

## Research Article

# A socio-demographic profile, growth, nutritional and hygiene status of children of primary and secondary boarding schools of Gandhinagar district: a cross sectional study

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## ABSTRACT

**Background:** A school is a key location for educating children about health, hygiene and nutrition, and for putting in place interventions to promote the health of children. Objectives: of current study were 1) To study the socio demographic profile of children of boarding schools. 2) To study the growth, nutritional and hygiene status of children of boarding schools.

**Methods:** The study was a cross sectional study. After taking the permission of principal of resident schools and consent of the parents of children, 867 children from 8 boarding schools were interviewed during February-March 2011. A self-administered questionnaire was used for data collection.

**Results:** Age of the study children (total 867) ranged from 5-19 years. (Mean age =  $13.80 \pm 1.96$  years). Out of 867, 434 (49.9%) were boys and 433 (50.1%) were girls. 32.6% belonged to socio economic class IV. There were only 122 (14.1%) children who had been in boarding school since 4 and more than 4 years. Good personal hygiene was observed in only 75 (8.7%) children followed by fair personal hygiene in 292 (33.7%) children and poor personal hygiene in 500 (57.7%) children. 220 (50.8%) female children had fair personal hygiene and 343 (79.0%) male children had poor personal hygiene and this difference was statistically significant. Prevalence of malnutrition in this study was 7.2% (Females = 4.2%; Males = 10.1%;  $P < 0.001$ ). The bulk of the malnutrition cases were constituted by the grade-I P.E.M. cases (66.1%) followed by grade-II P.E.M. cases (25.8%) and there were 5 (8.1%) cases of grade-III malnutrition only in female children.

**Conclusion:** Poor personal hygiene, poor nutritional status among these children needs great attention and health education.

**Keywords:** Boarding school, Growth, Nutritional status, Hygiene status, Residential school children

## INTRODUCTION

A school is a key location for educating children about health, hygiene and nutrition, and for putting in place interventions to promote the health of children. At the same time, poor health, poor nutrition and disability can be barriers to attending school and to learning.<sup>1</sup> Schools are sacred because they provide an environment, for

learning skills, and for development of intelligence that can be utilized by students to achieve their goals in life. It is also observed that “to learn effectively, children need good health.” Health is key factor in school entry, as well as continued participation and attainment in school.

The school is also potentially a location for contracting infections or diseases. Finally, childhood health behavior

habits such as diet, substance addiction and physical activity are influenced by the school setting and often track into adulthood<sup>1</sup>. The fact is that the most of these conditions are preventable or avoidable and curable especially in early stages by promotion of hygienic practices among school children through proper health education by teachers, who are the first contacts.<sup>2</sup>

Some parents think it is simply impossible to allow the child to stay away from home from an early age, while there are others who believe that boarding schools instill a sense of responsibility and discipline in children, which is a great benefit for their overall development. There are positive as well as negative effects of boarding school on children.<sup>3</sup> This study is a humble effort to throw light on socio demographic profile, growth, nutritional and hygiene status of children of boarding schools.

**Objectives**

- To study the socio demographic profile of children of boarding schools.
- To study the growth, nutritional and hygiene status of children of boarding schools.

**METHODS**

The study was a cross sectional study. 8 residential schools were selected by purposive sampling. After taking the permission of principal of resident schools and informed written consent of the parents of children, 867 children from 8 boarding schools were interviewed during February-March 2011. A self-administered questionnaire was used for data collection. Modified Prasad’s classification was used for social classification. Indian academic of pediatric classification was used for nutritional classification. Status of the personal hygiene of the children was judged by examining ten aspects namely (1) Eyes (2) Ear (3) Nose (4) Mouth (5) Skin (6) Hairs (7) Nails (8) Hands (9) Feet and Toes (10) Clothes. Children having cleanliness of 8-10 aspects were considered as having good personal hygiene, those with 6-7 aspects clean were taken as fair and rest were declared to have poor personal hygiene.

