

HEALTH STATUS OF CHILDREN OF PRIMARY AND SECONDARY BOARDING SCHOOLS OF GANDHINAGAR DISTRICT

Nilesh Thakor¹, Aparajita Shukla², DV Bala², Mayur Vala¹, Rakesh Ninama¹

¹ Department of Community Medicine, GMERS Medical College, Dharpur-Patan, Gujarat, India

² Department of Community Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

Correspondence to: Nilesh Thakor (drnileshthakor@yahoo.co.in)

DOI: 10.5455/ijmsph.2014.090420142

Received Date: 03.04.2014

Accepted Date: 19.04.2014

ABSTRACT

Background: Poor health, poor nutrition and disability can be barriers to attending school and to learning.¹ 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.

Aims & Objective: To study health profile of children of boarding schools of Gandhinagar district.

Materials and 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 examined for nutritional deficiencies during February-March 2011.

Results: Age of the study children (total 867) ranged from 5-19 years. (Mean age = 13.80 ± 1.96 years). Out of 867, 434 (49.9%) were boys and 433 (50.1%) were girls. Vitamin A deficiency was present in 54 (6.2%) children. Vitamin B complex deficiency signs were seen in 179 (20.6%) children. Vitamin C deficiency signs were seen in 86 (9.9%) children. PEM was observed in 77 (8.9%) children. The study revealed that 46.7% girls were suffering from anaemia compare to 37.3% of boys. 122 (12.9%) children had visual impairment. Almost 22% of study population was suffering from dental caries. Wax in ears was present in 816 (94.1%) children.

Conclusion: Poor personal hygiene and nutritional deficiency among these children needs great attention and health education.

Key Words: School Health; Boarding School; Children Health; 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.^[1] 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 behaviour habits such as diet and physical activity are influenced by the school setting and often track into adulthood.^[1] The common morbidities found in school age children are nutritional deficiencies, dental, visual and hearing problems, respiratory infections, skin conditions, loco motor disabilities and congenital heart and other problems. 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.^[2]

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 instil 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.^[3] This study is a humble effort to throw light on the health status of children of boarding school.

Materials and Methods

The study was a cross sectional study. Eight 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 of Gandhinagar district were examined using Pre-designed, pre-tested, semi-structured WHO standard with ICMR modifications questionnaire for nutritional deficiencies during February-March 2011. Performa contained general information, anthropometry and general health check-up of the child. The modification included deletion of columns irrelevant to the present study and addition of some columns to record other health abnormalities

specially which are common in school children.

Statistical Analysis

Data were analysed 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)

Growth and nutrition usually go together and any deviation in nutrition affects the growth of the child. The malnutrition status was assessed on the basis of classification laid down by Indian Academy of Paediatrics. 5 (1.2%) cases of grade-III malnutrition were observed only in female children in 10-14 years age group and maximum numbers of P.E.M. cases (10 out of 18 cases) were also observed in this age group. (Table 2) There were no cases of grade-III P.E.M. in the boys. Cases of malnutrition (grade-I and grade-II) observed amongst the all age groups. The maximum numbers of cases (24 out of 44) were reported in 10-14 years age group. The 10-14 years old children, the age group in which the growth spurt takes place, were observed to be at highest risk of wasting in both genders. (Table 3)

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 fulfilment of nutritional requirements is

still a weak point of boarding schools. (Table 4)

Physical examination of the children was conducted to identify various morbid conditions and nutritional disorders. Identification of common morbidity conditions including nutritional disorders of school going children is helpful in constructing the morbidity pattern, to work out the priority areas and in organising the health care services. Table 5 shows the various morbid conditions which was prevalent in children at the time of study. Wax in ears was present in 816 (94.1%) children while 192 (22.14%) children had one or more morbid conditions. Vitamin A deficiency was present in total 54 (6.2%) children. 26 (6.0%) were females and 28 (6.5%) were males. 3 male children had both signs. The signs of vitamin A deficiency and gender was not significantly associated ($p > 0.05$). Other signs of vitamin A deficiency such as Bitot's spot, corneal xerosis and corneal opacities were not observed in any children. (Table 6)

Table 7 shows signs of vitamin B complex deficiency. Signs were seen in total 179 (20.6%) children. 72 (16.6%) were females and 107 (24.7%) were males. Many children have multiple signs of vitamin B complex deficiency. Signs such as angular stomatitis (Female: 2.5% Male: 6.5% $p < 0.05$) and geographic tongue (Female: 0.9% Male: 4.8% $p < 0.05$) were significantly more observed in males than in females.

