

Original Research Article

Nutritional Profile of School Going Children (10-12 years) Belonging to Trans Yamuna Area of Allahabad, India

Rubina Perween*

Department of Home Science, Patna University, India

*Corresponding author

ABSTRACT

Children are the future of the society. Hence to ensure sound foundation and secure future of any society, health and nutrition of the children needs protection. The school age period is nutritionally significant because it is the prime time to build the body stores of nutrients in preparation for rapid growth of adolescence. A total of 120 school going children were selected and data were collected using pre-tested schedule which include general information, clinical examinations for nutrient deficiency, anthropometry measurements and dietary assessments. The nutritional status of the respondents was found below the standards. Significant differences in the average height and weight of both boys and girls were found in comparison to NCHS standard values (WHO, 2007)¹. Clinical signs of deficiencies noticed were poor appearance (8.3 %), pale conjunctiva (21.6 %), pale nail colour (11.6 %), abnormal red tongue (13.3 %), angular stomatitis (0.8 %), marked caries (25%), dermatitis skin (8.3 %) and lack of lustrous hair (28.3 %). Referring to undernutrition of school going children, it was found that 24.2 % were found with low height for age, 6.6 % were low weight for height and 20 % belong to underweight category (low weight for age). Significant difference in the average height and weight of both boys and girls were found as well as inadequate intake of important nutrients and presence of clinical signs of nutritional deficiencies.

Keywords

Nutrition status,
anthropometry,
diet, nutrition,
school age
children

Introduction

Nutrition is the basic human need and a prerequisite for healthy life. A proper diet is essential from the very early stages of life for growth, development and active life (NIN, 2003)². According to Park (2002)³ the science of human nutrition is mainly concerned with defining the nutritional requirement for the promotion, protection and maintenance of health in all groups of the population. Children are the future of the society, Hence to ensure sound foundation and secure future of any society, health and nutrition of their children needs protection (WHO, 2005)⁴. Growth in children is a

sensitive indicator of the general state of health as well as nutritional status of the community.

The monitoring of the growth and development, to detect deviations from normal provides one of the simplest but important methods of assessing the health of a child. The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence (Kumar and R. Jain, 2005)⁵. In children, protein/calorie deficient diet results

in underweight, wasting and lowered resistance to infection, stunted growth and impaired cognitive development and learning. Whereas, iron deficiency in school age children, is associated with retardation of growth, decreased immunity, poor cognitive development resulting in lower Intelligence Quotient (IQ) and behavioral abnormalities (Sangunam, 2005)⁶. Therefore, it becomes very important to know the nutritional status of school going children, the building blocks of state and country. Good nutrition of the school going children is of utmost importance. This is the time when their brains are ready to be used in the academic fronts; also the school going age is a dynamic period of growth and development as children undergo physical, mental and emotional development during this stage. It is thus important that the child should be well nourished to support their rapid brain development. Only when the child gets required nutrients, they can reach their potential in physical growth and motor coordination.

Objectives

To assess the dietary pattern of school going children belonging to the Trans Yamuna area of Allahabad.

To assess the nutritional status of school going children of Trans Yamuna area of Allahabad.

To investigate the prevalence of undernutrition among the selected children.

Materials and Methods

The present study entitled “*Nutritional Profile of school going children (10-12 years) belonging to Trans Yamuna area of Allahabad*” was carried out using the methodology described below.

The study was conducted under the following heads:

Selection of sample.
Collection of data
Analysis of data.

Selection of sample

Selection of study area

Trans Yamuna area of the Allahabad district was selected purposively keeping in mind the constraints of time and resources and also because it was convenient and easily.

Selection of schools

Two schools namely Hindi Vidyapeeth at Mahewa and International Academy at Naini were selected purposively because of easy accessibility and convenience for authentic collection of data.

Selection of respondents

Four hundred children (145 from Hindi Vidyapeeth and approx 255 from International Academy) were found as total population size. 30% of the total chosen population ie 120 (10-12 years), 50 children from Hindi Vidyapeeth School and 70 from International Academy were selected for the study. Equal number of boys and girls were taken from each school.

