



# NUTRITIONAL ASSESSMENT OF PRIVATE PRIMARY SCHOOL CHILDREN IN WESTERN MAHARASHTRA: A CROSS-SECTIONAL STUDY

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**Financial Support:** None declared  
**Conflict of interest:** None declared  
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## How to cite this article:

Ganganahalli P, Tondare MB, Durgawale PM. Nutritional Assessment of Private Primary School Children in Western Maharashtra: A Cross-sectional Study. *Ntl J Community Med* 2016; 7(2):97-100.

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**Date of Submission:** 13-11-15

**Date of Acceptance:** 22-02-16

**Date of Publication:** 29-02-16

## ABSTRACT

**Introduction:** Malnutrition denotes impairment of health arising either from deficiency or excess or imbalance of nutrients in the body. Anthropometry has become a practical tool for evaluating the nutritional status of populations, particularly of children and nutritional status is the best indicator of the global well-being of children.

**Method:** Cross-sectional study was conducted among private primary school children from class I to V were assessed for nutritional status, personal hygiene measures and their mothers regarding knowledge about nutritious foods.

**Results:** study showed that 19.9% of private school children were undernourished, 8% were grade I short/stunted whereas 10.2% were overweight and 5.7% obese. Majority mother's knowledge about nutritious foods was good.

**Conclusion:** Each and every child is a victim for dual burden of Malnutrition irrespective of socio-economic status, maternal good knowledge about nutritious food & there is need to be attended equally.

**Keywords:** Anthropometry, Malnutrition, Obesity, School children

## INTRODUCTION

Malnutrition denotes impairment of health arising either from deficiency or excess or imbalance of nutrients in the body.<sup>1</sup> Anthropometry has become a practical tool for evaluating the nutritional status of populations, particularly of children in developing countries and nutritional status is the best indicator of the global well-being of children.<sup>2</sup>

One of the major global health problem faced by the developing countries is malnutrition. In developing countries, it is postulated that poverty and ignorance are primary casual factors of malnutrition.<sup>2</sup>

Despite the economic growth observed in developing countries, undernutrition is still highly prevalent. Concurrently, a growing prevalence of obesity and its related chronic diseases is being observed in these countries. Increasing obesity is already a major concern in developed countries for pre-school children as well as schoolchildren.<sup>3</sup>

School age is the active growing phase of childhood. Primary school age is a dynamic period of physical growth as well as of mental development of the child.<sup>4</sup> Mothers' knowledge of child nutrition would

have a significant effect on their children's nutritional status. However, there are conflicting study results on this. Whereas some studies have reported that maternal nutritional knowledge is positively associated with the nutritional status of children, others have also shown that adequate knowledge *per se* is not always translated into appropriate actions.<sup>5</sup>

Children of private schools who belonged to high socioeconomic class were better nourished compared to Government school students who belonged to low socioeconomic class. Studies have showed that being financially sound may allow the children to indulge in practice of eating calorie dense fast foods and a lifestyle involving less of physical activity and more in-door activities.<sup>6</sup>

The study was organized to know the overall nutritional status of the children of private primary school & to correlate it with awareness of mothers regarding nutritious food.

**MATERIAL & METHODS**

A Cross-sectional study was conducted in the Krishna English Medium School - a Private school among the children of class 1 to class 5 during the month of Jan-Feb 2014. The school selection was purposive considering feasibility and supportive response from the school authority. Approval of the Institutional Ethical Committee, informed consent of mothers and permission from school Principal to conduct the study in school was taken.

A proforma containing Information about the child regarding basic particulars like age, sex, anthropometry of child like height, weight, general physical & systemic examination was given to mothers of respective students on the day of parents meeting in the school after explaining them the purpose of study & then mother were asked to fill the remaining proforma regarding daily pattern of diet, hygiene practices, physical exercise and also about maternal education, maternal occupation, total income of the family members, maternal knowledge about the common nutritional foods.

