An Epidemiological Cross-Sectional Comparative Study of Nutritional Status between Government and Private Primary School Children of Meerut City, Uttar Pradesh

Shruti Sehgal[1], Rama Shankar[2], Jai Vir Singh[3], Tauseef Alvi[2], Sangeeta Jain[2]

Author's Affiliation:
[1]Assistant Professor; [2]PG Resident; [3]Professor and Head, Community Medicine, Muzaffarnagar Medical College, Muzaffarnagar

Correspondence:
Dr.Shruti Sehgal
ssehgaltbc@gmail.com

ABSTRACT

Background: School age recognized to be active growing phase of life. Study of ecology of malnutrition along with nutritional assessment is to map out the geographical distribution of malnutrition. The present study with regard to assessment of the nutritional status of children of both government and private primary schools of Meerut city was done.

Objectives: 1.To assess the malnutrition status in primary school of government & private school of Meerut city. 2 Comparison of malnutrition status between government and private primary schools of Meerut City.

Methodology: Between the period of May 2016-November 2016, a cross sectional study was conducted in one of the primary school of private and government schools. With the help of multistage stratified random sampling initially two separate strata of schools made (private and government). From enlisted schools one government and private school was selected randomly from each list.

Results: The prevalence of underweight, and overweight among private school children of Meerut city was 138 (19.4%) and 152 (21.6%) and of government primary school of Meerut city was 140 (28%) and 96 (19%) respectively. Children of both school on vegetarian diet showed more prevalence of underweight (32.4% and 23.2%) than on mixed diet and this was significant.

Key words: BMI, Quetelet Index, Under nutrition

INTRODUCTION

School age is well recognized to be the most active growing phase of life.[1] Primary school age is an active period of physical growth as well as of mental development of the child. Research discloses that health problems due to wretched nutritional status in primary school-age children are among the most usual causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance.[1] The present scenario of health and nutritional status of the school-age children in India is very unsatisfactory.[1] National Family Health Survey 4 national level factsheet reflects slight reduction of underweight children under 5 years of age to 35.7% from 42.5% (NFHS 3).[2] Malnutrition implies to both extremes, under-nutrition on one side and over-nutrition on the other, causes a great deal of physical and emotional suffering and it is a violation of a child's human rights. They both increase the vulnerability of a child to a variety of diseases in later life.[3] Health of children is of paramount importance as rapid growth occurs during this period. Good nutrition is a straightforward requirement for good health and a living organism is a product of nutrition. [4]

It is evident that, anthropometry is the most precious tool for doing nutritional assessment. The indicators commonly in use are weight for age,

height for age, weight for height, Quetelet Index, Broca Index, Mid Upper Arm Circumference etc.

Study of ecological of malnutrition along with nutritional assessment is to map out the geographical distribution of malnutrition, Henceforth the present study with regard to assessment of the nutritional status of children of both government and private primary schools of Meerut city was done.

OBJECTIVES

The present study was done with the objective to assess and compare the malnutrition status between government and private primary schools of Meerut City

MATERIAL AND METHODS

Between the period of May 2016-November 2016, a cross sectional study was conducted in the primary school children of private and government schools.District Education Officer of Meerut was contacted for the list of schools both government and private along with their strength. With the help of multistage stratified random samplinginitially two separate strata of schools made (private and government). From enlisted schools one government and private school was selected randomly from each list. Taking Prevalence of obesity (p) as 8%[5] and relative allowable error (l) as 20% of p, sample size calculation was done and 1210 primary school children constituted the study population.

We took approval from Institutional Ethical Committee of Muzaffarnagar Medical College along with school administration Parents of each participant were informed about the study protocol and informed consent was obtained for their child's participation.

A semi-structured questionnaire was prepared along with the help of school administration and distributed to the students after describing them about the study. The school administration asked all students to take the questionnaire home and get it filled by their parents/guardians, which were collected subsequently. Once collected we measured height and weight of the using standardized instruments and techniques. Variables such as age, sex, religion, type of diet, hours of outdoors games,education status, occupation, monthly income of their parents were included in the questionnaire to assess the socioeconomic status of the family. Assessment done using modified Kuppuswamy's method of socioeconomic scale.[6]

The child was asked to stand upright without footwear and with the heels, the buttocks and the shoulders touching the wall. Measuring tape was used to measure the height. Weight was recorded in kilogram using the standard weighing machine. The students were asked to stand upright, bare footed on the weighing machine looking straight, while the measurement was read.

