

## **Dietary and physical activity patterns of school children in an urban area of Sri Lanka.**

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(Key words: physical activity, tuition, obesity, overweight, thinness)

### **Abstract**

**Objective** To provide information on nutritional status and dietary and physical activity pattern of 8-12 year old school children in an urban area of Sri Lanka.

**Method** Seven schools in Colombo were randomly selected. These schools showed a fair representation of children of all social levels. Students of years 4, 5, 6 and 7 were included. 50 students from each grade of each school were randomly selected and recruited into study. The purpose of study was explained to the students and any withdrawals allowed. Medical officers performed the anthropometric measurements. Height was measured using a stadiometer and weight using an electronic weighing scale. Medical assessment was done in all children who participated in study. To define obesity and overweight, sex and age specific body mass index (BMI) cutoffs recommended by International Obesity Task Force were used. Age and sex specific BMI 5th percentile from revised NCHS (2000) growth charts were used to define thinness. Information regarding physical activity, behaviour, feeding practices and socioeconomic factors were obtained using a pre-tested questionnaire filled by parent/guardian. Data was analyzed using Epi Info 2000 (CDC, USA) software.

**Results** One thousand two hundred and sixty six children were recruited to the study. Data of 1224 subjects were used in the anthropometric analysis, while 1102 data sets were used in analysis of dietary and physical activity. Of the latter group 44% were boys. The children belonged to 3 types of schools

based on type of administration. About 12% each were from ages 8 and 12; the rest were almost equally distributed among the other 3 age categories. More than 80% of mothers had a level of education above GCE (O/L). 60.8% watched television for 1-2 hours each day during weekdays and 39.5% watched television for 3-4 hours during weekends. More than 50% engaged in daily physical activity for more than one hour during weekdays as well as weekends. 80.1% attended tuition classes. A similar distribution was seen in all age groups. Although consumption of vegetables was high, fruit consumption was not satisfactory. Majority had eggs or fish as their main source of protein. Prevalence of obesity and overweight increased with increase in family income and thinness was high among low socio-economic groups. Dental caries was the commonest health problem. Highest prevalence was among children from public non-national schools (48.7%), whilst public national and private schools had a prevalence of 10.5% and 11.8% respectively. Of the skin lesions commonest was scabies.

**Conclusion** The main factor that influenced the nutritional status and related behaviour was the socio-economic standard. Health programmes should be designed targeting these groups.

### **Introduction**

The lifestyle and diets of children are changing rapidly in response to social and cultural changes in society. Availability of fast food outlets, pre-prepared food and flavoured food and beverages have influenced feeding practices. Spending more time on viewing television, involvement in computer games and attending extra classes outside school hours have contributed to reduction in physical activity. These have led to an increase in prevalence of overweight and obesity. But this has not occurred uniformly in the entire society and malnutrition has not been controlled yet. This study was designed to assess the overall nutritional status and nutrition related

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behaviour patterns of 8 to 12 year old school children in an urban area of Sri Lanka. Assessment of nutritional status showed a significant prevalence of overweight and obesity despite the high level of underweight, stunting and thinness and results were discussed in another paper<sup>1</sup>. This clearly shows that, as in many other Asian countries, Sri Lanka is in a nutritional transition but facing a double burden of over and under nutrition at this moment of time.

### **Objective**

To provide information on nutritional status and dietary and physical activity patterns of 8-12 year old school children in an urban area of Sri Lanka.

### **Subjects and methods**

Seven schools situated in Colombo were randomly selected. These schools showed a fair representation of children of all social levels. Students of years 4, 5, 6 and 7 were included. 50 students from each grade of each school were randomly selected and recruited into the study. The purpose of study was explained to the students and any withdrawals allowed.

Medical officers performed the anthropometric measurements. Height was measured using a stadiometer. Weight was measured using an electronic weighing scale (Secca®, France) Medical assessment was done in all children who participated in study. To define obesity and overweight, sex and age specific body mass index (BMI) cutoffs recommended by International Obesity Task Force<sup>2</sup>

were used. Age and sex specific BMI 5th percentile from revised NCHS (2000) growth charts<sup>3</sup> were used to define thinness. Information regarding physical activity and behaviour, feeding practices and socioeconomic factors were obtained using a pre-tested questionnaire filled by parent/guardian. Data was analyzed using Epi Info 2000 (CDC, USA) software.

### **Results**

One thousand two hundred and sixty six children were recruited to the study. Data of 1224 subjects were used in the anthropometric analysis while 1102 data sets were used in analysis of dietary and physical activity, as the data of the remainder were not complete. Of the latter group 44% were boys.

Children belonged to 3 types of schools, private, public national and public non-national. 280 (25.4%) were from private schools, 494 (44.8%) from public national schools and 328 (29.8%) from public non-national schools.

Table 1 shows the characteristics of children that have been surveyed. First column shows data of the 1102 subjects used in analysis of dietary and physical activity while the second column shows data of the 1224 subjects used in the anthropometric analysis.

