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Nutritional Status of Children- A Comparative Study Among Students in Government and Private Schools

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ABSTRACT

A healthy diet is essential to a child's growth and development because it helps them to establish a firm foundation for staying healthy from an early age and also ensures healthy development of the brain and other key organs which further helps in the development of immunity against infectious diseases as well as decreases the incidence of malnutrition in all of its manifestations. The goal of the study is to compare and assess the nutritional status and its risk factor among children in Private and Government Schools. A Cross-sectional observational study was carried out among 200 samples in selected schools of Bengaluru. The data was collected by using self-designed and validated questionnaire, responses were recorded and BMI & waist-hip ratio were calculated. It was found that the underweight prevalence was much higher among Government School students and overweight prevalence was higher among Private School students.

Keywords: Nutrition, Government School, Private School, Children, Risk factors

INTRODUCTION

A healthy diet is essential to a child's growth and development because it helps them to establish a firm foundation for staying healthy from an early age and also ensures healthy development of the brain and other key organs which further helps in the development of immunity against infectious diseases as well as decreases the incidence of malnutrition in all of its manifestations. [1] Healthy diet enhances both physical and mental functioning. As a result, providing children with a good diet is crucial since it helps them to establish a foundation for a healthy balanced life. [2] The diverse eating habits of children are influenced by socio demographic, behavioural and environmental factors. [3] Malnutrition is a major factor that can lead to unwanted effects to our health. The world is now dealing with different types of malnutrition. Under nutrition, overweight or obese, and non-communicable diseases are caused by unhealthy eating habits. Improved nutrition makes pregnancies safer i.e., healthy pregnancy, increases mental alertness, and lowers the risk of diseases. [5] Under nutrition includes stunting and wasting. The cause of stunting, which is a chronic condition, is not well known. Wasting is caused by a severe lack of food intake. [7] Now coming to over nutrition, it is a type of malnutrition caused by nutritional consumption that is too high, resulting in build up of unhealthy body fat. [6]

Children who are obese frequently experience:

METABOLIC ISSUES	NON METABOLIC ISSUES	PSYCHOLOGICAL ISSUES
• High blood pressure • Glucose intolerance	• Flat feet • Limited mobility • Arthritis	• Depression • Eating disorders • Poor body image

Table 5: Effects of obesity on children [5]

For kids and teenagers, obesity has major emotional, social, and psycho-social effects. As it rises alarmingly in poor nations, adolescent over nutrition is turning into a global public issue. The risks of diseases related to diet rise with overeating. [5] Hypertension is becoming a major problem in India which occurs as a result of high sodium intake (>5 g salt per day). About 80% of heart diseases and stroke diagnoses can be avoided by making lifestyle changes, such as increasing physical activity and eating well. [10]

Drug induced weight gain is a significant adverse effect of several widely prescribed medications that can result in the escalation of obesity related co morbid disorders. [11]

DRUGS	EFECTS
• Thiazolidinediones • Atypical antipsychotics like Clozapine, Olanzapine,Risperidone , Quetiapine. • Serotonin reuptake inhibitors (SSRIs) like Amitryptyline,Mirtazapine • Mood stabilizers like Lithium,Valproic acid and Carbamazepine • Antiepileptic medications (AEDs) like Valproate, Carbamezpine, Gabapentin • Corticosteroids like Cortisone and Glucocorticoids.	• Weight gain is typically a side effect of treatment. • Will lead to an increase in the body weight. • Noticeable weight gain which cannot be attributed to a reduction in depressed symptoms alone. • Increases body weight. • All these drugs contribute to weight gain. • Causes significant increase in weight gain.

Table 7: Drug Induced Weight Gain [11]

The term “midday meal scheme” is the Government of India’s initiative to provide children with meal. The Children’s LoveCastles Trust began serving noon meals in Karnataka in 1997. [12] A food bank program was launched along adoption of total of eight schools. Later on, the State Government’s midday meal program took over for the food bank program. [13] The Mid-day meal scheme was implemented by the Karnataka Government throughout the state in 2002-2003. [14] Children in classes 1-5 from all Government and government –aided schools were involved in this program. The Ministry of Education has changed the name of the program to Pradhan Mantri Poshan Shakti Nirman (PM-POSHAN) scheme in September 2021. [15]

According to the most recent estimates, 45.4 million children worldwide are wasted and 149.2 million children under the age of five are stunted whereas in Asia, severe wasting affects more than 75% of all children and under nutrition is the most contributing factor in about 45% of fatalities in children below

five and 38.9 million children below 5 are overweight, and 1.9 billion adults worldwide are overweight or obese. [16] Compared to children who are well nourished, children who suffer from severe malnutrition have a 5 to 20 times higher mortality rate. [17] Obesity in childhood and adolescent is linked to decreased health in childhood and has substantial effects for early mortality and physical disorders in maturity. [18] According to the data provided by the Ministry on malnutrition and National Family Health Survey 4, there is a combined prevalence of underweight of 35.2%. The poor health of children from low socio economic classes appears to be caused by a number of critical underlying issues. [19]

PURPOSE OF THE STUDY

The current health status of school age children will be reflected in their nutritional status. Determining and assessing the risk factors for obesity is essential due to the harmful and incapacitating effects of obesity on the body. In this regard, knowing the status of child's nutrition will have a significant influence on the better development of future generations. [20] Therefore, evaluating a child's nutritional status will aid in identifying risk factors, which in turn helps in preventing future health consequences through awareness, prophylaxis, sustainable intervention in regard with healthy nutritional practices, encouragement of physical activity and thus leading a healthy lifestyle.

