

## Original article

### **Assessment of nutritional and health status of the school students of 5th to 9th standard (11 to 15 years age group) of Surendranagar district, Gujarat state, India.**

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#### **Abstract**

**Background:** School health has been acknowledged as important since the beginning of 20<sup>th</sup> century. Malnutrition is a cause of poor cognitive performance and physical growth in children<sup>3</sup>. This study was undertaken to find out nutritional and health status of school children of Surendranagar district.

**Method:** A cross sectional study conducted in both private and government schools selected by simple random sampling. Each class had an enrolment of 50 students and all the students were examined. Pre - tested questionnaire was used to collect information regarding age, height, weight and nutritional assessment for morbidities in a standardized way.

**Results:** Among 366 boys and 134 girls of the study population, Mean Body Mass Index ( BMI) for boys and girls were  $16.55 \pm 2.58$  and  $16.75 \pm 5.44$  respectively. BMI was more in the private school as compared to the government school and Mid Upper Arm Circumference (MUAC) was also more in the private as compared to Government school. About 59.2% of children showed morbidities of various types related to nutrition.

**Conclusion:** The study revealed 59.2% morbidity in the school children related to nutritional problems. BMI and MUAC were also lower than their reference value for that particular age group. In spite of various National Health programs for betterment of health of children, it is discouraging to note that there is a wide health gap in the health status which needs further exploration.

**Keywords:** MUAC, BMI, Morbidities, Refractory errors.

#### **Introduction:**

Malnutrition denotes impairment of health arising either from deficiency or excess or imbalance of nutrients in the body<sup>[2]</sup>. Adolescents represent around 20% of the

global world's population and around 84% of them are found in developing countries<sup>3</sup>. Inadequate nutrition in adolescence can put them at high risk of chronic diseases particularly if combined with other adverse lifestyle behaviors<sup>4</sup>. The objectives for the present study are to study the overall nutritional and health status of the students of 11 to 15 years age group studying in Surendranagar, to make comparison of the results of students from government and private schools, to determine a tool that will be easier and more appropriate for screening of adolescent malnutrition because assessment of nutritional status by middle upper arm circumference (MUAC) was easier, more convenient requiring less expertise than assessment with BMI<sup>5</sup>

#### **Materials and methods :**

Type of a study was a cross – sectional study. All schools were registered first and from the list one school from private and one school from government selected as a study school by simple random sampling method. School children of a government and a private school (5th to 9th standards) of Surendranagar as a study population. After taking prior permission from principal of the school, interview dates of study were fixed.

#### **Techniques and tools :**

All the students thus registered were subjected to measurement of height, weight, mid arm circumference and clinical examinations. School record was used for getting reasonable accuracy in age assessment. A pre-designed and pre-tested performa was used for data collection. Middle upper arm circumference was measured in centimeter with a non-stretched measuring tape with the right arm hanging relaxed. The measurement was taken midway between the tip of acromian and olecranon process. The tape was placed gently but firmly round the arm to avoid compression of soft tissue.

**Results :**

**Table – 1: BMI (Mean ± SD) of the study population according to the age group and its comparison with their reference values. (n=500).**

Sr. No.	Age in years	Frequency (%)	BMI (MEAN ± SD)	Reference value ±	Difference of MEAN BMI	P value
1.	11	74 (14.8)	15.64 ± 2.15	20.5 ± 6.78	4.86	0.0012
2.	12	145 (29)	16.30 ± 2.65	21.0 ± 7.29	4.7	0.0003
3.	13	109 (21.8)	16.85 ± 2.90	21.8 ± 6.74	4.15	0.0041
4.	14	83 (16.6)	16.58 ± 2.14	22.0 ± 8.22	5.42	0.0019
5.	15	89 (17.8)	17.63 ± 6.35	23.2 ± 5.91	5.57	0.0013

Statistically significant p value <0.001 at 5 % Significance level.

Table – 1 shows BMI results of the study population is comparatively lower for all the age groups with their reference value according to National Health and Nutritional Survey 2003-06 conducted by CDC, National Center for Health Statistics<sup>4</sup> suggestive of malnutrition for all the age group.

**Table – 2 : MUAC (MEAN ± SD) of the study population according to their age and its comparison with their reference value (n=500).**

Sr. No.	Age in years	Frequency (%)	MUAC (MEAN ± SD)	Reference value ±	Difference of Mean MUAC	P value
1.	11	74 (14.8)	19.13 ± 4.58	24.6 ± 6.82	5.47	0.005
2.	12	145 (29)	20.96 ± 3.00	25.4 ± 6.91	4.44	0.0132
3.	13	109 (21.8)	21.67 ± 2.69	26.8 ± 6.38	5.13	0.0076
4.	14	83 (16.6)	21.48 ± 2.09	27.7 ± 6.41	6.22	0.0013
5.	15	89 (17.8)	22.36 ± 2.90	29.3 ± 5.39	6.94	0.005

Statistically significant p value <0.001 at 5 % Significance level.

