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Assessment of nutritional status of selected school children of Himachal Pradesh

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Abstract

A sample of 200 school children in the age group of 7-9 years of two selected blocks (Chowari and Bharmour) of Chamba district was selected randomly with the aim to assess the nutritional status through anthropometric measurements and clinical symptoms. A questionnaire schedule was framed to collect information on anthropometric measurements and clinical assessment for observing the clinical signs of various deficiency diseases prevalent in selected children. Anthropometric measurements of school children of both the blocks were significantly lower than reference values. Height of Chowari block school children was lower and weight, body mass index, triceps skinfold thickness were higher than Bharmour block school children.

Key words: anthropometric measurements, clinical and nutritional assessment, school children.

Introduction

Early malnutrition or poor nutritional status among school children has significant adverse effects on school progress. Malnutrition during critical phases of early growth leads not only to stunting of physical growth, but also to suboptimal intellectual development and poor neurointegrative competence in children. The National Nutrition Policy documents state that despite the implementation of several developmental programmes as many as 93.8 per cent children suffer from moderate degree of Protein Energy Malnutrition (PEM) and 81 per cent suffer from severe forms of malnutrition (Dubey, 1996).

Anthropometry is a practical and accepted technique for assessing nutritional status of children. Different derived measures (e.g. per cent weight for age, per cent height for age and per cent weight for height) have different implications and might differently affect school performance e.g. low height for age occurs with chronic malnutrition, thereby reflecting earlier and prolonged deprivation. Reductions in per cent weight for age or per cent weight for height are measures of the severity of nutritional inadequacy, either acute or long standing. These anthropometric parameters may thus, be indirect indicators of environmental, socio-economic and family circumstances, all of which would be important determinants of learning (Wagstaff *et al.*, 1987). Keeping this in view the present investigation was planned and conducted to determine the nutritional status of selected school children (7-9 years) through anthropometric measurements and clinical assessment.

Material and methods

Anthropometric measurements: Height and weight used for calculation of BMI were measured using vertical rod and weighing balance according to the method described by Jelliffe (1966). The measurements were replicated three times for each individual and the mean values were compared with National Centre for Health Statistics (NCHS) standards. Body Mass Index of the subjects was also calculated using the following formula.

Body Mass Index (BMI) $kgm^{-2} = WxH^{-2}$

where W= weight in kg

H= height in m

The subjects were classified according to Gomez and Waterlow's classification. Mid-upper arm circumference (MUAC) and skinfold thickness (SFT) were measured according to the method described by Jelliffe (1966) using measuring tape and skinfold caliper respectively. Measurements of chest, waist and head circumference of respondents were also taken.

Clinical assessment: The clinical assessment was done for the manifestation of clinical symptoms of nutritional deficiencies and presence of infections and other illness which were noted in the structured schedule.

Results and Discussion

Mean height of Chowari and Bharmour block school children was 115.03±0.82cm and 119.77± 1.05cm, respectively which was significantly below the NCHS standards (Table 1). The present mean height was in accordance with the value (117.11± 8.13cm) as reported by Chauhan (2001). The average weight of Chowari and Bharmour block school children was 20.90 ± 0.36 and 19.98 ± 0.8 kg, respectively. The values were again less than the recommended standards. Difference between the mean and standard value (26.65 kg) was found to be significant ($P<0.05$). The mean weight of 7-9 year girls belonging to low income group in Ludhiana was 21.3 kg (Kaur, 1993) which was much below the standard values. The mean weight was found to be 19.76±3.48 kg in school children of Palampur region which was quite similar to that observed in school children of Bharmour block.

The mean body mass index (BMI) of Chowari and Bharmour block school children was 16.04 ±0.13 and 14.02 ±0.18 kg/m^2 respectively. Rao *et al.* (1993) reported lower mean value of BMI of Indian children as compared to NCHS, Harvard and England standards.