MATERIAL AND METHODS

This was a Cross-sectional observational study, and subjects for the study were identified by the investigator based on the inclusion and exclusion criteria. After obtaining approval from Institutional Ethics Committee in accordance with the ethical guidelines issued by the Indian Council of Medical Research (ICMR), on 23rd of May 2022, the study has been commenced and subjects for the study were identified by conducting a community visit in Government and Private Schools. The school authorities have been explained with the purpose of the study and permission from the respective schools and the responding consents have been taken. Relevant data (demographic details) was recorded on the self-designed and validated demographic sheet. A self-designed validated questionnaire was given to the study subjects to fill after obtaining proper consent. All obtained data was then entered in Microsoft Excel sheet and statistical analysis was performed using Chi-square test and data interpretation was carried out.

Inclusion criteria:

a. Subjects whose parents have given consent.
b. High school students within the age group of 13-16 years.
c. Both male and female.

Exclusion criteria:

a. Children with chronic illness.
b. Subjects with any major physical and mental disabilities.

Statistical Analysis:

All recorded data were entered and analyzed using MS Excel. Descriptive statistics were computed for quantitative variables. Frequencies and percentages were calculated for categorical values. Statistical analysis was performed using Chi-square test and data interpretation was carried out.

RESULTS

The study was carried out for a period of six months, and a total of 235 samples were collected and out of these 35 samples were dropped out due to insufficient data and the overall sample size was 200, out of which 100 each from Private School and Government School. The subjects were selected from Government High School, Chikkabanavara and KMV Red Hills School, Chikkabanavara, Bangalore.

DISTRIBUTION OF SUBJECTS ACCORDING TO DEMOGRAPHIC DATA

Out of 100 subjects in Private School, 73% were of the age 13, 12% were of the age 14, 10% were of the age 15, 5% were of the age 16.Out of 100 subjects in Government School, 14% were of the age 13, 48% were of the age 14, 34% were of the age 15, 4% were of the age 16.

Out of 100 subjects in Private School, 43% students were males and 57% were females. Out of 100 subjects in Government School, 45% of students were males and 55% were females.

Out of 100 subjects in Private School, 9% belonged to lower socioeconomic class, 74% belonged to middle socioeconomic class, while 17% belonged to higher socio economic class. And out of 100 subjects in Government School, 84% belonged to lower socioeconomic class and 16% belonged to middle socioeconomic class.

93% parents of Private School children were literate and 7% were illiterate. 46% mothers and 57% fathers of students from Government School were literate while 54% mothers and 43% fathers were illiterate.

Out of 100 students in Private School, 48% of their mothers, 99% fathers were employed and 52% mothers and 1% fathers were unemployed. Out of 100 students in Government School, 82% of their mothers, 96% fathers were employed and 16% mothers and 4% fathers were unemployed.

Demographic details	Private School		Government School	
Age	**No.**	**%**	**No.**	**%**
13	73	73%	14	14%
14	12	12%	48	48%
15	10	10%	34	34%
16	5	5%	4	4%
Sex				
Male	43	43%	45	45%
Female	57	57%	55	55%
Socio Economic Status				
Lower	9	9%	84	84%
Middle	74	74%	16	16%
Higher	17	17%	0	0%
Education status of mother				
Literate	93	93%	46	46%
Illiterate	7	7%	54	54%
Education status of father				
Literate	93	93%	57	57%
Illiterate	7	7%	43	43%

Occupation status of mother				
Self-employee	8	8%	12	12%
Employee at any sector	40	40%	72	72%
Not employed	52	52%	16	16%
Occupation status of father				
Self-employee	42	42%	25	25%
Employee at any sector	57	57%	71	71%
Not employed	1	1%	4	4%
Family size				
Above 5 members	21	21%	38	38%
Below 5 members	77	77%	58	58%
5	2	2%	4	4%

***Table 8**: Distribution of subjects by socioeconomic data*

DISTRIBUTION OF SUBJECTS ACCORDING TO DIET

Out of 100 subjects from Private School, 28 were vegetarians, 72 were non-vegetarians while out of 100 subjects from Government School 10 were vegetarians and 90 were non vegetarians as shown in below table.

Type of diet	Private School	Government School
	No. of students (100)	**No. of students (100)**
Vegetarian	28	10
Mixed diet	72	90

***Table 9:** Distribution of subjects by diet pattern.*

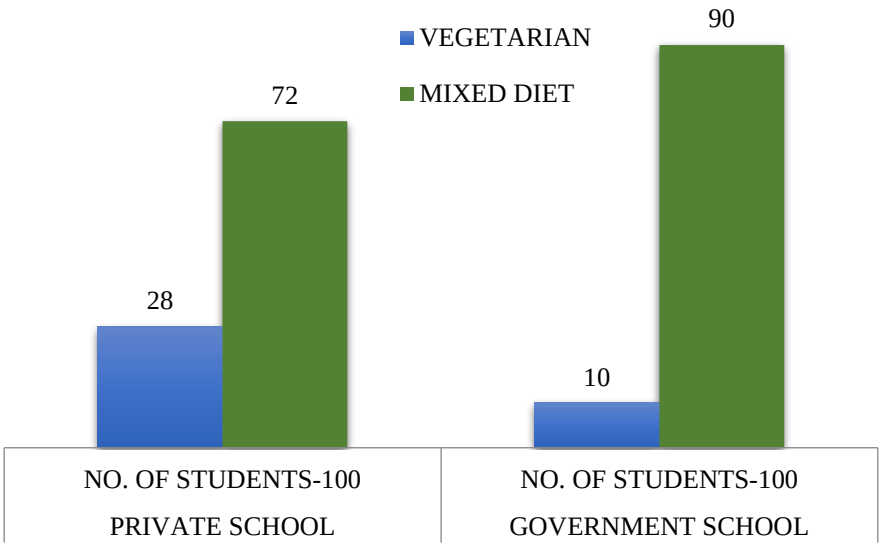

***Figure 2:** Distribution of subjects by diet pattern.*

DISTRIBUTION OF SUBJECTS ACCORDING TO NUTRITIONAL STATUS

Out of 100 subjects from Private School, 23 were underweight,61 were of normal weight,15 were overweight and one was obese .Out of 100 subjects from Government School, 51 were underweight, 46 were of normal weight, one from the class of overweight and 2 were obese as shown in below table.

