Comparative Evaluation of the Nutritional Status and Habits of Students Studying in Private and Government Schools in A Semi-Urban Town in India –Kumbakonamurban Rural Epidemiological Study - Kures -1

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Abstract

Malnutrition is a universal and an ever-rising problem due to changes in the lifestyle and eating habits among the children. The malnourished children are prone to illness. Hence, we planned to conduct a study in school children, both in Government set up and a private set up, to review their nutritional status and the influencing factors. Two thousand students in the age group of 8-17 years were interviewed for their food habits, asking them to fill up a proforma along with anthropometric measurements. Results: Among the children interviewed 72% were malnourished, but only 0.06% were obese. The nourishment was significantly better in private school children but still 58% were underweight. There was a strong liking for fast food among children from both the groups. The playing time was less than an hour in a majority of students. Conclusion: There is an alarming census of underweight children in a semi-urban Indian town, but obesity is not that alarming, with an incidence rate < 1%. There is an urgent need to promote games among children of all socioeconomic status. A blanket ban on fast food items in the school campus is the need of the hour. Undernourished children form majority of students going to school in India. This includes children attending private paid schools. The incidence of obesity is still so low so that anycommunity level action on the same is presently not needed in India.

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Introduction

Malnutrition is one of the most common causes of morbidity and mortality among children and adolescents throughout the world. Every year, around 10 million children worldwide die from preventable and treatable diseases. At least half of these deaths are caused by malnutrition and can be prevented.[1] There is a strong opinion that students studying in private schools tend to be better nourished than the ones in Government schools. There are a lot of other factors like parental family environment, increased incidence of fast food intake, and sleep-play timings, which can influence the nutritional status of children. Many factors like environment, family, heredity, lack of awareness, wrong food choices, craving for fast foods, and lack of physical activity influences obesity.[2] Regarding comparing childhood nutrition among government and private schools, there are not much of valid studies in South India. Hence, we decided to study the different factors influencing the nutritional status of school children of 8 -17 years of age and make a comparison between children studying in private schools and Government schools. The aims and objectives are

- To assess the weight, height, and BMI in 8 - 17 years age group children in private and Government schools in Kumbakonam.
- To evaluate the nutritional status by using the BMI score and a questionnaire.
- To evaluate the role of the various factors influencing nutrition.
- To create awareness about eating habits and food choice through nutrition education, imparted orally.

Materials And Methods

After getting institutional review board approval (IRB – STH101/2018 – copy enclosed), this cross-sectional observational epidemiological study was undertaken from October 2018 to March 2019. Two thousand children in the age group of 8 – 17 years were interviewed along with a proforma to fill up regarding the type of school, family environment, food, sleep, and playing habits. This study was done in private and Government schools in Kumbakonam, a semi-urban town of South India, where the students were chosen for the study using a continuous sampling technique. Height, weight, and BMI were assessed using the World Health Organization (WHO) BMI chart. The equipment used was standardized for a variation of a maximum of 1 %. The variables noted were age, weight, height, BMI, sleep and playing times, nuclear or joint family, like or dislike for fast food dishes. The BMI values are used to classify the students as follows: <18 - underweight; 18 to 24.5 -normal; 25 to 30 - overweight; and > 30 - obesity.

Table 1: Showing thequestionnaire Proforma for data collection

S.no.	Proforma Character	Student Response
1	P/G	
2	M/F	
3	AGE	
4	WEIGHT	
5	HEIGHT	
6	BMI	
7	V/NV/E	
8	N/J	
9	FAMILY SIZE	
10	DAILY/MONTHLY -INCOME	
11	LIKE/DISLIKE – FAST FOOD	
12	HOURS OF PLAY /DAY	
13	HOURS OF SLEEP	
14	HEALTH PROBLEMS IF ANY	

CLASS: SCHOOL:

P/G = private/Government
BMI = BMI
V/NV/E = vegetarian/ nonvegetarian/eggetarian
D/M – daily or monthly income
L/DL – like / dislike

A questionnaire was given to each of the 2000 students, who were asked to fill the proforma form guided by teachers. The volunteers, teachers, and college students were helping the students to understand the proforma and help them fill it up properly. Strict vigilance was instituted to avoid filling up by teachers instead of the students. A joint family meant at least one grandparent was living with them along with parents. A salaried-class parent was described as monthly income group while parents who are skilled, unskilled labourers or have a daily-earning business were described as daily earners. The playing time meant outdoor games, which were noted in hours per day. Similarly sleeping times

were noted. The liking for fast foods was asked and noted. After the data collection, the students were counselled for good nutrition habits.