The mean triceps skinfold thickness was 4.66± 0.09 and 4.65±0.09 mm of Chowari and Bharmour block school children, respectively. Mid upper arm circumference (MUAC) was found to be almost the same i.e. 16.65±0.12 cm and 16.94±0.35 cm for Chowari and Bharmour block school children, respectively. Kataria (1992) observed mean mid upper arm circumference of 15.21±0.26 cm ranging from 13-19 cm in school children aged 7-9 years. Mean head circumference of Chowari block school children was 51.36±0.23 cm and for Bharmour block school children the value recorded was almost similar (51.31± 0.25 cm). Kataria (1992) has reported that head circumference of boys was more

Table 1. Anthropometric parameters of selected school children (7-9 years)

Parameter	Chowari	Bharmour	't'
Height(cm)	115.03±0.82	119.77±1.05	3.61
Weight(kg)	20.90±0.36	19.98±0.28	2.05
Body Mass Index(Kgm-2)	16.04±0.13	14.02±0.18	1.27
Triceps skinfold thickness (mm)	4.66±0.09	4.65±0.09	0.0225
Mid upper arm circumference (cm)	16.65±0.12	16.94±0.35	0.7576
Head circumference (cm)	51.36±0.23	51.31±0.25	0.1391
Chest circumference (cm)	56.21±0.43	55.94±0.30	0.5149
Waist circumference (cm)	52.83±0.38	52.26±0.28	1.1683

Values and mean ± standard error

(50.88±0.29 cm) ranging from 48.0-54.5 cm as compared to girls (50.48±0.30 cm) with a range of 47.0 to 53.5 cm.

Mean chest circumference of Chowari and Bharmour block school children was 56.21±0.43 cm and 55.94 ±0.30 cm, respectively. Kataria (1992) reported 56.89±0.69 cm mean chest circumference in respondents of her study. The boys had 57.46±0.70 cm chest circumference while the girls 56.32±0.68 cm. Waist circumference of Chowari block school children was 52.83±0.38 cm and that of Bharmour block was 52.26±0.28 cm, respectively. Not much significant difference was observed between the two blocks.

Assessment of nutritional status

According to Gomez classification, 37 per cent of Chowari and 42 per cent of Bharmour block school children were normal on the basis of weight/age relationship. Mild malnutrition was observed in 44 and 41per cent and moderate in 19 and 15 per cent of Chowari and Bharmour block school children, respectively. No case of severe malnutrition was found in Chowari block while 2 per cent of school children of Bharmour block suffered from severe malnutrition. Almost similar observation was reported by Chauhan (2001). Maurya and Jaya (1997) revealed that based on weight for age classification of 7-10 year tribal children of Bihar, 2.2per cent children were normal whereas 97.8 per cent suffered from various degrees of malnutrition.

Waterlow's classification revealed that 29 per cent of Chowari and 52 per cent of Bharmour school children were normal, 51 and 41 per cent were mildly impaired, 20 and 7 per cent were moderately impaired, respectively in regard to height for age. Maurya and Jaya (1997) has reported 19.11per cent of trial children in the age group of 7-10 years normal while 80.88 per cent suffered from various degrees of malnutrition in respect of height for age in Bihar.

Weight for height classification showed 58 per cent of Chowari and 41 per cent of Bharmour block school children were normal, 30 and 38 per cent were mildly impaired, 10 and 19 per cent were moderately impaired, respectively. Chauhan (2001) has reported almost similar values for normal and mildly impaired in a study for Government school children. Five per cent were found moderately impaired in comparison to 2 per cent of severely impaired respondents.

Table 2. Assessment of nutritional status in relation to weight/age, height/age classification and weight/height classification

Degree	Criteria	Per cent prevalence	
		Chowari	Bharmour
Weight/age classification			
Normal	90-100%	37	42
Mild malnutrition	75-89%	44	41
Moderate malnutrition	60-74%	19	15
Severe malnutrition	<60%	0	2
Height/age classification			
Normal	>95.0	29	52
Mildly impaired	87.5-95.0	51	41
Moderately impaired	80.0-87.5	20	7
Severely impaired	<80.0	0	0
Weight/height classification			
Normal	>90	58	41
Mildly impaired	80-90	30	38
Moderately impaired	70-80	10	19
Severely impaired	<70	2	2

Assessment of clinical symptoms

Table 3 indicated that maximum proportion of Chowari (54%) and Bharmour blocks (60%) school children had normal appearance while 16 and 17 per cent had good and 30 and 23 per cent had poor appearance. Subhadra (2000) conducted a study on assessment of the nutritional status of government and private school children of Hissar city and reported that about half (56.7%) of the private school children and 1/8th (11.7%) of the government school children had good appearance and about half (45%) of the government school children and one third (33.33%) of the private school children had normal appearance. Poor appearance was observed in 43.3 per cent of the government and only in 10 per cent of the private school children.