Table 1  
Characteristics of the population surveyed in this study

1	2	
<b>Sex</b>		
Boys	585 (44%)	588 (48%)
Girls	617 (56%)	636 (52%)
<b>Age</b>		
8	141 (12.8%)	160 (13.1%)
9	275 (25.0%)	305 (25.0%)
10	240 (21.8%)	271 (22.1%)
11	304 (27.6%)	317 (25.9%)
12	142 (12.8%)	171 (13.9%)
<b>Type of School</b>		
Public – National	494 (44.8%)	543 (44.3%)
Public – Non national	328 (29.8%)	332 (27.2%)
Private	280 (25.4%)	349 (28.5%)
<b>Number of children in the family</b>		
1	167 (15.1%)	
2	567 (51.5%)	
3	284 (25.8%)	
4	64 (5.8%)	
5	20 (1.8%)	
<b>Monthly family income in Rupees</b>		
<5,000	121 (11.0%)	
5,000 – 10,000	175 (15.9%)	
10,000 – 15,000	161 (14.6%)	
15,000 – 20,000	151 (13.7%)	
> 20,000	418 (37.9%)	
Not answered	76 (6.9%)	
<b>Maternal education</b>		
Up to year 6	13 (1.2%)	
Year 6 – 9	49 (4.4%)	
GCE O/L	312 (28.3%)	
GCE A/L	474 (43.0%)	
Tertiary (Diploma or Degree)	122 (11.1%)	
Not answered	132 (12.0%)	

1. Details of 1102 data sets used in the analysis of dietary and physical activity
2. Details of 1224 data sets used in the anthropometric analysis

Table 2 shows the age and sex distribution of children with the mean height, weight and BMI for each category.

**Table 2**  
**Mean height, weight and BMI of school children according to age and sex (data of 1224 subjects)**

Age (years)	Number	Height	Weight	BMI
		Mean ± SD	Mean ± SD	Mean ± SD
<b>Male</b>				
8	83	129.7 ± 6.72	26.9 ± 8.09	15.7 ± 3.92
9	135	133.8 ± 6.58	29.9 ± 7.47	16.5 ± 3.01
10	140	138.2 ± 7.64	32.3 ± 8.71	16.7 ± 3.20
11	142	142.2 ± 7.63	34.8 ± 9.42	17.1 ± 3.53
12	82	147.1 ± 8.80	39.1 ± 10.44	17.6 ± 3.43
<b>Female</b>				
8	77	127.9 ± 6.13	25.3 ± 6.76	15.3 ± 2.15
9	170	133.2 ± 6.57	28.4 ± 6.70	15.8 ± 2.86
10	131	138.4 ± 8.66	32.6 ± 8.39	16.5 ± 3.19
11	175	145.0 ± 8.20	37.9 ± 10.13	17.8 ± 3.86
12	83	150.8 ± 7.83	41.9 ± 11.10	18.3 ± 3.67

Table 3 shows the time spent by children watching television each day, during weekdays as well as weekends. During weekdays majority spend less than 2 hours (82%). During weekends children spend more time watching television each day. More than 48% spend more than 2 hours each day during the

weekends. Table 3 also shows the time spent on outdoor physical activity during weekdays and weekends. Neither watching television nor outdoor physical activity showed a correlation to obesity and overweight.

**Table 3.**  
**Time spent each day on watching television and on physical activity (data of 1102 subjects)**

Time spent (hours)	Watching Television		Physical activity (Outdoor)	
	Week day (%)	Week end (%)	Week day (%)	Week end (%)
None	24 (2.2)	33 (3.0)	168 (15.2)	218 (19.8)
< 1 hr	236 (21.4)	57 (5.1)	243 (22.1)	102 (9.2)
1 – 2 hrs	670 (60.8)	407 (36.9)	563 (51.1)	432 (39.2)
3 – 4 hrs	126 (11.5)	436 (39.5)	91 (8.3)	286 (26.0)
> 5 hrs	0	92 (8.3)	29 (2.6)	58 (5.3)
Don't know	9 (0.8)	17 (1.5)	8 (0.7)	6 (0.5)
Unanswered	37 (3.3)	60 (5.7)	0	0

80% of children attended tuition classes. Table 4 shows time spent by children of each category on tuition during weekdays and weekends. More than 50% of each category spent time on attending extra classes during weekdays as well as during weekends

and it is almost equally distributed among all age groups. The type of school did not influence attending these extra classes (data not shown).