Nutritional status	Private school	Government school
	No. of students	No. of students
Underweight	23	51
Normal	61	46
Overweight	15	1
Obesity	1	2

Table 10: *Distribution of subjects based on nutritional status*

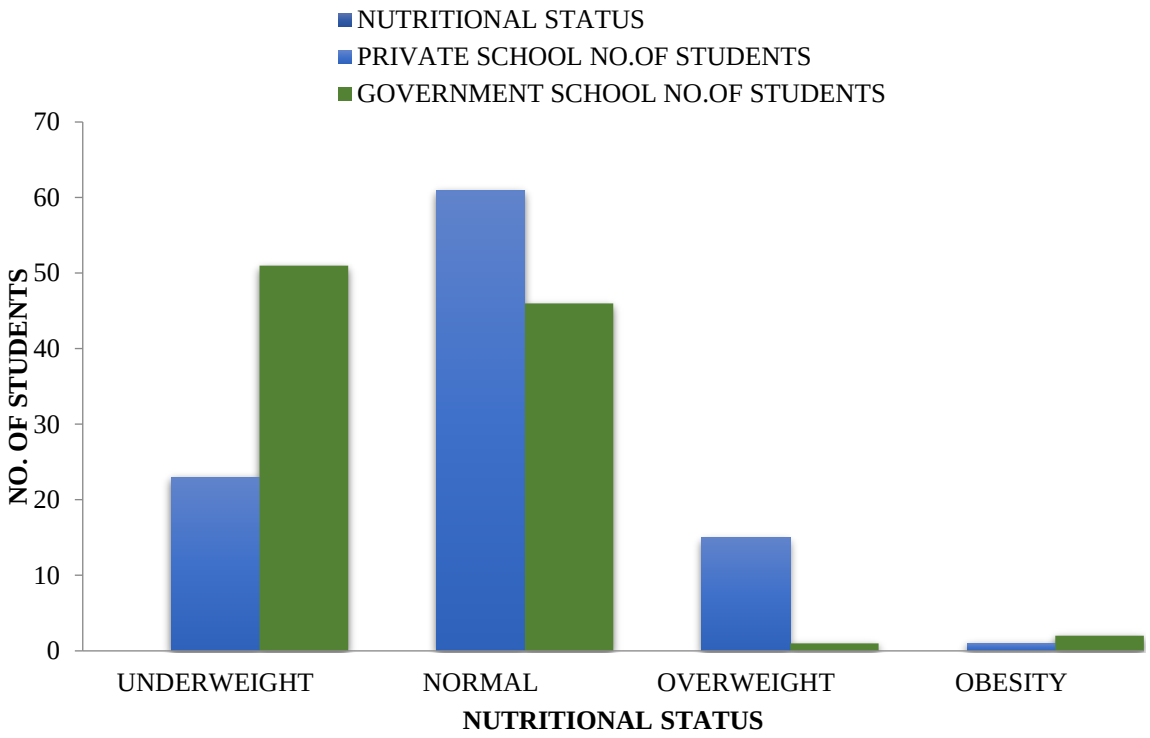

Figure 3: Distribution of subjects based on nutritional status

DISTRIBUTION OF SUBJECTS BASED ON SEX

Out of 100 subjects from Private School, 14% of males were underweight, 21% were of normal weight,8% were overweight and no obese conditions were observed while among females 9% were underweight, 40% were of normal weight,7% were overweight and 1% was found to be obese as shown in the below table.

Variables	Private School			
Sex	Underweight	Normal	Overweight	Obese
Male	14	21	8	0
Female	9	40	7	1

Total	23	61	15	1

Table 11: *Distribution of subjects from Private School based on sex*

Out of 100 subjects from Government School, 24% of males were underweight, 21% were of normal weight, no overweight and obese conditions were observed while among females, 27% were underweight, 25% were of normal weight,1% each from the class of overweight and obesity as shown in the below

Variable	Government School			
Sex	**Underweight**	**Normal**	**Overweight**	**Obese**
Male	24	21	0	0
Female	27	25	1	2
Total	51	46	1	1