Method of enquiry and collection of data

Survey method was adopted to collect the data from the selected respondents with the help of pre-tested schedule. The children were personally interviewed during the period of study for the collection of required information. Schedule included the aspects which led to the fulfillment of the objectives.

The schedule helped to elicit the following information:

General information: data regarding general profile of the respondents was collected using interview schedule.

Anthropometric measurements: all the selected children were assessed by measuring body heights (cm) and weights (kg) and were compared with National Center for Health Statistics (NCHS) standards (Srilakshmi, 2006)⁷.

Clinical assessment: children were observed for physical signs indicative or suggestive of malnutrition Swaminathan (2007)⁸.

Dietary information: dietary habits and 24 hours recall method were adopted (Swaminathan, 2007)⁸.

Analysis of data: The data recorded during the course of investigation were analyzed with suitable Statistical tools.

Results and Discussion

Maximum respondents, 35%, belonged to 12 years age group; minimum respondents 30.8 % belonged to 11 years age group.

The total respondents were 120 out of which 60 were females and 60 were males. As per data collected, majority of respondents belonged to nuclear family i.e., 63.3% and 36.6 % of them belonged to joint family. Maximum female respondents, 61.6 % belonged to nuclear family and 38.3 % of them were from joint family. Most of the male respondents, 65%, belonged to nuclear family and 35 % belonged to joint family. Nuclear family was more common than joint families. Similar were the findings of Verma (2004)⁹ in some parts of Allahabad District of Uttar Pradesh, India. Maximum

respondents had 1-2 siblings i.e., 58.3 % and 41.6 % of them had more than 3 siblings. Maximum female respondents, 51.6 % had more than 3 siblings and 48.3 % of them with 1-2 siblings. Maximum children, 94.2 % belonged to Hindu religion followed by Muslim 3.3 % and Christian 2.5 % respondents respectively. As per the data collected (with the help of class teacher) maximum respondents, 40.6 % were average in school performance whereas minimum respondents 2.5 % are considered as excellent students.

From Tables no. 1 and 2 it was observed that when the mean heights and weight were compared with standard values of NCHS at 50th percentile, the observed mean height for both boys and girls of 10 years age was found higher than the NCHS standard values. Among the girls in the age group of 11 and 12 years, the observed mean heights were less than the NCHS standards values. Whereas, among the boys of 11 year the observed mean height was higher than NCHS standard value and of 12 years boys, the observed mean height was less than NCHS standard values. The observed mean weights of all the respondents (girls and boys) except girls belonged to 10 years were less than the NCHS standard value.

On applying t-test, it was found that the calculated values of t, in most cases is greater than table value at 5% probability level, therefore it can be concluded that there are significant difference in the average weight and height of boys and girls in comparison to NCHS standard values.

It was also observed that the average height of girls of all age group was lower than the average height of boys of same age groups, whereas the average weight of girls of 10 year was higher than average weight of boys of same group.

When the total children screened (n=120) and their height for age (stunting), weight for age (wasting) and weight for age (underweight) were compared with NCHS standard values, overall undernourished children (stunted+ wasted) and underweight were found to be 7.3 % in 10 year age group, 24.3 % in 11 years age group and 28.6 % in 12 years age group. Undernourished children 28.6 % were found more in the age group of 12 years. Similar were finding of Handa *et al.*, (2008)¹⁰ carried out in survey in Allahabad and reported that 30 % school going children of Allahabad district were Underweight, 17.3 % children were found stunted and 3 % were wasted. Table no.4 shows that clinical sign and symptoms of malnutrition like poor appearance, pale conjunctiva, pale nail colour, abnormal red tongue, angular stomatitis, marked caries, dermatitis skin, lack of lustrous hair, thin hairs and alopecia were experienced by 8.3 %, 21.6 %, 11.6 %, 13.3 %, 0.8 %, 25 %, 8.3 %, 28.3 %, 14.2 % and 0.8 % school going children respectively.