**Table 4**  
Mean hours spent attending tuition classes per week during weekdays and weekends (data of 1102 subjects)

Age (yrs)	Total	Tuition during week days		Tuition during week ends	
		Number*(%)	Mean ± SD	Number*(%)	Mean ± SD
8	141	89 (63.1)	2.10 ± 2.51	77 (54.6)	1.46 ± 1.66
9	275	165 (65.7)	2.42 ± 2.75	137 (54.5)	1.73 ± 2.14
10	240	139 (63.0)	2.10 ± 2.46	130 (58.8)	2.10 ± 2.54
11	304	186 (68.4)	2.30 ± 2.53	174 (64.0)	2.30 ± 2.40
12	142	76 (65.0)	2.50 ± 2.98	69 (59.0)	1.90 ± 2.17

\*the total that attended tuition classes in each category

The 3 most favourite drinks were milk (32.6%), fruit juices (21.8%) and water (9.6%). The 3 most popular food items were rice (20.0%), chicken (7.0%) and fruits (6%). Table 5 gives the frequency of taking some selected food items. Eggs or fish were the commonest source of animal protein. The commonest

meat product used was chicken and its consumption showed a clear relation to family income. Consumption of fruits was not very satisfactory. Majority consumed a fruit at a frequency of less than 3 times a week.

**Table 5**  
Frequency of consumption of some selected food items (data of 1102 subjects)

	6-7 times/wk (%)	4-5 times/wk (%)	1-3 times /wk (%)	Occasionally§ (%)	Does not take (%)
Eggs	32 (2.9)	178 (16.1)	656 (59.5)	193 (17.5)	43 (4.0)
Fish	217 (19.7)	298 (27.0)	459 (41.6)	70 (6.3)	58 (5.4)
Chicken	26 (0.4)	131 (11.9)	554 (50.3)	290 (26.3)	101 (9.1)
Beef	8 (0.7)	12 (1.1)	83 (7.5)	61 (5.5)	937 (85.2)
Cheese	19 (1.7)	86 (7.8)	315 (28.6)	492 (44.6)	190 (17.3)
Pastries	16 (1.4)	61 (5.4)	374 (33.7)	380 (34.5)	271 (25.0)
Vegetables	1102 (100)	-	-	-	-
Fruits	430 (39.0)	308 (28.0)	264 (24.0)	59 (5.3)	41 (3.7)
Chocolate	65 (5.9)	128 (11.6)	383 (34.7)	435 (39.5)	91 (8.3)
Ice cream	26 (2.3)	70 (6.3)	368 (33.2)	528 (48.0)	110 (10.2)
Soft drinks	71 (6.4)	107 (9.7)	299 (27.1)	396 (35.9)	229 (20.9)
Pizza	0	8 (0.7)	124 (11.2)	382 (34.7)	588 (53.4)

§ frequency of once in 2 to 4 weeks

Table 6 shows the correlation between nutritional status and family income. Prevalence of obesity and overweight increased with increase of family income

whilst a high prevalence of thinness was seen among low-income groups.

**Table 6**  
**Nutritional status according to the family income(data of 1102 subjects)**

Family income Rupees per month	Number	Obesity (%)	Overweight (%)	Thinness (%)
<5,000	121	8 (6.6)	46 (38.0)	
5,000 – 10,000	175	0	13 (7.4)	42 (24.0)
10,000 – 15,000	161	4 (2.5)	15 (9.3)	48 (29.8)
15,000 – 20,000	151	3 (2.0)	24 (15.9)	33 (21.8)
>20,000	418	25 (5.9)	54 (12.9)	87 (20.8)
Not declared	76	3 (3.9)	10 (13.1)	12 (15.8)

Medical inspection showed that dental caries was the commonest health problem. Highest prevalence was among children from public non-national schools (48.7%), whilst public national and private schools had a prevalence of 10.5% and 11.8% respectively. Of the skin lesions commonest was scabies, and all cases were seen among children from public non-national schools (4.2%).

### Discussion

Methods adopted in obtaining information regarding dietary and physical activity patterns of the children was based on the ability of parents/guardians on recalling the facts as well as judgment on the part of parents/guardians about the kind of food and type and duration of physical activity performed. Mainly observing the trends based on qualitative data rather than drawing conclusions based on quantitative data would minimize the biases arising from errors of judgment and recording. Although the problem of under nutrition is not controlled we are saddled with the problem of over nutrition too. The nutrition transition occurring in the region with the socio-economic transformation has led to the double nutrition burden. With the increase of prevalence of overweight and obesity more related health problems such as diabetes mellitus, coronary heart disease and hypertension could be expected to be on the rise. Number of hours spent on watching television is not very high and it did not show any relation to obesity and overweight. Possible reason could be that our children do not have the habit of eating junk food

while watching television. Amount of time spent on physical activity is quite satisfactory.

A very high number of school children had been attending tuition classes even at a very young age of 8 to 12 years. Specially spending time on weekdays to attend these has deprived them of valuable time, which could have been spent on other recreational activities.

Health status of children was fairly satisfactory except for prevalence of dental caries. Prevalence was high among low socio-economic groups. Children attending private and public national schools came from more or less equal socio-economic groups and therefore most of the nutritional and behaviour indices were closely related whereas most children who attended public non-national schools were from low socio-economic classes and their health indices were mostly adversely affected.

### Conclusion

The main factor that influenced the nutritional status and related behaviour was the socio-economic standard. Health programmes should be designed targeting these groups.

## References

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