Anthropometry of children were measured and interpreted as follows,

**Weight:** weight was measured accurately using a digital scale. The scale was placed on firm flooring, the child without shoes and heavy clothing stand with both feet in the center of the scale and the weight was recorded to the nearest decimal fraction of 0.1kg.<sup>7,8</sup>

**Height:** height was measured accurately by making child to remove shoes, bulky clothing, and hair ornaments interfere with the measurement on flooring against a flat surface. The child was made to

stand with feet flat together against the wall with legs straight, arms at sides, and shoulders at level. Mark was made where the bottom of the head piece meets the wall. Then by using a metal tape height was measured from the base on the floor to the wall to the nearest 0.1 centimeter.<sup>7,8</sup>

**Body Mass Index (BMI):** BMI is primarily used to assess obesity. The formula to calculate BMI is Weight (kg)/Height (meters)<sup>2</sup>. BMI >85<sup>th</sup> centile to <95<sup>th</sup> centile was taken as Overweight whereas BMI at or >95<sup>th</sup> centile for age as Obesity.<sup>9,10</sup>

**Weight-for-age:** according to Indian Academic of Paediatrics (IAP) classification<sup>9,10</sup>

- Normal - >80%
- Grade I - 71-80%
- Grade II - 61 - 70%
- Grade III - 51 - 60%
- Grade IV - ≤50%

**Height-for-age:** as per Waterlow's classification<sup>10</sup>

- Normal - >95%
- First degree stunting/short - 90 to 95%
- Second degree stunting - 85 - 90%
- Third degree stunting/dwarf <85%-gradeIII short

Data was entered in excel sheet & systematically analyzed.

**RESULTS**

Total 176 students from five classes were enrolled for the study. Out of them 64.3% were male & 35.7% female. Table 1 shows the class wise, gender wise distribution of students and also mean age for all classes.

**Table 1: Frequency distribution of students according to class & gender**

Class	Male (%)	Female (%)	Total (%)	Age in yrs		
				Min.	Max.	Mean±S.D
I	22 (78.6)	06 (21.4)	28 (15.9)	6	7	6.4 ± 0.57
II	16 (66.7)	08 (33.3)	24 (13.6)	7	8	7.4 ± 0.50
III	27 (65.9)	14 (34.1)	41 (23.3)	8	9	8.2 ± 0.46
IV	23 (59)	16 (41)	39 (22.2)	9	11	9.9 ± 0.64
V	25 (56.8)	19 (43.2)	44 (25.0)	10	12	10.9±0.64
<b>Total</b>	<b>113(64.3)</b>	<b>63 (35.7)</b>	<b>176(100)</b>	<b>6</b>	<b>12</b>	<b>8.8 ± 1.70</b>

Table 2 showed majorities of the mothers were having higher education (>50%), are nonworking (housewives 72%) & belong to family with total income of Rs. 10,000 (79%).

According to table 3, majority of children were drinking milk daily minimum one time, brushing twice daily, play outdoor more than 1hour, wash hand after toilet, after playing & before eating. As it shows on one side maximum of them were following good life practices but the same time on other

side maximum of them were found eating junk foods daily.

**Table 2: Distribution of mothers according to education, Occupation & total income of family**

Variables	Frequency (n=176) (%)
<b>Maternal education</b>	
Primary	05 (2.80)
Secondary	19 (10.80)
Higher secondary	47 (26.70)
Graduate	88 (50)
Postgraduate	17 (9.70)
<b>Maternal occupation</b>	
Housewife	128 (72.70)
Working	48 (27.30)
<b>Total income of the family</b>	
< Rs.10,000=00	37 (21)
Rs. 10,000 to 20,000	46 (26)
Rs. 20,000 to 30,000	37 (21)
Rs. 30,000 to 40,000	26 (15)
>Rs. 40,000	30 (17)

**Table 3: Distribution of children according to hygiene practices, dietary pattern & physical exercise**

Practices	Yes (%)	No (%)
Daily milk drinking	106 (60)	70 (40)
Eating junk food daily	99 (56)	77 (44)
Outdoor physical activity >1hr	123 (70)	53 (30)
Brushing teeth's twice daily	108 (61)	68 (39)
Hand washing after toilet	176 (100)	00 (00)
Hand washing after playing	172 (98)	04 (02)
Hand washing before eating	172 (98)	04 (02)

General physical examination of children's shows 4% were having pallor and 15% dental caries.

Total five questions were given to mothers regarding common nutritious foods and their responses were shown in table 4, according to it nearly 2/3<sup>rd</sup> of mothers were found aware about nutritious contents of certain common foods used by them for children's regularly.