Dietary Information

It was observed that on an average maximum subjects, 80.8 % were vegetarian, 10.3 % were non-vegetarian and 8.3 % were eggetarian. Figure1 shows that maximum number of respondents i.e 45% have the habit of taking three meals a day pattern (breakfast + lunch + dinner).

In total 60.8 % school going children had good appetite whereas about 30 % children had fair and only 9.2 % school going children had poor appetite. Lack of appetite might be due to lack of time, change of taste or any physiological conditions like fever or any kind of disease. About 16.7 % respondents used to skip their breakfast, may be due to lack of time, loss of appetite,

desire to sleep longer in the morning, change of taste or due to their schedule, whereas 5.8 % children are used to skip their mid-morning meal and 6.7 % skipped their lunch which resulted in reduction of calorie, protein and their other nutrients intake. "Breakfast skipping seems to be a matter of personal choice, providing free or subsidized meals will not help those who choose not to eat," Shaw (1998)¹¹.

Among 120 sample children, about 47.5 % respondents were taking food supplements. It was also observed that boys (31.2 %) were consuming more food supplements than girls (16.3 %); it may be happened because boys may get more preference in their family than girls. Gender inequalities in quantity and quality of food intake may contribute to under-nutrition mainly in settings where the girl is still considered less important than the boy.

Tables no. 5 and 6 show that all school going children (100 %) were taking cereals and pulses daily. Sugar, fats and oils were also consumed on a daily basis by all the school going children belonging to Trans Yamuna Region of Allahabad.

The average intake for boys of age 10-12 years shows the average intake of protein (49.4 g/day), calorie (1640 Kcal/day), calcium (569.65 mg/day), iron (22.82 mg/day), vitamin A (472.43µg/day), thiamin (0.93 mg/day), riboflavin (1.02mg/day), niacin (9.90 mg/day) and pyridoxine (0.85 mg/day) were less than the RDA (ICMR). Among girls of the same age group, the average intake of protein (42.46 g/day), calorie (1161.46 Kcal/day), calcium (354.16 mg/day), iron (17.37 mg/day), vitamin A (384.06µg/day), thiamin (0.91 mg/day), riboflavin (0.99 mg/day), niacin (11.21 mg/day) and pyridoxine (0.68 mg/day) were less than the RDA (ICMR).

Table.1 Comparison of Mean Height of School Girls and Boys (10-12 years) with NCHS Standard

Girls (n=60)						
Age (yrs)	No. of respondents	Observed Mean \pm SD	50 th percentile NCHS Std.	Difference	t value	Result
10	22	139.77 \pm 0.30	138.3	1.47	3.31	S
11	17	142.64 \pm 0.46	144.8	-2.16	1.08	NS
12	21	147.90 \pm 0.35	151.5	-3.6	2.13	S
Boys (n=60)						
Age (yrs)	No. of respondents	Observed Mean \pm SD	50 th percentile NCHS Std.	Difference	t value	Result
10	19	139.89 \pm 0.47	137.5	2.39	1.19	NS
11	20	144.4 \pm 0.29	143.3	1.1	0.805	NS
12	21	145.57 \pm 0.36	149.5	-3.93	2.27	S

Table.2 Comparison of Mean Weight of School Girls and Boys (10-12 years) with NCHS Standard

Girls (n=60)						
Age (yrs)	No. of respondents	Observed Mean \pm SD	50 th percentile NCHS Std.	Difference	t value	Result
10	22	34.01 \pm 0.27	32.5	1.51	1.21	NS
11	17	35.35 \pm 0.37	37	-4.65	2.01	S
12	21	38.42 \pm 0.31	41.5	-3.08	3.58	S
Boys (n=60)						
Age (yrs)	No. of respondents	Observed Mean \pm SD	50 th percentile NCHS Std.	Difference	t value	Result
10	19	30.31 \pm 0.40	31.4	-1.09	0.67	NS
11	20	32.55 \pm 0.15	35.3	-2.75	3.80	S
12	21	35 \pm 0.38	39.8	-4.8	2.86	S