Table 12: *Distribution of subjects from Government School based on sex*

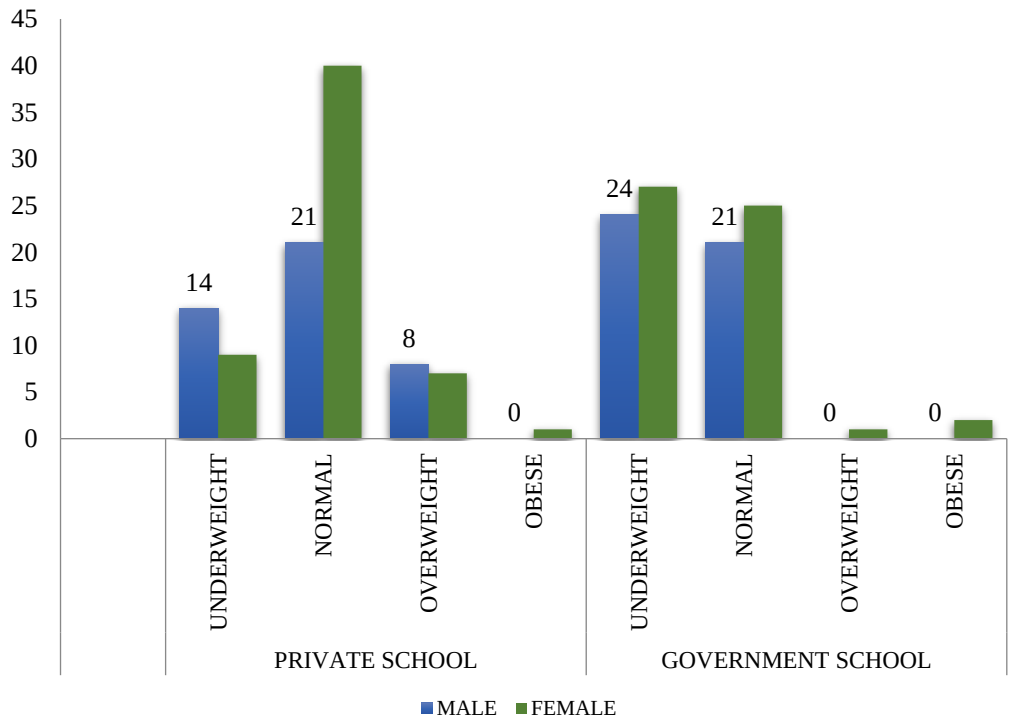

Figure 4: *Distribution of subjects based on sex*

DISTRIBUTION OF SUBJECTS BASED ON BODY MASS INDEX

Based on the classification of body mass index, out of 100 students from Private school who follows vegetarian diet, 7 (25%) were underweight, 17 (60.71%) were of normal weight,3 (10.71%) were overweight and 1 (3.57%) was obese. And among the students who follows mixed diet, 16(22.2%) were underweight, 44 (61.1%) were of normal weight, 12 (16.67%) were overweight and no obese conditions. Out of 100 students from Government school who follows vegetarian diet, 4 (44.4%) were underweight, 5 (55.5%) were of normal weight, no overweight and obese conditions were observed. And among the students who follows mixed diet, 47 (51.64%) were underweight, 41 (45.05%) were of normal weight, 1

(1.09%) were overweight and 2 (2.19%) were obese, with Chi-Square value 0.0025 and p-value 0.9.The result is not significant at p <0.05. This tells that there is no statistically significant association between body mass index and diet pattern.

Body mass index (BMI)	Diet pattern of students			
	Private School		Government School	
	Vegetarian	Mixed diet	Vegetarian	Mixed diet
Underweight (<18.5)	7	16	4	47
Normal (18.5-24.9)	17	44	5	41
Over weight (25-29.9)	3	12	0	1
Obesity (30-34.9)	1	0	0	2
Chi-Square value : 0.0025		**p-value : 0.9**		

Table 13: *Distribution of subjects by BMI*

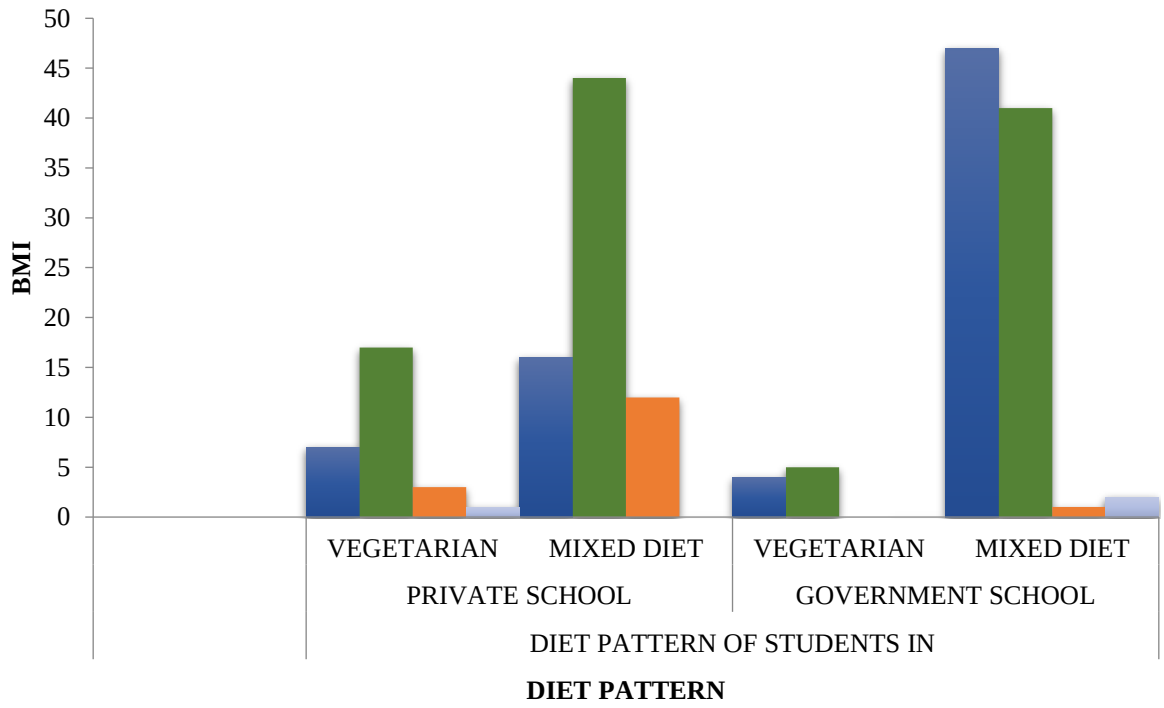

Figure 5*: Distribution of subjects by BMI*

DISTRIBUTION OF SUBJECTS BASED ON WAIST – HIP RATIO

Out of 100 subjects from Private School, among males 40(93.02%) were of low risk, 3(6.97%) were of moderate risk. And among females, 12(21.05%) were of low risk, 12(21.05%) were of moderate risk and 33(57.89%) were of high risk. Out of 100 subjects from Government School, among males 44(97.7%) were of low risk, 1(2.22%) were of moderate risk. And among females, 8(14.54%) were of low risk, 14(25.45%) were of moderate risk and 33(60%) were of high risk with Chi-Square value 0.05 and p-value is 0.8. The result is not significant at p<0.05.This tells that there is no statistically significant association between waist- hip ratio and nutritional status.