Study result shows that MUAC (MEAN±SD) is also lower with their reference value<sup>4</sup>

for all the age groups suggestive of malnutrition.

**Table-3 : BMI (MEAN ± SD) of students of private and government school (n=500).**

Sr. No.	Age in years	Private school BMI (MEAN ± SD)	No (%)	Government school BMI (MEAN ± SD)	No (%)	P value
1.	11	16.32 ± 2.4	24 (9.6)	15.31 ± 1.96	50 (20)	0.005
2.	12	16.16 ± 2.04	102 (40.8)	16.61 ± 2.19	43 (17.2)	0.0132
3.	13	17.18 ± 2.46	50 (20)	16.58 ± 3.22	59 (23.6)	0.0076
4.	14	16.94 ± 2.09	32 (12.8)	16.34 ± 2.16	51 (20.4)	0.0013
5.	15	18.15 ± 2.82	42(16.8)	17.17 ± 2.74	47 (18.8)	0.005

Using Z test Statistically significant at 5% Significance level

Study results shows that there is significant difference between Mean BMI values of private and government schools. Children of Private schools were better nourished compared to students of Govt. school.

**Table-4: Findings of clinical examination of both private and government schools (n=500).**

Findings	Private school students No (%)	Government school students No (%)	Total No (%)
Hair – lack of luster and Face – diffuse pigmentation	12 (4.8)	20 (8)	32 (6.4)
Face – diffuse pigmentation and Eyes – pale conjunctiva	15 (6)	25 (10)	40 (8)
Teeth – caries and discoloration	14 (5.6)	30 (12)	44 (8.8)
Pale conjunctiva and Teeth pathology	25 (10)	35 (14)	60 (12)
Face, eyes and teeth morbidity	8 (3.2)	12 (4.8)	20 (4)
Thyroid enlargement	-	1 (0.2)	1 (0.002)
Worm infestations	25 (10)	41 (16.4)	66 (13.2)
Refractory errors	70 (28)	115 (42)	185 (37)

\*Study result shows that most common morbidity found among the students was refractory errors (37%).

\*Pale conjunctiva was found in (25%) students.

\*There was one student who showed thyroid enlargement but was not symptomatic probably a pubertal enlargement in girls; how ever she was advised to be checked up and was referred to a physician.

**Fig.1.Association of education of mother with their child nutritional status**

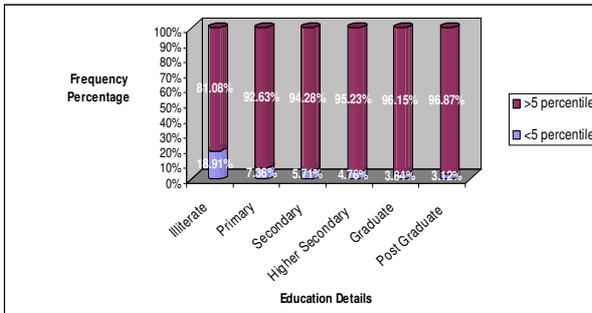


Figure 1 shows that as the education of mother improved, the nutritional status of the child improves and the number of undernourished children decreases.

Chi-square test 21.38 df 5 p value 0.05.

**Discussion :**

A similar study was carried out in the service area of urban health center, Chetla<sup>5</sup>, Kolkatta; which showed similar results in which mean values of BMI and MUAC were found to be lower compared to their reference values.

Another study carried out in Chetla<sup>7</sup>, among primary school children to find out the nutritional status and various morbidity profile, the commonest morbidity was clinical pallor (28%) which is almost similar to this study(25%). Worm infestation was 13.2% in our study. It was lower compared to a study conducted in Chetla<sup>7</sup> ( 39.81%). However, in the study in Dhotra<sup>[8]</sup> it was (17.8%) which was more or less similar to our study.

Morbidities and under nutrition were significantly higher among the study population. .Both Mean values of BMI and MUAC significantly shows lower values in comparison with their reference values. Literacy status of mother also plays an important role in the nutritional status of the child. Majority of health problems affecting the school children are preventable by promotion of hygienic practices through proper health education by the teachers who are the first contacts. Education of mother

also plays a great role in improvement of nutritional status of the children, which is evident from this study hence encouragement of educating girl children and prevent their school drop outs can help in alleviating the nutritional problems of children. MUAC and BMI are two important tools to measure the nutritional status of children

Most of the studies are based on BMI. MUAC also showed similar results compared to BMI in our study. Hence, it may be mentioned that MUAC can also be used as a tool for measuring malnutrition in children which is an easier method compared to BMI where measuring BMI requires a height board, weighing scales and mathematical calculations. On the other hand assessment by MUAC is easy, feasible and does not required a weighing machine carrying which sometimes becomes quite tiring especially when house to house survey is done.

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