Vitamin C deficiency signs were seen in total 86 (9.9%) children. The prevalence rates in males and the females were 11.1% (48 children) and 8.8% (38 children) respectively. 2 male children had both signs. The signs of vitamin C deficiency and gender was significantly associated ($p < 0.05$). (Table 8)

Protein energy malnutrition was observed in total 77 (8.9%) children. 31 (7.2%) were females and 46 (10.6%) were males. Many children have multiple signs of protein energy malnutrition. The signs of protein energy malnutrition and gender was significantly associated ($p < 0.001$). Thin and sparse hair was more common in girls and lack of lustre of hair was more common in boys. (Table 9)

Essential fatty acid deficiency in the form of phrynodema was observed in total 123 (14.2%) children and almost equal distribution was observed in females (62, 14.3%) and males (61, 14.1%). Prevalence of essential fatty acid deficiency and gender was not significantly associated ($p > 0.05$). (Table 10)

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)
Total	433 (49.9)	434 (50.1)	867 (100)

Figures given in parentheses are percentages

Table-2: Nutritional status of girls according to their age groups

Age groups (years)	Normal	Grade-I	Grade-II	Grade-III	Total
5-9	22	1	0	0	23
10-14	261	4	1	5	271
15-19	132	6	1	0	139
Total	415 (95.8)	11 (2.5)	2 (0.5)	5 (1.2)	433

Figures given in parentheses are percentages

Table-3: Nutritional status of boys according to their age groups

Age groups (years)	Normal	Grade-I	Grade-II	Total
5-9	21	3	1	25
10-14	208	19	5	232
15-19	161	8	8	177
Total	390 (89.9)	30 (6.9)	14 (3.2)	434 (100)

Figures given in parentheses are percentages; χ^2 : 11.91; DF: 2; p=0.0026

Table-4: Gender wise nutritional status of 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)
Total	433 (100)	434 (100)	867 (100)

Figures given in parentheses are percentages

Table-5: Gender wise distribution of children according to their morbid conditions

Morbid Conditions	Gender		Total (867)
	Female (433)	Male (434)	
Wax in ears	402 (92.8)	414 (95.4)	816 (94.1)
Cough and cold	29 (6.7)	36 (8.3)	65 (7.5)
Headache	17 (3.9)	16 (3.7)	33 (3.8)
Pus draining from ear	22 (5.1)	9 (2.1)	31 (3.6)
Fever	14 (3.2)	14 (3.2)	28 (3.2)
Mild enlarged liver	0 (0.0)	15 (3.5)	15 (1.7)
Enlarged Lymphnodes	5 (1.2)	8 (1.8)	13 (1.5)
Tonsillitis	5 (1.2)	2 (0.5)	7 (0.8)

Figures given in parentheses are percentages

Table-6: Vitamin A deficiency

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Conjunctival xerosis	21 (4.8)	27 (6.2)	48 (5.5)
Night blindness	5 (1.2)	4 (0.9)	9 (1.0)
Total conditions	26	31	57

Figures given in parentheses are percentages; Females: 6.0%; Males: 6.5%; p>0.05

Table-7: Vitamin B complex deficiency

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Nasolabial dyssebacea	4 (0.9)	3 (0.7)	7 (0.8)
Angular stomatitis	11 (2.5)	28 (6.5)	39 (4.5)
Cheilosis	38 (8.8)	46 (10.6)	84 (9.7)
Red and raw tongue	7 (1.6)	7 (1.6)	14 (1.6)
Geographic tongue	4 (0.9)	21 (4.8)	25 (2.9)
Pellagrous dermatosis	19 (4.4)	13 (3.0)	32 (3.7)
Total conditions	83	118	201