Source: Srilakshmi, 2009; S.E. = Standard Error (\pm)
 SD= standard deviation; S= Significant $P \leq 0.05$
 NS= Non-Significant $P \geq 0.05$

Table.3 Prevalence of undernutrition among school going children (10-12 yrs)

Nutritional status	Age group (years)							
	10 yrs (n=41)		11 yrs (n=37)		12 yrs (n=42)		Total (N=120)	
	No.	%	No.	%	No.	%	No.	%
Underweight (wt for age \leq -2SD)	3	7.31	9	24.32	12	28.57	24	20
Adequate weight	38	92.69	28	75.68	30	71.43	96	80

Table.4 Presence of clinical signs and symptoms of Malnutrition in school going children

Sign and symptoms	Girls n=60		Boys n=60		Total N=120	
	N	%	N	%	N	%
General appearance						
Good	25	41.67	49	81.67	74	61.67
Fair	31	51.66	5	8.33	36	30.00
Poor	4	6.67	6	10.00	10	8.33
Pale conjunctiva						
Absent	44	73.33	50	83.33	94	78.33
Present	16	26.67	10	16.67	26	21.67
Nail colour						
Normal	50	83.33	56	93.33	106	88.33
Pale	10	16.67	4	6.67	14	11.67
Night blindness						
Absent	60	100	60	100	120	100
Present	-	-	-	-	-	-
Tongue colour						
Abnormal red	9	15.00	7	11.67	16	13.33
Healthy pink	51	85.00	53	88.33	104	86.67
Angular stomatitis						
Absent	59	98.33	60	100	119	99.17
Present	1	1.67	-	-	1	0.83
Gums						
Bleeding	-	-	-	-	-	-
Normal	60	100	60	100	120	100
Caries						
Absent	27	45.00	19	31.67	46	38.33
Marked	13	21.67	17	28.33	30	25.00
Slight	20	33.33	24	40.00	44	36.67
Skin						
Smooth slight moist	24	40.00	30	50.00	54	45.00
Healthy glow	30	50.00	26	43.33	56	46.67
Dermatitis	6	10.00	4	6.67	10	8.33
Hair						
Lustrous	37	61.67	31	51.67	68	56.67
Lack of lusture	8	13.33	26	43.33	34	28.33
Thin	14	23.33	3	5.00	17	14.17
Alopecia	1	1.67	-	-	1	0.83

Table.5 Food frequency consumption in School Going Boys (10-12 years)

Food Items	Every day		4-6 times in a week		2-4 times in a week		1-2 times in a week		Occasionally		Never		Total n=120	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cereals & Pulses	60	100	-	-	-	-	-	-	-	-	-	-	60	100
Milk & products	34	56.67	10	16.67	15	25.00	-	-	-	-	1	1.66	60	100
Green leafy vegetables	2	3.33	27	45.00	17	28.33	2	3.33	10	16.67	2	3.33	60	100
Roots & tubers	58	96.67	2	3.33	-	-	-	-	-	-	-	-	60	100
Other vegetables	42	70.00	15	25.00	3	5.00	3	5.00	-	-	-	-	60	100
Fruits	39	65.00	4	6.67	10	16.67	5	8.33	2	3.33	-	-	60	100
Meat & poultry	-	-	2	3.33	4	6.67	2	3.33	1	1.67	51	85.00	60	100
Fats & Oils	60	100	-	-	-	-	-	-	-	-	-	-	60	100
Sugar/ Jaggery	60	100	-	-	-	-	-	-	-	-	-	-	60	100

Table.6 Food frequency consumption in School Going Girls (10-12 years)