Statistics

The sample size was calculated from a town population of 150,000 and a possible age group-wise census of 13,500. To achieve a power of 99% and a risk of 3%, a sample size of 1611 was needed; we collected 2000 to satisfactorily conduct the study. The Pearson correlation analysis was used to establish the correlation between different variables. The unpaired Student's t-test was used for comparison between the groups. The limitation of the study was self-reporting, which has its own bias.This was minimized by taking teachers' help in data collection. The SPSS software version 20 was used for data entry and analyses.

Results

Children were very eager to know their height and weight and participated in the questionnaire section with great enthusiasm. All the 2000 children completed the proforma and submitted. The teachers keenly helped the students. The proformas were completed without any blank columns. There were no untoward events.

Background of Children

- Sample Size: 2000 children, aged 8 to 17 years.
- The number of students studying in private school were 810 (40.5%) and 1190 (59.5%) in Government school.
- The number of male and female students were 981 (49.1%) and 1019 (51.0%), respectively.
- Sixty percent of children were living in joint family and 40% were in nuclear family.
- Children who were vegetarian, non-vegetarian and eggetarian constituted 14.9%, 82.6%, and 2.6% of the total, respectively.
- Fifty percent ofparents were monthly earners.
- 66.9% of the children liked to have fast food, while it was 33.1 %disliked
- The playing time was less; 62.0% of the children revealed that they play < one hour, 22.7% played < two hours, and the remaining 15.3% played < four hours.
- The data set revealed that 72.40% children were underweight,24.45% had normal

weight, 2.55% were overweight, and 0.60% were obese.
- It was found that 8.4%, 53.3%, 33.6%, and 4.7% of the children slept for six, eight, ten, and twelve hours, respectively.
- Health issues were not found in 67.2% of the children, whereas the remaining children conveyed that they were suffering from cold (11.4%), head ache (11.6%), fever (2.5%), stomach pain (2.5%), and eye problem (1.8%).
- Age was positively correlated with the BMI(p=0.225, sig. (2-tailed) =0.001) and hours of play/day (p=0.127, sig. (2-tailed) =0.001). However, it was negatively correlated with the hours of sleep/day (p=-0.139, sig. (2-tailed) =0.001). Therefore, increased child age is associated with increase of BMI and hours of play/day. In contrast, increased child age is associated with decrease of hours of sleep/day. This established that school children played more and slept less with increase in age. This was similar both in private and Government school students.

Table 2: Correlation of Variables

Sl. No	Variables	Pearson Correlation	Sig. (2-tailed)
1	Age		
	BMI	0.225	0.001**
	Hours of play/day	0.127	0.001*
	Hours of sleep/day	-0.139	0.001*
2	Body Mass Index		
	Income	0.152	0.001*
	Hours of play/day	-0.105	0.001*
3	Size of Family		
	Hours of sleep/day	0.055	0.015*
4	Income		
	Hours of sleep/day	-0.133	0.001*
5	Hours of play/day		
	Hours of sleep/day	0.053	0.018*

The increase inBMI is associated with increase of family income (p=0.152, sig. (2-tailed) =0.001) and vice versa. However, the BMI showed a negative relationship with the hours of play/day. The decrease of BMI was associated with the increase of play/day (p=-0.105, sig. (2-tailed) =0.001). This was similar both in private and Government school students.

Children of both groups living in joint family slept and played more than from a nuclear family. However, as the children's family income increased, the hours of sleep/day was decreased (p=-0.133, sig. (2-tailed) =0.001). This demonstrated that the children of rich parents slept less. See table 2

Table 3: BMI of the children studying in private vs Government school

Crosstab		School		Total	Pearson Chi-Square	df	Asymp. Sig. (2-sided)
		Private	Government				
Body Mass Index	Under weight	475	975	1450	138.178	3	0.001*
	Normal	290	201	491			
	Over weight	37	10	47			
	Obese	8	4	12			

* - - statistical significance

Association of Variables

The Pearson chi-square crosstab (Table 3) revealed underweight children (975) in the Government school were more than in private school (475). Similarly, the overweight children were more (37) in private school and less (10) in Government school. In the same way, obese children were more in private school (8) than in Government school (4). Anyway, the percentage of obese children was less in private schools (<0.1%), the underweight children are more in a government setup.