**Table 6: comparison between maternal knowledge about nutritious foods and nutritional status of children**

Questions	Q1		Q2		Q3		Q4		Q5		Total
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
<b>Correct Answers Frequency</b>	<b>104</b>	<b>72</b>	<b>140</b>	<b>36</b>	<b>117</b>	<b>59</b>	<b>127</b>	<b>49</b>	<b>123</b>	<b>53</b>	<b>176</b>
<b>IAP classification</b>											
Normal	82	59	112	29	94	47	97	44	96	45	141
Undernourished	22	13	28	07	23	12	30	05	27	08	35
X <sup>2</sup> value (p-value)	0.09 (0.75)		0.0055 (0.94)		0.011 (0.91)		3.19 (0.07)		0.705 (0.40)		-
<b>Waterlow's classification</b>											
Normal	94	68	129	33	109	53	117	45	113	49	162
Stunting	10	04	11	03	08	06	10	04	10	04	14
X <sup>2</sup> value (p-value)	0.48 (0.48)		0.008 (0.92)		0.226 (0.63)		0.004 (0.94)		0.017 (0.89)		-
<b>BMI percentile</b>											
Normal	89	59	118	30	94	54	106	42	106	42	148
Overweight	08	10	12	06	14	04	14	04	09	09	18
Obesity	07	03	10	00	09	01	07	03	08	02	10
X <sup>2</sup> value (p-value)	4.79 (0.09)		4.40 (0.11)		4.09 (0.12)		0.32 (0.84)		4.08 (0.13)		-

**Table 4: Percentage distribution of mother's responses to knowledge about nutrition**

Questions <sup>11</sup>	Correct An- swers <sup>10</sup>	Correct Ans (%)	Wrong Ans(%)
Green leafy vegetables are rich in	B-comp.	104(59.1)	72(40.9)
Milk is rich in	Calcium	140(79.5)	36(20.5)
Exposure to sunlight provides which vitamin	Vit-D	117(66.5)	59(33.5)
Carrots are rich in	Vit-A	127(72.2)	49(51)
Pulses are rich in	Protein	123(69.9)	53(47)

B-comp.=Vitamin B complex; Vit=Vitamin

**Table 5: Classification of malnutrition among children**

Grade	Frequency (%)
<b>Weight for age (IAP)</b>	
Normal >80%	141 (80.1)
Grade I under nutrition (71-80%)	23 (13.1)
Grade II under nutrition (61-70%)	12 (6.8)
<b>Height for age (Waterlows)</b>	
Grade I short or stunting (90-95%)	14 (08)
Normal >95%	162 (92)
<b>BMI percentile</b>	
Normal <85% <sup>11e</sup>	148 (84.1)
Overweight >85% <sup>11e</sup>	18 (10.2)
Obesity >95% <sup>11e</sup>	10 (5.7)

The following table 5 shows mean values of weight, height & BMI percentile of children class wise, which shows increasing values with increase in grade of classes. Whereas Weight for age calculation shows 19.9% children as undernourished according to India Academy of Pediatrics (IAP) classification, Height for age calculation shows 8% as stunted (Waterlow's classification) and BMI percentile shows 10.2% as overweight & 5.7% as obese.

Mothers of maximum proportion of children with normal nutritional status have good knowledge about nutritious foods compared to mothers of malnourished children. But According to table 6, there was no significant difference found between proportions of maternal knowledge about nutritious foods & Malnutrition among children.

## DISCUSSION

Present study showed that 19.9% of private school children were undernourished, 8% were grade-I short/stunted whereas 10.2% were overweight and 5.7% obese.

Thekdi K et al<sup>1</sup> studied nutritional assessment among government & private school children in Gujarat showed 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.

Babar NF et al<sup>12</sup> studied nutritional status among children from upper & lower socio-economic class which showed only 16 (19.28%) were under-nourished, and 20 (24.10 %) were at risk of being overweight, and 10 (12.5%) were obese among Upper SE class whereas in children from lower SE class, 32 (41.03%) were underweight and 2 (2.56%) were at risk of being overweight, only 3 (3.84%) were obese.

Shrihari G et al<sup>13</sup> reviewed 11 research literatures and reported that Overweight and obesity were prevalent among 8.5-29.0% and 1.5-7.4% respectively among school children.

Pandey S et al<sup>14</sup> conducted a cross-sectional study which shows that the prevalence of childhood and adolescent overweight and obesity amongst children from a upper-socio-economic stratum of society has remained high at 25-30% during both the periods of the school-based study.

Jain G et al<sup>15</sup> found that the magnitude of overweight (23.8%) and obesity (8.4%) is very high and alarming for both the sex. eating habits like junk food, chocolate, eating in front of TV etc remarkable effect on prevalence on overweight and obesity among low to high SES group. The study also suggested that under nutrition rates remain high (10.2%) in children.

## CONCLUSION

Private schools, which are usually habited by upper socio-economic status children, are found undernourished and also equally over nourished. Maternal knowledge about nutritious foods is good but it

should be translated in to proper action to overcome the dual burden of malnutrition. Each and every child is a victim for dual burden of Malnutrition irrespective of socio-economic status, maternal good knowledge about nutritious food & there is need to be attended equally.

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