Waist - hip ratio	Private School		Government School	
Males:	**Number**	**Percentage**	**Number**	**Percentage**
≤ 0.95 (low risk)	40	93.02%	44	97.70%
0.96-1.0 (moderate risk)	3	6.97%	1	2.22%
≥1.0 (high risk)	0	0	0	0
Females:	**Number**	**Percentage**	**Number**	**Percentage**
≤ 0.8 (low risk)	12	21.05%	8	14.54%
0.81-0.85 (moderate risk)	12	21.05%	14	25.45%
≥ 0.86 (high risk)	33	57.89%	33	60%
Chi-Square Value: 0.05		**p-value : 0.8**		

Table 14: *Distribution of subjects based on waist-hip ratio*

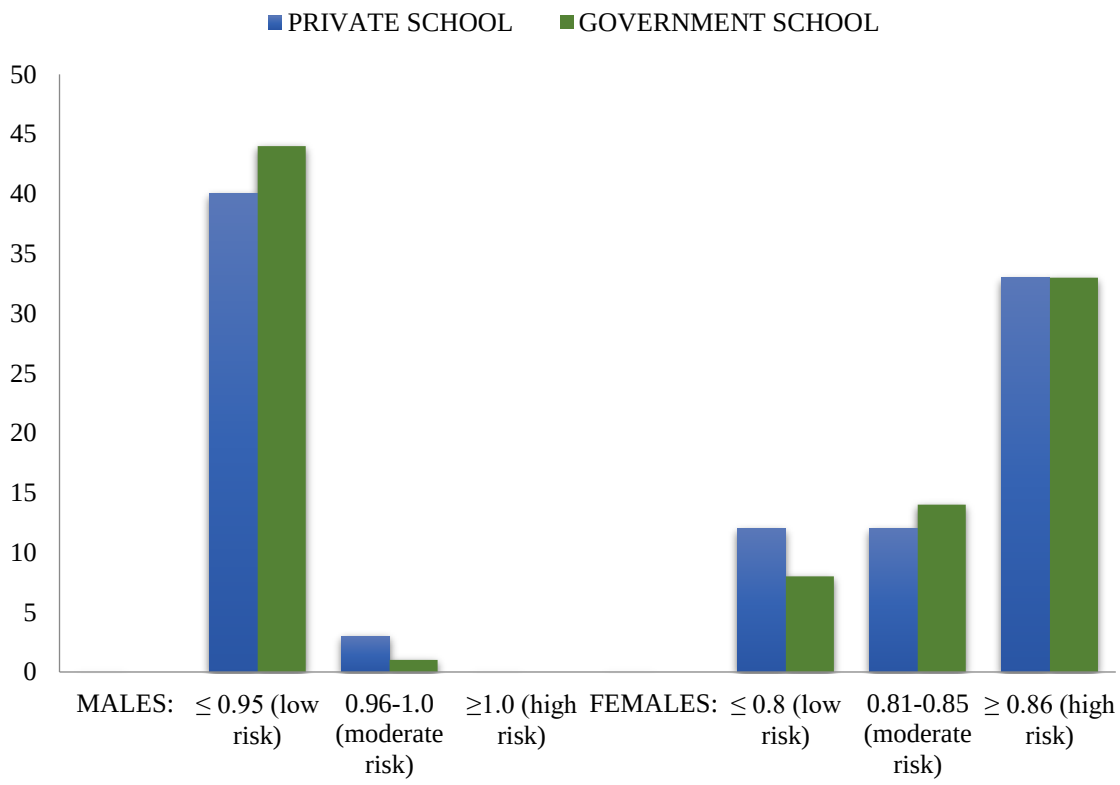

Figure 6*: Distribution of subjects by waist-hip ratio*

DISTRIBUTION OF SUBJECTS BASED ON THEIR FOOD PREFERENCE

PRIVATE SCHOOL:

Out of 100 subjects from Private School, among underweight category 16(69.56%) preferred regular meals, 5(21.7%) preferred fast foods, and 2(8.69%) preferred cakes and pastries. Among subjects with normal weight 40(65.57%) preferred regular meals, 21(34.42%) preferred fast foods. And subjects who are overweight, 12(80%) preferred regular meals, 3(20%) preferred fast foods. Among obese, 1(100%) preferred regular meals.

Private School	Food Preference					
	Regular Meals		Fast food		Cakes & Pastries	
	No.	%	No.	%	No.	%
Underweight	16	69.56%	5	21.7%	2	8.69%
Normal weight	40	65.57%	21	34.2%	0	0%
Overweight	12	80%	3	20%	0	0%
Obesity	1	100%	0	0%	0	0%

Table 15: *Distribution of subjects in Private School based on food preference*

GOVERNMENT SCHOOL:

Out of 100 subjects from Government School, among underweight category 35(68.62%) preferred regular meals, 14(27.45%) preferred fast foods, and 2(3.92%) preferred cakes and pastries. Among subjects with normal weight 37(80.43%) preferred regular meals, 5(10.86%) preferred fast foods, 4(8.69%).And subjects who are overweight, 1(100%) preferred regular meals. Among obese, 2(100%) preferred regular meals.