Food Items	Every day		4-6 times in a week		2-4 times in a week		1-2 times in a week		Occasionally		Never		Total n=120	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cereals & Pulses	60	100	-	-	-	-	-	-	-	-	-	-	60	100
Milk & products	27	45.00	12	20.00	11	18.33	2	3.33	4	6.67	4	6.67	60	100
Green leafy vegetables	8	13.33	24	40.00	15	25.00	9	15.00	3	5.00	1	1.67	60	100
Roots & tubers	59	98.33	1	1.67	-	-	-	-	-	-	-	-	60	100
Other vegetables	40	66.67	15	25.00	2	3.33	2	3.33	1	1.67	-	-	60	100
Fruits	21	35.00	19	31.67	5	8.33	2	3.33	13	21.67	-	-	60	100
Meat & poultry	-	-	3	5.00	6	10.00	2	3.33	3	5.00	46	76.67	60	100
Fats & Oils	60	100	-	-	-	-	-	-	-	-	-	-	60	100
Sugar/ Jaggery	60	100	-	-	-	-	-	-	-	-	-	-	60	100

Table.7 Average nutrient intake per day of School going Children (10-12 yrs)

		Energy (kcal)	Protein (g)	Fat (g)	Ca (mg)	Fe (mg)	Vit A (µg)	Vit B1 (mg)	Vit B2 (mg)	Vit B3 (mg)	Vit B6 (mg)	Vit C (mg)
Boys n=60	ICMR (RDA)	2190	54	22	600	34	600	1.1	1.3	15	1.6	40
	Intake	1640.6	49.39	27.0	569.6	22.82	472.43	0.93	1.02	9.90	0.85	76
	S.E.	±1.45	±0.10	±0.06	±1.76	±0.03	±0.10	±0.02	±0.01	±0.03	±0.02	±0.03
	Diff.	-549.3	-4.61	5.07	-30.3	-11.1	-127.5	-0.17	-0.28	-5.1	-0.75	36
	t value	48.65	5.60	6.82	2.19	36.50	17.88	10.72	19.01	20.01	13.02	138.7
	Result	S	S	S	S	S	S	S	S	S	S	S
Girls n=60	ICMR (RDA)	1970	57	22	600	19	600	1	1.2	13	1.6	40
	Intake	1161.5	42.46	27.4	354.2	17.37	384.06	0.91	0.99	11.21	0.68	75
	Diff.	-808.5	-14.54	5.43	-245	-1.63	-215.9	0.09	-0.21	-1.79	-0.92	35
	S.E.	±4.153	±0.08	±0.05	±1.13	±0.03	±0.86	±0.01	±0.05	±0.01	±0.04	±0.03
	t value	29	29.55	16.88	58.08	6.60	32.62	0.877	6.29	16.07	15.59	155.3
	Result	S	S	S	S	S	S	NS	S	S	S	S

RDA Source: Gopalan *et al.*, 2004

S= Significant $P \geq 0.05$ NS= Non-Significant $P \leq 0.05$ S.E.= Standard Error (\pm)

Nutrition deficiencies depend not only on nutrient intake but also upon geographical, climatic condition as in as living condition. On applying of t-test for 10-12 yrs children, it was found that the calculated value of t is greater than the table value of t at 5 % probability level for almost all the nutrients, so that it can be concluded that there is highly significant difference in the entire nutrient intake among the groups.

A total of 120 school going children (age 10-12 years) were selected for the present study. Significant difference was found between the average mean height and weight with NCHS standard values. It shows that height and weight of school going children were lower than standards. It was also observed that the average height of girls of all age group was lower than the average height of boys of same age groups, whereas the average weight of girl of 10 year was higher than average weight of boys of same group.

Out of 120 children, underweight were found to be 7.31 per cent in 10 year age group, 24.32 per cent in 11 years age group and 28.57 per cent in 12 years age group. Undernourished

children 28.57 per cent were found more in the age group of 12 years.

Clinical sign and symptoms of malnutrition like poor appearance, pale conjunctiva, pale nail color, abnormal red tongue, angular stomatitis, marked caries, dermatitis skin, lack of lustrous hair, thin hairs and alopecia were experienced by 8.33 per cent, 21.67 per cent, 11.67 per cent, 13.33 per cent, 0.83 per cent, 25 per cent, 8.33 per cent, 28.33 per cent, 14.17 per cent and 0.83 per cent school going children respectively.