**Statistics**

Data were analyzed using SPSS version 17 (trial version). Parameters such as rate, ratio and percentages were calculated. In order to have valid interpretation of rates, 95% Confidence Intervals (CI) were calculated. To test the significance of the difference among the statistical parameters in different subsets of population, suitable statistical tests were applied. They included chi-square test, Z- test and unpaired t test.

**RESULTS**

Age of the study children ranges from 5-19 years. Mean age of the study children was 13.80 ± 1.96 years.

Maximum numbers of the children were in the age group of 10-14 years (58%). Mean age of female and male children was 13.78 ± 1.89 years and 13.82 ± 2.02 years respectively. Out of total (867), 48 (5.5%) children were in 5-9 years (primary school) age group, whereas 819 (94.5%) belonged to 10-19 years (adolescent) age group (Table 1).

**Table 1: Gender wise distribution of children according age groups.**

Age groups	Female	Male	Total
5-9	23 (2.7)	25 (2.8)	48 (5.5)
10-14	271 (31.3)	232 (26.7)	503 (58.0)
15-19	139 (16.1)	177 (20.4)	316 (36.5)
<b>Total</b>	<b>433 (49.9)</b>	<b>434 (50.1)</b>	<b>867 (100)</b>

Figures given in parentheses are percentages

Table 2: Socioeconomic status of family influences the health of all family members, particularly the children of growing age and also access to health facilities.

Out of total 867 children studied majority (32.6%) belonged to socio economic class IV followed by class V (30.6%).

**Table 2: Social class wise distributions of children (according to modified Prasad’s classification).**

Social class	Number of children
I	41 (4.7)
II	184 (21.2)
III	94 (10.8)
IV	283 (32.6)
V	265 (30.6)
<b>Total</b>	<b>867 (100)</b>

Figures given in parentheses are percentages

Table 3: Education status of head of the family is important in promotion of health of their children as education determines the awareness of health needs and also provides access to health campaigns conducted through print media. Out of 867 children 749 (86.4%) children had father as a head of the family, 63 (7.3%) children had grandfather as a head of the family, remaining 50 (5.8%) and 5 (0.6%) had grandmother and mother as a head of family respectively. Literacy rate of the head of the family in this study was 92.4%.

288 (33.2%) children had been in boarding school for the 1 year followed by 222 (25.6%) and 235 (27.1 %) for the last 2 and 3 years respectively. Only 122 (14.1%) children had been in boarding school for the last 4 and more than 4 years.

**Table 3: Distribution of children according to education status of head of the family and caste.**

Education of HOF	Number of children
Illiterate	66 (7.6)
Primary	250 (28.8)
Secondary	255 (29.4)
Higher secondary	131 (15.1)
Graduate	120 (13.8)
Post graduate	45 (5.2)
<b>Total</b>	<b>867 (100)</b>

Figures given in parentheses are percentages

Table 4: Many families had more than one reasons for sending their children to boarding school but the predominant reason is considered shown in Table 4.

63.6% children were in residential school were due to economical reason as these boarding schools were government granted boarding schools.

**Table 4: Distribution of children according to parents' reasons for sending them to boarding school.**

Reason	Number of children	Percentage
Economical	551	63.6
For better education	227	26.2
School far away	86	9.9
School not available	3	0.3
<b>Total</b>	<b>867</b>	<b>100</b>

Table 5: The mean height in female children was found increasing consistently with the increase of age. It increased from minimum 104.75 ± 0.96 cm. (5 years age) to 149.60 ± 3.78 cm (17 to 19 years age groups). Similar pattern was evident in boys too, who showed increase in their height with the age. The minimum height observed in the boys was 106.00 ± 0.00 cm (5 years age) which rose to maximum 166.82 ± 3.90 cm. (17 to 19 years age groups). In 13 and 17 to 19 years age groups girls however showed slight reduction in mean height from the mean height of the preceding age group. In 9 and 17 to 19 year age groups boys showed slight reduction in mean height from the mean height of the preceding age group.