Government School	Food Preference					
	Regular Meals		Fast food		Cakes & Pastries	
	No.	%	No.	%	No.	%
Underweight	35	68.82%	14	27.45%	2	3.92%
Normal weight	37	80.43%	5	10.86%	4	8.69%
Overweight	1	100%	0	0%	0	0%
Obesity	2	100%	0	0%	0	0%

Table 16: *Distribution of subjects in Government School based on food preference*

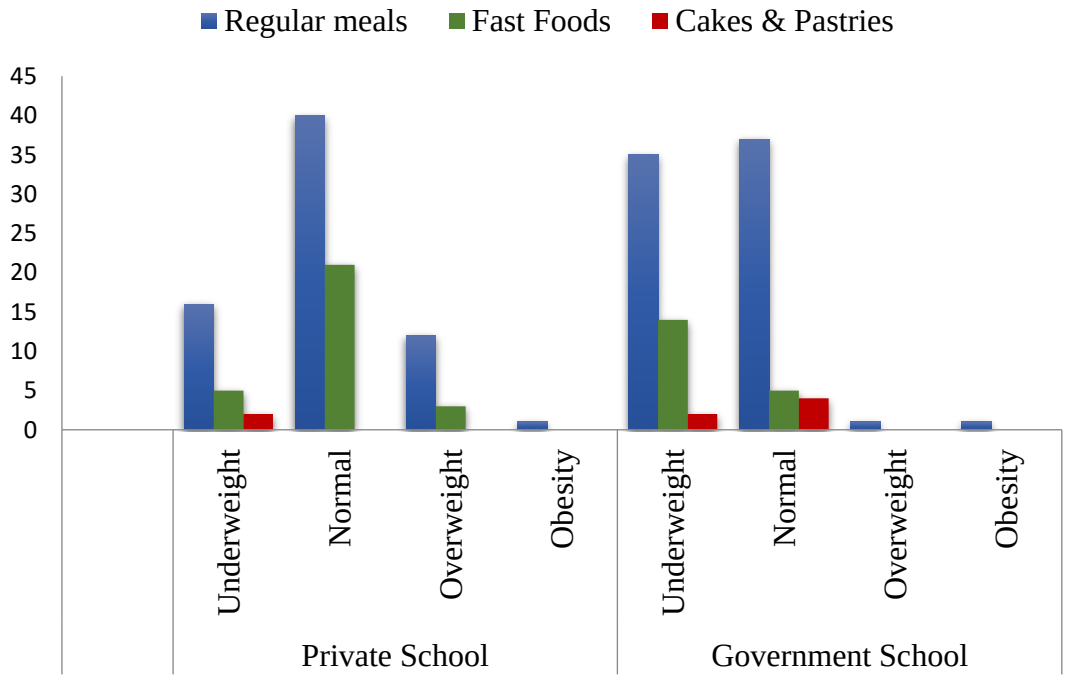

Figure 7*: Distribution of subjects based on food preference*

DISTRIBUTION OF SUBJECTS BASED ON THEIR CONSUMPTION OF BAKERY PRODUCTS

PRIVATE SCHOOL:

Out of 100 subjects from Private School, among underweight category 7(30.43%) use to have bakery products once in a week, 7(30.43%) will have bakery products twice in a week, other 7(30.43%) use to have thrice in a week while 2(8.69%) don't eat any of the bakery products. Among normal weight category, 21(34.42%) use to have bakery products once in a week, 18(29.5%) will have bakery products twice in a week, other 19(31.14%) use to have thrice in a week while 3(4.91%) don't eat any of the bakery products. Subjects who are overweight, 4(26.67%) among them use to have bakery products once in a week, 18(29.5%) will have bakery products twice in a week, other 19(31.14%) use to have thrice in a week while 3(4.91%), 1(7%) don't eat any of the bakery products. Among obese, 1(100%) use to consume bakery products twice in a week.

Private School	Use of bakery products							
	Once in a week		Twice in a week		Thrice in a week		Don't eat any of these	
	No.	%	No.	%	No.	%	No.	%
Underweight	7	30.43%	7	30.43%	7	30.43%	2	8.69%
Normal weight	21	34.42%	18	29.5%	19	31.14%	3	4.91%
Overweight	4	26.67%	7	46.67%	3	20%	1	7%
Obesity	0	0%	1	100%	0	7%	0	0%

Table 17: *Distribution of subjects in Private School based on consumption of bakery products*

GOVERNMENT SCHOOL:

Out of 100 subjects from Government School, among underweight category 32(62.74%) use to have bakery products once in a week, 6(11.76%) will have bakery products twice in a week, other 11(21.56%) use to have thrice in a week while 2(3.92%) don't eat any of the bakery products. Among normal weight category, 27(58.69%) use to have bakery products once in a week, 3(6.52%) will have bakery products twice in a week, other 13(28.26%) use to have thrice in a week while 3(6.52%) don't eat any of the bakery products. Subjects who are overweight, 1(100%) use to have bakery products once in a week. Among obese, 2(100%) will consume bakery products once in a week.

Government School	Use of bakery products							
	Once in a week		Twice in a week		Thrice in a week		Don't eat any of these	
	No.	%	No.	%	No.	%	No.	%
Underweight	32	62.34%	6	11.76%	11	21.56%	2	3.92%
Normal weight	27	58.69%	3	6.52%	13	28.26%	3	6.52%
Overweight	1	100%	0	0%	0	0%	0	0%
Obesity	2	100%	0	0%	0	0%	0	0%

Table 18: *Distribution of subjects in Government School based on consumption of bakery products*

DISTRIBUTION OF SUBJECTS BASED ON TIME SPEND FOR OUTDOOR GAMES

PRIVATE SCHOOL:

Out of 100 subjects from Private School, among underweight 13(56.62%) use to play outdoor games while 10(43.47%) don't spend time for outdoor games. Subjects of normal weight, 31(50.81%) spend time for playing outdoor games while 30(49.18%) don't play outdoor games.11 (73.34%) from overweight category use to play outdoor games while 4(26.67%) are not into playing outdoor games while 1(100%) from obese category use to play outdoor games.

Private School	Playing outdoor games			
	Yes		No	
	No.	%	No.	%
Underweight	13	56.52%	10	43.47%
Normal weight	31	50.81%	30	49.18%
Overweight	11	73.34%	4	26.67%
Obesity	1	100%	0	0%

Table 19: *Distribution of subjects in Private School based on spending time for outdoor games*

GOVERNMENT SCHOOL:

Out of 100 subjects from Government School, among underweight 38(74.5%) use to play outdoor games while 13(25.5%) don't spend time for outdoor games. Subjects of normal weight, 32(69.56%) spend time for playing outdoor games while 14(30.43%) don't play outdoor games,1(100%) from overweight category were not into playing outdoor games while 1(50%) use to play outdoor games and other 1(50%) is not into playing outdoor games.