According to Centre for Disease Control (CDC) BMI for age percentile chart, which is considered to provide an appropriate reference curves for the world population aged 2-20 years, [7] children were categorized into four groups: ≥95 th percentile as obese, >85 th percentile as overweight, 5-85 th percentile as normal and <5 th percentile as underweight. Data was compiled using Microsoft Excel software and analyzed using StatCalc version 8.2.2.

RESULTS

With 1210 children, aged 6-12 years, 501 (41.4%) were from government school and 709 (58.6%) were from private school. Majority of children in government school were in the age group of 8-10 years (39.3%) and in private school were in the age group of 6-8 years (36.2%). In this study, 121 (24.2%) and 140 (27.9%) government school children belonged to Classes IV and V respectively. 209(29.5%) and 191 (26.9%) private school children belonged to Classes I and II socioeconomic group (Table 1).

The prevalence of underweight, and overweightamong private primary school children of Meerut city was 138 (19.4%), and 152 (21.6%), respectively. The prevalence of underweight, and overweight among government primary school children of Meerut city was 140 (28%), and 96 (19%), respectively The overall prevalence of underweight was more in government school (28%) than private school (19.4%) (Table 1)

Class III, IV and V economic groups children (79.3%) of government school showed higher prevalence of underweight than Classes I and II (20.7%) economic group. Significant association of high socioeconomic status was seen with prevalence of overweight low socioeconomic status with underweight prevalence in government school. Classes IV and V economic group children (49.5% and 67.5%) of private school showed higher prevalence of underweight than Classes I and II (10% and 12.6%) economic group. Significant association of high socioeconomic status was seen with prevalence of overweight low socioeconomic status with underweight prevalence in private school (Table 2 and 3).

Children of both government and private school on vegetarian diet showed more prevalence of underweight (32.4% and 23.2%) than on mixed diet and this was found to be significant.

Table 1: Distribution of study subject in government and private school based on their SES and Nutritional status

Variables	Government school (n=501)(%)	Private School (n=709) (%)	Total (n=1210) (%)
SES*#			
I	74 (14.8)	209 (29.5)	283 (23.4)
II	81 (16.2)	191 (26.9)	272 (22.5)
III	85 (17)	172 (24.3)	257 (21.2)
IV	121 (24.2)	97 (13.7)	218 (18)
V	140 (27.9)	40 (5.6)	180 (14.9)
Nutritional Status@			
Underweight	140 (27.9)	138 (19.5)	278 (23)
Normal	265 (52.9)	419 (59.1)	684 (56.5)
Overweight	96 (19.2)	152 (21.4)	248 (20.5)

* Modified Kuppuswamy Classification
#Chi square value=165.674, DF=4 P<0.0001 (Highly significant)
@Chi square value=11.929, DF=2 P<0.003 (significant)

Table 2: Nutritional status of Private school children in relation to their socio demographic, dietary habits and physical activity

Variables	Underweight (%)	Normal (%)	Overweight (%)	Total (%)	P value
Age (years)					
6-8	53 (20.6)	145 (56.4)	59 (23)	257 (36.2)	**<0.0001**
8-10	51 (20.5)	167 (67.1)	31 (12.4)	249 (35.1)	
10-12	34 (16.7)	107 (52.7)	62 (30.5)	203 (28.6)	
Total	138 (19.4)	419 (59)	152 (21.6)	709 (100)	
SES					
Class I	21 (10)	168 (80.4)	20 (9.6)	209 (29.5)	**<0.0001**
Class II	24 (12.6)	115 (60.2)	52 (27.2)	191 (26.9)	
Class III	18 (10.5)	83 (48.3)	71 (41.3)	172 (24.3)	
Class IV	48 (49.5)	45 (46.4)	4 (4.1)	97 (13.7)	
Class V	27 (67.5)	8 (20)	5 (12.5)	40 (5.6)	
Total	138 (19.4)	419 (59)	152 (21.6)	709 (100)	
Type of diet					
Veg	89 (23.2)	230 (60.1)	64 (16.7)	383 (54)	**<0.001**
Mixed	49 (15)	189 (58)	88 (27)	326 (46)	
Total	138 (19.5)	419 (59.1)	152 (21.4)	709 (100)	
Playing outdoor games					
≤ 1 hr	71 (21.6)	201 (61.1)	57 (17.3)	329 (46.4)	**<0.001**
> 1 hr	67 (17.6)	218 (57.4)	95 (25)	380 (53.6)	
Total	138 (19.5)	419 (59.1)	152 (21.4)	709 (100)	
Watching TV					
≤ 1 hr	71 (21.1)	210 (62.3)	56 (16.6)	337 (47.5)	**<0.026**
> 1 hr	67 (18)	209 (56.2)	96 (25.8)	372 (52.5)	
Total	138 (19.5)	419 (59.1)	152 (21.4)	709 (100)	

P <0.05 indicate statistical significance

Playing outdoors games has got no significant association to malnutrition status in government school but found to be associated in private school as shown in table. Watching television more than a hour/day was significantly associated with the high prevalence of overweight in both and government and private school (Table 2 and 3).