Figures given in parentheses are percentages

Table-8: Vitamin C deficiency

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Spongy bleeding gums	30 (6.9)	33 (7.6)	63 (7.3)
petechiae	18 (4.2)	7 (1.6)	25 (2.9)
Total conditions	48	40	88

Figures given in parentheses are percentages; χ^2 : 4.291; DF: 1; p=0.038

Table-9: Protein Energy Malnutrition

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Flag sign on hair	4 (0.9)	7 (1.6)	11 (1.3)
Lack of lustre of hair	14 (3.2)	40 (9.2)	54 (6.2)
Thin and sparse hair	29 (6.7)	8 (1.8)	37 (4.3)
Total conditions	47	55	102

Figures given in parentheses are percentages; χ^2 : 24.781; DF: 2; p<0.001

Table-10: Essential fatty acid deficiency

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Phrynoderma	62 (14.3)	61 (14.1)	123 (14.2)
Total conditions	62	61	123

Figures given in parentheses are percentages

Table-11: Iron deficiency

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Pallor of tongue	174 (40.2)	144 (33.2)	318 (36.7)
Pallor of conjunctiva	172 (39.7)	133 (30.6)	305 (35.2)
Pallor of nail	173 (40.0)	154 (35.5)	327 (37.7)
Koilonychia	1 (0.2)	2 (0.5)	3 (0.3)
Total conditions	520	433	953

Figures given in parentheses are percentages

Table-12: Fluorine deficit and/ or excess

Signs	Gender		Total (867)
	Female (433)	Male (434)	
Dental caries	93 (21.5)	96 (22.1)	189 (21.8)
Mottled enamel	192 (44.3)	229 (52.8)	421 (48.6)
Total conditions	285	325	610

Figures given in parentheses are percentages; χ^2 : 0.54; DF: 1; p=0.46

Table-13: Gender wise distribution of children according to their vision

Visual Impairment & Category	Gender		Total
	Female	Male	
Category 0: Mild or no visual impairment	365 (84.3)	390 (89.9)	755 (87.1)
Category 1: Moderate visual impairment	61 (14.1)	40 (9.2)	101 (11.6)
Category 2: Severe visual impairment	6 (1.4)	3 (0.7)	9 (1.0)
Category 3: Blindness	1 (0.2)	1 (0.2)	2 (0.2)
Total	433 (100)	434 (100)	867 (100)

Figures given in parentheses are percentages; χ^2 : 5.97; DF: 1; p=0.014

The prevalence of anaemia in children in present study was 42 % (364 children). The prevalence of anaemia in female (202, 46.7%) was significantly higher than males(162, 37.3%). Possible reasons for IDA include poor consumption of DGLV, increased demand during adolescence and menstrual loss. (Table 11)

Out of total 610 (70.4%) children with dental conditions, 285 (65.8%) were females and 325 (74.9%) were males. Fluorine deficiency characterised by dental caries, was

observed in 189 (21.8%) children. Mottling of enamel was observed in 421 (48.6%) children, of which 18.6 % may be due to tobacco addiction. Rest can be attributed to fluorosis. The signs fluorine deficit and/or excess and gender was not significantly associated (Table 12)

Moderate to severe visual impairment and blindness was 15.7% in girls and 10.1% in boys respectively and the gender difference was statistically significant. Though 112 (12.8%) children had moderate visual impairment to blindness only 15 (1.7%) children were wearing spectacles. (Table 13)