Government School	Playing outdoor games			
	Yes		No	
	No.	%	No.	%
Underweight	38	74.5%	13	25.5%
Normal weight	32	69.56%	14	30.43%
Overweight	0	0%	1	100%
Obesity	1	50%	1	50%

Table 20: *Distribution of subjects in Government School based on time spend for outdoor games*

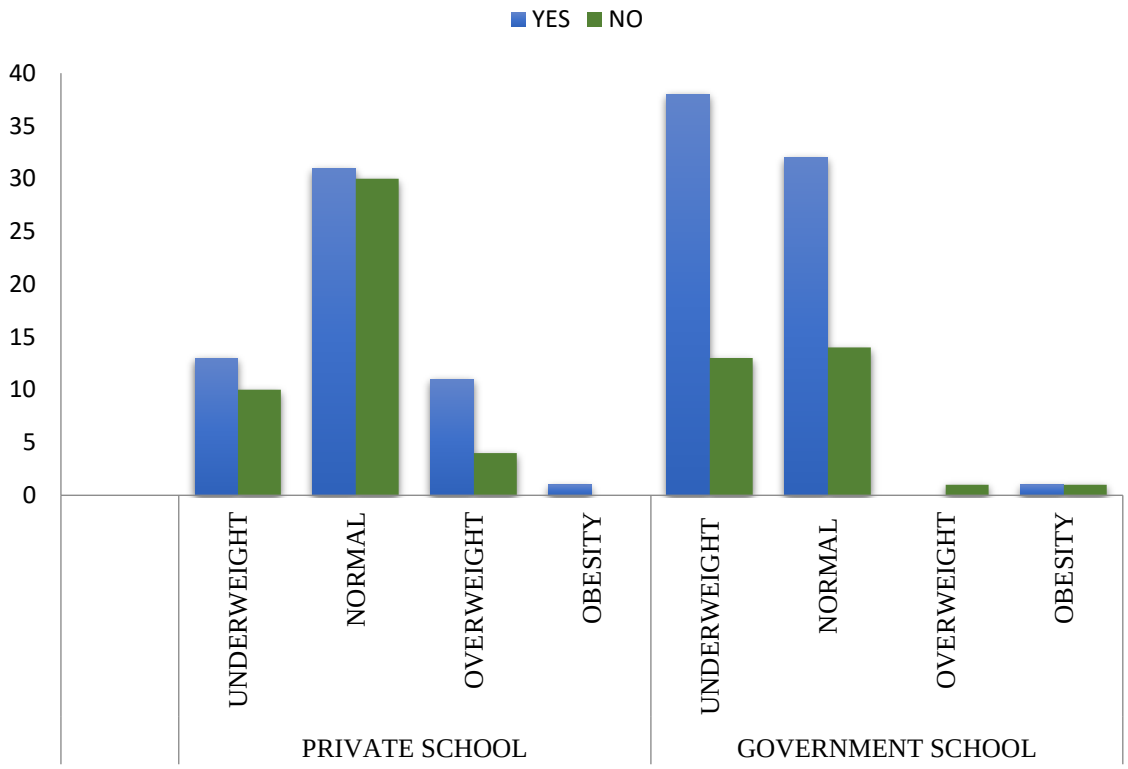

***Figure 8**: Distribution of subjects based on time spend for outdoor games*

DISTRIBUTION OF SUBJECTS BASED ON TIME SPEND FOR SLEEP

PRIVATE SCHOOL

Out of 100 subjects from Private School, among underweight category 9 (39.13%) sleep for an ideal 8 hours while 14(60.89%) sleeps less than 8 hours. Subjects of normal weight,22(36.06%) sleep for 8 hours while 39(63.93%) sleeps less than 8 hours .8 subjects (53.34%) sleeps for 8 hours in the overweight category while 7(46.67%) sleeps less than 8 hours. Among obese, 1(100%) sleeps for 8 hours.

Private School	Time spend for sleep			
	8 hours		Less than 8 hours	
	No.	%	No.	%
Underweight	9	39.13%	14	60.89%
Normal weight	22	36.06%	39	63.93%
Overweight	8	53.34%	7	46.67%
Obesity	1	100%	0	0%

***Table 21:** Distribution of subjects in Private School based on time spend for sleep*

Government School	Time spend for sleep			
	8 hours		Less than 8 hours	
	No.	%	No.	%
Underweight	14	27.45%	37	72.5%

Normal weight	20	43.47%	26	56.52%
Overweight	0	0%	1	100%
Obesity	1	50%	1	50%

Table 22: *Distribution of subjects in Government School based on time spend for sleep*