**Table 5: Distribution of standing height (in centimetres) according to age and gender.**

Age (years)	Female		Male		Unpaired t-test
	Number examined	Mean ± SD	Number examined	Mean ± SD	P value
5+	4	104.75 ± 0.96	1	106.00 ± 0.00	0.33
6+	2	110.00 ± 2.83	9	112.89 ± 7.43	0.61
7+	10	116.40 ± 4.65	7	115.29 ± 7.52	0.71
8+	6	119.83 ± 7.36	6	122.83 ± 6.14	0.46
9+	1	121.00 ± 0.00	2	115.50 ± 7.78	0.67
12+	5	145.60 ± 4.16	11	142.73 ± 6.17	0.36
13+	101	145.07 ± 5.83	106	142.96 ± 8.36	0.04
14+	165	148.97 ± 6.01	115	149.86 ± 7.27	0.26
15+	105	150.07 ± 6.66	144	152.33 ± 7.03	0.01
16+	29	153.62 ± 4.20	22	157.91 ± 5.45	0.00
17 to 19+	5	149.60 ± 3.78	11	166.82 ± 3.90	0.00

When compared between two sexes, on an average the males were found to be significantly taller than the females at ages 15, 16 and 17 to 19 years (unpaired t-test P <0.05). At the age 5, 6, 8 and 14 years males were taller than the females but these difference were statistically not significant (unpaired t-test P >0.05). The females were found to be significantly taller than the males at the age 13 years (unpaired t-test P <0.05).

Table 6: The mean weight in female children increased consistently with the increase of the age from the minimum 13.00 ± 0.81 kg, in 5 years age to 41.60 ± 6.54

kg, in 17 to 19 years age groups. However, it showed a slight reduction in 16 and 17 to 19 years age group over the preceding age group. In male children too, the mean weight increased with the increase of the age from the minimum 15.00 ± 0.00 kg, in 5 years age to 45.27 ± 7.30 kg, in 17 to 19 years age groups. In 9 year age group the mean weight was less than the mean weight of the preceding age group. Between the two sexes, the male children were heavier than the females in all age groups except 9 and 12 to 14 years age groups but these difference were statistically not significant (unpaired t-test P >0.05).

**Table 6: Distribution of body weight (in kilograms) according to age and gender.**

Age (years)	Female		Male		Unpaired t-test
	Number examined	Mean $\pm$ SD	Number examined	Mean $\pm$ SD	P value
5+	4	13.00 $\pm$ 0.81	1	15.00 $\pm$ 0.00	0.12
6+	2	15.00 $\pm$ 1.41	9	16.00 $\pm$ 2.08	0.54
7+	10	17.30 $\pm$ 2.06	7	17.79 $\pm$ 4.22	0.76
8+	6	18.50 $\pm$ 2.95	6	20.16 $\pm$ 3.19	0.37
9+	1	19.00 $\pm$ 0.00	2	16.50 $\pm$ 2.12	0.51
12+	5	34.00 $\pm$ 1.41	11	31.00 $\pm$ 3.63	0.10
13+	101	35.65 $\pm$ 10.14	106	33.72 $\pm$ 6.67	0.10
14+	165	38.41 $\pm$ 4.90	115	38.23 $\pm$ 6.53	0.85
15+	105	41.76 $\pm$ 6.06	144	42.00 $\pm$ 6.65	0.77
16+	29	41.45 $\pm$ 5.58	22	42.10 $\pm$ 5.09	0.67
17 to 19+	5	41.60 $\pm$ 6.54	11	45.27 $\pm$ 7.30	0.35

Table 7: The overall prevalence of malnutrition in this study was 7.2% separately being high (10.1%) in the male children than the female children (4.2%) and this difference was found statistically significant. The bulk of the malnutrition cases were constituted by the grade-I P.E.M. cases (66.1%) followed by grade-II P.E.M. cases (25.8%) and there were 5 (8.1%) cases of grade-III malnutrition only in female children.

Though this classification is based on single reading and regular monitoring of growth (weight and height) would be a better indicator, this shows that fulfillment of nutritional requirements is still a weak point of boarding schools.