Majority of Chowari (92%) and Bharmour (94%) block school children had normal hair. Loss of luster was observed in 2 per cent of Chowari and 3 per cent of Bharmour block school children. Discoloured hair was found in 3 per cent children of both the blocks. Easy pluckability was observed in 3 per cent of Chowari block school children only. The study conducted by Chauhan (2001) has also revealed lack of luster (32%), discoloured hair (5%) and easy pluckability (4 %) of hair in government school children.

The findings of the present study showed that 70 and 88 per cent of Chowari and Bharmour block school children had normal eyes. Pale conjunctiva was observed in 28 per cent of Chowari and 12 per cent of Bharmour block school children due to iron deficiency. Bitot's spot and conjuctival xerosis due to vitamin A deficiency was observed in 1 per cent of Chowari block school children only. Keratomalacia was not observed in any of the children of selected blocks. Mittal (1999) reported pale conjunctiva in 26.6 per cent girls (7-9 years) belonging to lower income

Table 3. Clinical assessment of selected school children (7-9 years)

Clinical characteristics	Chowari (no.)	Bharmour (no.)
General appearance		
Good	16	17
Normal	54	60
Poor	30	23
Hair condition		
Normal	92	94
Loss of lustre	2	3
Discoloured hair	3	3
Easy pluckability	3	-
Eyes		
Normal	70	88
Pale conjunctia	28	12
Bitot spot	1	-
Conjunctival xerosis	1	-
Keratomalacia	-	-
Tongue		
Normal	65	74
Pale but coated	13	10
Red and raw	9	13
Fissured	13	3
Smooth	-	-
Teeth		
Fluorosis		
Absent	59	46
Chalky teeth	21	19
Mottled and pigmented teeth	20	35
Caries		
Absent	44	25
slight	24	63
marked	32	12
Gums		
Normal	94	98
Bleeding	5	2
Spongy	1	-
Lips		
Normal	82	85
Angular stomatitis	8	3
Angular scar	8	12
Cheilosis	2	-

groups. The value is quite close to that was observed in Chowari block. Goyal and Kawatra (1996) have found symptoms of Bitot's spots (7%) and xerosis (54.3%) in rural school children of Bahadurgarh and have related these symptoms to low food and nutrient intake.

Angular stomatitis and angular scar was observed in 8 per cent each of Chowari block whereas 3 and 12 per cent of Bharmour block school children. Chelosis was observed in 2 per cent of Chowari block school children. Regarding appearance of tongue, 13 and 10 per cent of Chowari and Bharmour block

school children had pale but coated tongue, 9 and 13 per cent had red and raw tongue. Fissured tongue was observed in 13 per cent of Chowari and 3per cent of Bharmour school children. Chalky, mottled and pigmented teeth were observed among 21 and 19 per cent of Chowari and Bharmour block school children, respectively. Slight caries was observed in 24 and 63 per cent of Chowari and Bharmour block school children and marked dental caries was seen in 32 and 12 per cent of Chowari and Bharmour block school children. Bleeding gums were obsereved in 5 per cent of Chowari and 2 per cent of Bharmour block school children. Only 1 per cent of Chowari block school children had spongy gums while no such symptoms were observed in Bharmour block school children.

After analyzing the clinical symptoms of the selected school children of both the blocks (Chowari and Bharmour), it may be inferred that due to non-inclusion and inadequate food intake of protective and nutritious food as was evident from the meal and dietary pattern and the resulting inadequate nutrient intake, some prominent deficiency symptoms were observed. During the course of investigation, no extreme case of any of the symptoms was observed in both the blocks.

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