DISCUSSION

The overall prevalence of overweight was similar to the findings in studies by Chhatwal et al.,[8] in Punjab and Sharma et al.[9] in Delhi where it was reported to be of 14% and 22%, respectively. The overall prevalence of under nutrition was very near to the findings by Ashok et al.,[3] in a study done in Mysore in both government and private schools.

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 by Ramesh, [10] in Kerala and Thekdi [11] in Gujarat also stated the same. Economically sound family has got their inclination to purchase dense fast foods for their children. These children's involvement in physical activity is declining and there has been increase in indoor games.

Table 3: Nutritional status of government school children in relation to their socio demographic characteristics, dietary habits and physical activity

Variables	Underweight (%)	Normal (%)	Overweight (%)	Total (%)	P value
Age (years)					
6-8	57 (32.9)	87 (50.3)	29 (16.8)	173 (34.5)	<0.0001
8-10	47 (23.9)	100 (50.8)	50 (25.4)	197 (39.3)	
10-12	36 (27.5)	78 (59.5)	17 (13)	131 (26.1)	
Total	140 (28)	265 (53)	96 (19)	501 (100)	
SES					
Class I	10 (13.5)	43 (58.1)	21 (28.4)	74 (14.8)	<0.0001
Class II	19 (23.5)	38 (46.9)	24 (29.6)	81 (16.2)	
Class III	31 (36.5)	32 (37.6)	22 (25.9)	85 (17)	
Class IV	37 (30.6)	63 (52.1)	21 (17.4)	121 (24.2)	
Class V	43 (30.7)	89 (63.6)	8 (5.7)	140 (27.9)	
Total	140 (28)	265 (53)	96 (19)	501 (100)	
Type of diet					
Veg	85 (32.4)	139 (53.1)	38 (14.5)	262 (52.3)	<0.006
Mixed	55 (23)	126 (52.7)	58 (24.3)	239 (47.7)	
Total	140 (27.9)	265 (52.9)	96 (19.2)	501 (100)	
Plying outdoor games					
≤ 1 hr	71 (28)	140 (55.1)	43 (16.9)	254 (50.7)	<0.402
> 1 hr	69 (27.9)	125 (50.6)	53 (21.5)	247 (49.3)	
Total	140 (27.9)	265 (52.9)	96 (19.2)	501 (100)	
Watching TV					
≤ 1 hr	68 (28.1)	143 (59.1)	31 (12.8)	242 (48.3)	<0.001
> 1 hr	72 (27.8)	122 (47.1)	65 (25.1)	259 (51.7)	
Total	140 (27.9)	265 (52.9)	96 (19.2)	501 (100)	

P <0.05 indicate statistical significance

Physical activity: There has significant association between decrease in outdoor game and obese private school. Our findings corroborates withKotianetal.,[12] in Mangalore, which emphasized increased risk among those participating <2 h/week in any type of physical activity.In government schools, poor nutrition along with increase in outdoor games led children toward undernourishment.

Studies by Laxmaiah etal,[13] Dietz,[14] Goyal etal.,[15] Crespo etal.,[16] have shown a significant association between the indoor gamesand increased prevalence of overweight in children, parallel to our study. Children engaged in indoor games replace the time that children spend in physical activities, contribute to increased and excessive snacking and eating meals in front of the TV, andthereby lowers children's metabolic rate.

Higher economic class children, usually studies in private school, keep on sedentary lifestyle and are prone to become overweight/obese, leading them to NCDs. Under nutrition seen more in government school children as they usually belongs from Lower economic class.

CONCLUSION

Over nutrition is more prevalent in affluent communities and sedentary life styles are practiced by them.High calorie diet along with less physical activity predisposes them to overweight. Healthy lifestyle among school children by creating understanding about balanced diet and recommended level of physical activity will act as primordial prevention for sure.

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