children were severely stunted (31.8 %) and wasted (29.1 %). They also reported that percentage of stunting and underweight was more in girls compared to boys. In the present study prevalence of thinness was found to be 36.9 per cent (42.3 % boys and 30 % girls). Deb *et al* (2010) reported prevalence of thinness to be 40.7% in males and 25.9 % in females. Rashmi *et al* (2015) reported 34 % thinness in school children. In the present study it was also observed that percentage of stunted children was more in age group 6-8 yr as compared to older children. This

Table 1. Distribution as per weight for age (underweight) and height for age (stunting).

Weight for age (underweight)				
	6 years	7 years	8 years	Total
Male	15 (65.2%)	5 (62.5%)	8 (44.4%)	28(57.1%)
Female	15 (78.9%)	6 (60.0%)	8 (57.1%)	29 (67.4%)
Total	30 (71.4%)	11 (61.1%)	16 (50%)	57 (61.9%)
Height for age (stunting)				
	6 years	7 years	8 years	Total
Male	15 (65.2%)	4(50%)	8 (44.4%)	27 (55.1%)
Female	11 (57.8%)	4 (40%)	9 (64.2%)	24 (55.8%)
Total	26 (61.9%)	8 (44.4%)	17 (53.1%)	51 (55.4%)

Table 2. Distribution as per height for age (stunting) in children of 9-10 years.

Height for age (stunting)			
	9 years	**10 years**	**Total**
Male	4 (36.3%)	7 (46.6%)	11 (42.3%)
Female	5 (50%)	6 (60%)	11 (55%)
Total	9 (42.8%)	13 (52%)	22 (47.8%)
BMI for age (thinness)			
	9 years	**10 years**	**Total**
Male	4 (36.3%)	7 (46.6%)	11 (42.3%)
Female	2(20%)	4 (40%)	6 (30%)
Total	6 (28.5%)	11 (44%)	17 (36.9%)

may be due to the fact that older children can assert their preference for food, leading to increase in food intake. Best *et al* (2010) reported that underweight and thinness were most prominent in populations from south-east Asia and Africa compared to Latin America. They also reported prevalence of thinness to be 34±26 per cent in the school children of south East Asia region. Further studies are needed among a larger sample of children for effective planning of nutritional intervention programs in Pauri Garhwal region.

CONCLUSION

It was evident from the findings that the percentage of underweight, stunting and thinness was high among primary school children. Therefore, intervention planning to combat this problem should involve multi pronged strategies involving all stake holders.

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