In Dietary assessment section, also the food intakes by the respondents are found below the food recommended for the age. The average intake of boys of age 10-12 years shows the average nutrient intake of protein (49.39 gm/day), energy (1640.62 Kcal/day), calcium (569.65 mg/day), iron (22.82 mg/day), vitamin A (472.43µg/day), thiamin (0.93 mg/day), riboflavin (1.02mg/day), niacin (9.90 mg/day) and pyridoxine (0.85 mg/day) were less than the I.C.M.R. RDA. Among girls of the same age group, the average nutrient intake protein (42.46 gm/day), energy (1161.46 Kcal/day), calcium (354.16 mg/day),

iron (17.37 mg/day), vitamin A (384.06µg/day), thiamin (0.91 mg/day), riboflavin (0.99 mg/day), niacin (11.21 mg/day) and pyridoxine (0.68 mg/day) were less than the I.C.M.R. RDA. To sum up all the observations among 10-12 year school going children revealed that the nutritional status of the respondents were below the standards. The dietary pattern of both boys and girls were more or less same, as they were deficient in certain nutrients (calorie, Protein, Calcium, Iron, Vitamin A, Riboflavin, Thiamin and Pyridoxine) in their diet required for proper growth and development compared to the RDA.

The nutritional status of a good proportion of the respondents were not satisfactory due to significant difference in the average height and weight of both boys and girls as well as inadequate intake of important nutrients and presence of clinical signs of nutritional deficiencies. However in certain parameters, boys were found better than girls, it may be because boys get more preferences in the family than girls. Also the nutrient intake of boys was found to be better than girls and other parameters like number of family members (number of siblings), food supplements etc. Gender inequality in nutritional status due to intra household allocation of resources has been consistently reported in India (Dey and Chaudhuri, 2008)¹².

Out of 120 children 30.8 % were found under nourished (24.2 % stunted, 6.6% wasted) and 20 % underweight. Poor anthropometric indices and under nutrition may be due to lower intake of food and nutrients than Recommended Dietary Allowances.

References

Dey I, Chaudhuri RN (2008): Gender inequalities in nutritional status among under five children in a village in Hooghly district, West Bengal. *Indian J*

Public Health 52, 218–220.

Handa, R., Ahamad, F., Kesari, K. and Prasad, R. (2008) Assessment of Nutritional Status of 7-10 Years School Going Children of Allahabad District: A Review, *Middle-East Journal of Scientific Research* 3 (3): 109-115, 2008

Kumar, S. and R. Jain, (2005). Assessment of school children from rural Bihar. *Journal of Nutrition and Dietetics*, 42: 326-334.

National Institute of Nutrition, (2003). Differences in attention-concentration, memory and school achievement of regular and irregular breakfast eaters and noneaters. *Indian Journal of Nutrition and Dietetics*, 32: 262. Annual Report, 4: 27-30.

Park, K. (2002), *Parks Textbook of Preventive and Social Medicine*. 18th edition. Med. Progl. Sep.-Oct.; 53(9-10):493-501.

Sangunam, A. (2005) Nutritional status of Lodha children in a village of Paschim Medinipur district, West Bengal. *Indian J Public Health* 2008; 52:203-206

Shaw, M. E. (1998). "Adolescent Breakfast Skipping: An Australian Study" *Adolescent*, Vol.33:pp851-861

Srilakshmi, B. (2006). *Nutrition Science*, Revised Second edition. New Age International (p) Limited Publishers: 328-337, 392

Swaminathan, M. (2007), Assessment of nutritional status. *Advanced text book on Food and Nutrition*, The Bangalore printing and publishing Ltd., volume-2, 300-310, 336-340.

Verma, V; (2004) "Prevalence of anaemia among adolescent girl" Thesis, M.sc Food Nutrition and dietetics, Allahabad Agriculture Institute, Deemed-to-be-University, Allahabad.

WHO, (2005) *Malnutrition. Nutrition for Health and development*, pp: 11-12.

WHO, (2007) *Growth reference data for 5-19 years*.

<http://www.who.int/growthref/en/>