**Table 7: Gender wise nutritional status of 867 children.**

Nutritional status	Gender		Total
	Female	Male	
Normal	415 (95.8)	390 (89.9)	805 (92.8)
Grade-I	11 (2.5)	30 (6.9)	41 (4.7)
Grade-II	2 (0.5)	14 (3.2)	16 (1.8)
Grade-III	5 (1.2)	0 (0.0)	5 (0.6)
<b>Total</b>	433 (100)	434 (100)	867 (100)

Figures given in parentheses are percentages  
Chi-square: 11.91; Degrees of freedom: 2; P = 0.0026

Table 8: Maintaining personal hygiene is an important intervention in primary prevention of a number of diseases particularly those of skin, oro-dental, eye and gastrointestinal. The above table shows personal hygiene status and gender was significantly associated. Mean personal hygiene score (total 10) of girls (5.86  $\pm$  1.57) was significantly higher than that of boys (4.24  $\pm$  1.68) (P < 0.05).

**Table 8: Gender wise distribution of children according to their personal hygiene status.**

Personal hygiene status: maximum score 10	Gender		Total
	Female	Male	
Good (8-10)	56 (12.9)	19 (4.4)	75 (8.7)
Fair (6-7)	220 (50.8)	72 (16.6)	292 (33.7)
Poor (1-5)	157 (36.3)	343 (79.0)	500 (57.7)
<b>Total</b>	433 (100)	434 (100)	867 (100)

Figures given in parentheses are percentages  
Chi-square: 162.46; Degrees of freedom: 2; P < 0.0001

## DISCUSSION

In Srinivasan K et al. 61.4% children were in the age group of 10-14 years.<sup>4</sup> In Panda P et al. 59.5% are boys and 40.5% are girls.<sup>5</sup>

In Panda P et al. On an average the boys were found to be significantly taller than the girls at ages 5, 15 and 16. At 4, 6, 7, 9, 11, 12 and 13 years the girls were taller than the boys, but these differences were statistically not significant.<sup>5</sup> these findings may be due to physiological changes during adolescence. In their study, on an average the girls weighed significantly more than the boys at ages 6, 13 and 14. At ages 7, 9, 11 and 12 also the girls weighed more than the boys, but these differences were statistically not significant. The boys were significantly heavier than the girls at ages 5, 15 and 16. At ages 4, 8 and 10 also the boys weighed more than the girls, but the differences were statistically not significant.<sup>5</sup> None of the study children were found to be overweight.

Growth and nutrition usually go together and any deviation in nutrition affects the growth of the child.

In Panda P et al. 47.8% of children were found to be normal as per their weight for age, 52.2% were malnourished. 28.4% children had mild, 17.0% had moderate and 6.8% children had severe degree of malnourishment.<sup>5</sup> In Osei A et al. 60.9% children were underweight in primary school age group.<sup>6</sup>

In Soumya Deb et al. 40.8 % boys and 25.93% girls were underweight. In their study mean personal hygiene score of girls ( $4.15 \pm 0.98$ ) was significantly higher than that of boys ( $3.2 \pm 1.4$ ) ( $P < 0.05$ ). 30.43% children had good, 50% children had fair and 19.57% children had poor personal hygiene score.<sup>7</sup>

## CONCLUSION

Regular weight and height measurements should be taken along with plotting them in growth charts by class teachers or warden to monitor the development of the children.

There should be school health education program with the active involvement of school teachers to improve personal hygiene in school children and to reduce related morbidities along with provision of necessary materials like soaps and oils etc., under supervision by hostel staff will go a long way in controlling these infections.

Inclusion of more foodstuffs especially fruits, vegetables, milk and milk products in daily diet of residential school children is recommended for improving their nutritional status.

Nutrition counselling, health education and systematic training to people who are planning and realising nutrition in boarding schools by doctors, teachers and health workers should be given to decrease the effect of ignorance and faulty practices.

There should be monthly parent-teacher meetings so that teachers could give their feedback to parents and vice versa to improve the health status of children.

The recommendations based on this study should be implemented by concerned authorities and similar studies and also advanced studies in future should be encouraged.

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