Discussion

In Srinivasan K et al 61.4% children were in the age group of 10-14 years, 84.3% children had one or more morbid conditions, 29.9% children had skin disorders, prevalence of anaemia in children was 79.6, dental caries was present in 23.5% children, and 4.4% children had defective vision.^[4] In Panda P et al 59.5% are boys and 40.5% are girls, prevalence of anaemia in boys was 22.9% and in girls was 30.5%, 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, 5.6% children had refractive errors, dental caries was detected in 23.1% of children.^[5] In Soumya Deb et al 40.8 % boys and 25.93% girls were underweight, 76% of boys and 74% of girls were suffering from one or more morbidities, prevalence of anaemia in boys was 55.34% and in girls was 51.85%.^[6] In Osei A et al 60.9% children were underweight in primary school age group, 36.7% children were found anaemic in primary school age group.^[7] In Dongre A R et al wax in ears was present in 10.3% of children, dental caries was detected in 8.3% of children.^[8] In Chandna S. et al children had night blindness in 35.9%, xerosis conjunctiva in 9.2%, Bitot's spots in 14.2%, nasolabial dyssebacea in 6.8%, angular stomatitis in 6.8%, cheilosis in 8.7% red and raw tongue in 1.6%, pellagrous dermatosis in 13.3%, bleeding gums in 15.2%, ecchymoses in 6.1%, lack of lustre of hair in 26.5%, thinness and sparseness of hair in 24.3%, prevalence of anaemia in children was 34%, 15.9% children had phrynoderma.^[9] In Rema N et al prevalence of anaemia in boys was 44.08% and in girls was 52.21%, prevalence

of vitamin A deficiency in boys was 5.65% and in girls was 8.64%.^[10] As per DLHS (2002-2004), prevalence of anaemia in adolescent girls is 72.6%.¹¹ In India 6-7% children aged 10-14 years have problem with their eye sight.^[11]

Conclusion

The available data show a high prevalence of anemia among children. Micronutrient deficiencies are also present among these children. There is definitely a need for well-planned, large-scale studies using standardized methodologies to estimate the prevalence of iron deficiency, anemia and other micronutrient deficiencies. When planning these studies it is necessary to ensure that importance is given to accurate evaluation of socio economic status and representation of the different regions of India. A comprehensive study including anthropometric data, biochemical data, clinical signs and dietary intake data among the same group of children will give a better insight into the situation.

References

1. Rama B. Introduction. In: School Health Services In India. 1st edition. New Delhi: Sage Publications; 2008. p. 6-7.
2. Prasad KR. School Health. Indian Journal of Community Medicine 2005;30:109-10.
3. Manohar U. Boarding School: Effect on Children. Available from: URL: <http://www.buzzle.com/articles/boardingschool-effect-on-children.html>
4. Srinivasan K, Prabhu GR. A Study of The Morbidity Status of Children In Social Welfare Hostels In Tirupati Town. Indian Journal of Community Medicine 2006-07;31:51-6.
5. Panda P, Benjamin AI, Shavinder Singh, Zacharia P. Health Status of School Children in Ludhiana city. Indian Journal of Community Medicine 2000;4:150-5.
6. Deb S, Dutta S, Dasgupta A, Misra R. Relationship of Personal Hygiene with Nutrition and Morbidity Profile: A Study Among Primary School Children in South Kolkata. Indian J Community Med 2010;35:280-4.
7. Osei A, Houser R, Bulusu S, Joshi T, Hamer D. Nutritional Status of Primary School Children in Garhwali Himalayan villages of India. Food Nutr Bull 2010;31:221-33.
8. Dongre AR, Deshmukh PR, Garg BS. The Impact of School Health Education Programme on Personal Hygiene and Related Morbidities in Tribal School Children on Wardha District. Indian Journal of Community Medicine 2006;31:81-2.
9. Chandna S, Sehgal S. Prevalence of Deficiency Diseases among School Children. Health arid Population-Perspective and Issues 1994;17:108-13.
10. Rema N, Vasanthamani G. Prevalence of nutrition and lifestyle disorders among school going children in urban and rural areas of Coimbatore in Tamil Nadu. Indian Journal of Science and Technology 2011;4:131-40.
11. Park K. Park's Textbook of Preventive and Social Medicine. 21st edition, Jabalpur, India: Banarsidas Bhanot; 2010.

Cite this article as: Thakor N, Shukla A, Bala DV, Vala M, Ninama R. Health status of children of primary and secondary boarding schools of Gandhinagar district. Int J Med Sci Public Health 2014;3:866-869.

Source of Support: Nil

Conflict of interest: None declared