Table 4: BMI of the male and female school children

Crosstab		Sex		Total	Pearson Chi-Square	df	Asymp. Sig. (2-sided)
		Male	Female				
Body Mass Index	Under weight	758	692	1450	22.281	3	0.001*
	Normal	199	292	491			
	Over weight	20	27	47			
	Obese	4	8	12			

* - - statistical significance

Table 4 illustrates the BMIof male and female children in the data set, which had a significant difference. The number of underweight males and females are 758 and 692, respectively, while 20 male and 27 female children were overweight. However, 4 male and 8 female children were found to be obese. Female children are more malnourished on either side of the normal weight spectrum.

The crosstab table (Table 5) shows the association between the variable body mass indexes with the liking and dislike for fast food among the children in the data set. All students of both private and Government schools had an increased liking for fast foods. It is evident that irrespective of the BMI, the liking for such foods is significantly high.

The Pearson Chi-Square crosstab confirmed the association between the BMIand health problem. It was confirmed that 1344 children did not have any health problems, whereas the remaining 656 children suffered minor ailments, out of which 517 belonged to the underweight category. It is clear that underweight children of both private and Government schools were affected by illnesses.

Discussion

Malnutrition is more prevalent in students studying in Government schools. The incidence of underweight children in our study is around 72.4%, which is almost the double the incidence reported by Yadav *et al.*[3] for children under the age of 5. The female children were the most affected, which was also in agreement with their findings. In a different study, Dhone *et al.*[4] have described an incidence rate of 65% underweight children below 5. Pal *et al.*[5] found the incidence of undernutrition to be 54%, which was significantly associated with maternal literacy. The maternal literacy factor was not studied by us. The findings of a study by Endris *et al.*,[6] conducted in Ethiopia, revealed that approximately 50% of the children aged 0–59 months were malnourished, and the risk factors included the region of residence, literacy of mother, economic status, age of the child, and preceding interval between the children. In our study, we also demonstrated a correlation between the underweight childrenand their poor economic status. Rashmi *et al.*[7] found that under-nutrition is also prevalent in private school children, which is in concurrence with our results. They have also mentioned that the scholastic attitude decreases with malnourishment. Prakash *et al.*[8] in their comparative study of students from private and Government schools have concluded that the number of underweight children is very less in the private school, which isagainst our findings possibly due to the differences in the places where the studies were conducted. There is also a distinct correlation between the health problems and underweight children. The incidence of obesity is only 0.04% in students of private schools, which is against the findings of Agbozo *et al.*[9] Ranjani *et al.*[10] described a high incidence rate of 19% overweight children, but our study showed that only 59 students out of 2000 (0.02%) were overweight, even though the incidence was a little higher in the private group. Our study contradicts the findings in that obesity is not alarmingly rising in semi-urban Indian children. There was no significant dual malnutrition problem as described by Ashok *et al.*[11] There is a correlation between children whose parents were daily-wage earners and malnutrition. In our study, 82.6% children were nonvegetarians and were equally distributed in both the groups. Hota *et al.*[12] revealed that 87% of the children are nonvegetarian, which goes with our results. Combining both the groups, 62% of the students played less than an hour a day. Naha *et al.*[14] found an increased incidence of hypertension in children who play less than an hour a day, the actual statistics of the incidence rate in children's playing time is not available. The exact data for a liking for fast food in children is not available; we present the same to be around 67%. The sleeping pattern is acceptable with an average of 8 hours a day. The size of the family is not significantly related to malnutrition in children of both the groups. The limitations of our study are that we have not studied the parents' literacy and income with regard to nutrition. The study was limited to schools belonging to a single semi-urban town in India.

Conclusion

In a study with 2000 children about the nutritional habits, the incidence of underweight children is around 72.4%, which needs quick attention. The obesity is less prevalent. The socioeconomic status, dietary indulgences like fast foods, lack of activities like playing games in school children are the key influencing factors. The children from private schools are better nourished, still the underweight percentage of 58.6%. With regard to playing times, dietary habits, and sleeping times, they are comparable with children from Government schools. There is an urgent need to promote games among children of all socioeconomic status. A blanket ban on fast food items in the school campus is the need of the hour.

Conflict of Interests

All authors declare that they have no competing interests.

Authors' Contributions

SMR conceived and designed the study.. AM, GR,, SRS collected and entered the data. PS contributed to writing the manuscript. All authors read and approved the final manuscript.

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