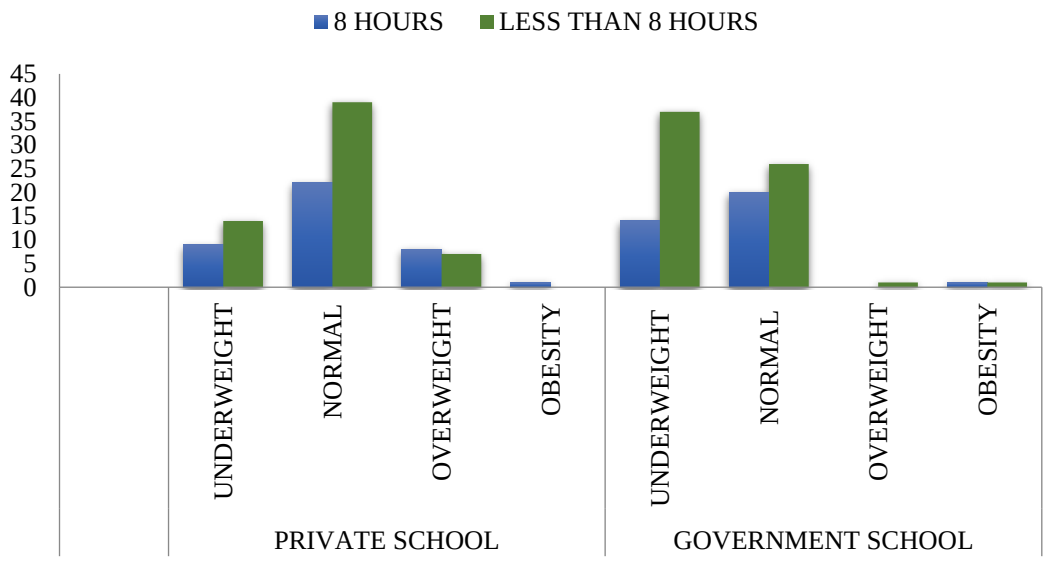

Figure 9*: Distribution of subjects based on time spend for sleep*

DISTRIBUTION OF SUBJECTS BASED ON TIME SPEND ON WATCHING TELEVISION/ USING MOBILE

PRIVATE SCHOOL:

Out of 100 subjects from Private School, 12(52.17%) spend less than 1 hour/day on watching television/ mobile while 11(47.82%) spend more than 1 hour/day on watching television/mobile among underweight subjects whereas among subjects of normal weight, 28(45.9%) less than 1 hour/day on watching television/ mobile and 33(54.09%) spend more than 1 hour/day on watching television/mobile. 5(33.34%) of subjects who are overweight spend less than 1 hour/day on watching television/ mobile while 10(66.67%) spend more than 1 hour/day on watching television/mobile. Among obese, 1(100%) spend less than 1 hour/day on watching television/mobile.

Table 23: *Distribution of subjects in Private School based on time spend on television/mobile*

Private School	Time spend on TV/Mobile			
	Nil ≤ 1 hour/day		> 1 hour/day	
	No.	%	No.	%
Underweight	12	52.17%	11	47.82%
Normal weight	28	45.90%	33	54.09%
Overweight	5	33.34%	10	66.67%
Obesity	1	100%	0	0%

GOVERNMENT SCHOOL:

Out of 100 subjects from Government

School, 21(41.17%) spend less than 1 hour/day on watching television/ mobile while 30(58.82%) spend more than 1 hour/day on watching television/mobile among underweight subjects whereas among subjects of normal weight, 26(56.52%) less than 1 hour/day on watching television/ mobile and 20(43.47%) spend more than 1 hour/day on watching television/mobile. 1(100%) who is overweight spend less than 1 hour/day on watching television/ mobile. Among obese, 2(100%) spend less than 1 hour/day on watching television/mobile.

Private School	Time spend on TV/Mobile			
	Nil ≤ 1 hour/day		> 1 hour/day	
	No.	%	No.	%
Underweight	21	41.17%	30	58.82%
Normal weight	26	56.52%	20	43.47%
Overweight	1	100%	0	0%
Obesity	2	100%	0	0%

Table 24: *Distribution of subjects in Government School based on time spend on television/mobile*

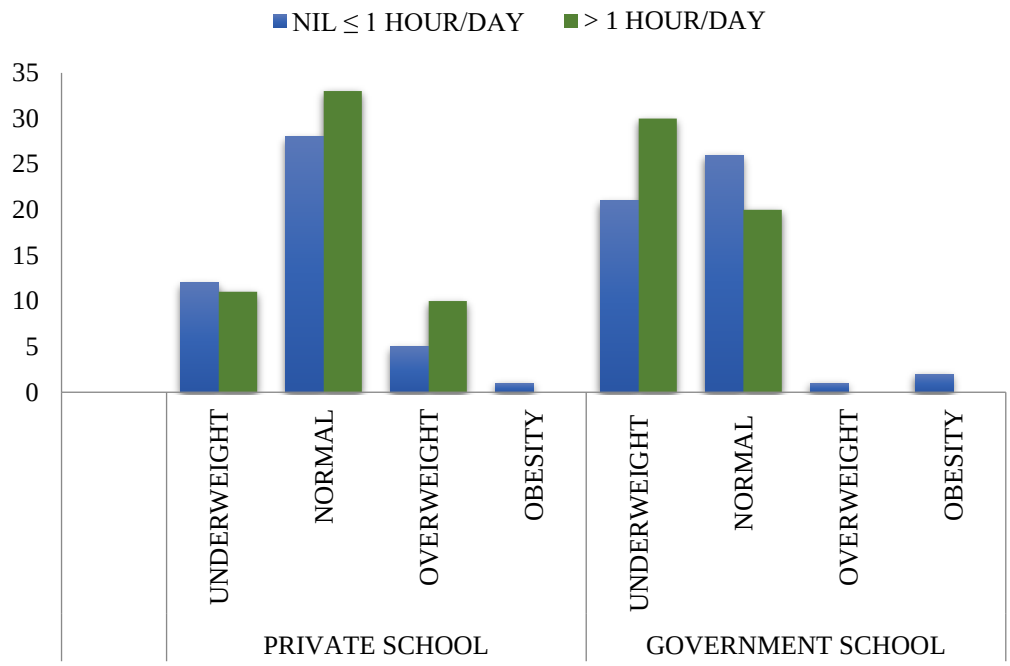

Figure 10*: Distribution of subjects based on time spend on television/mobile*

DISCUSSION

Six months of cross sectional observational study was performed in subjects drawn from selected schools within 10km radius of Acharya Institutes, Soladevanahalli, Bangalore .A total of 235 subjects were enrolled in the study based on inclusion and exclusion criteria out of which 200 subjects were taken into account by omitting inappropriate ones within the study period. The data regarding nutritional status of subjects from both Government and Private School was collected using self-designed data collection form and the subjects were assigned according to the classification based on

Body Mass Index and also according to the range of risk by calculating waist-hip ratio.

Out of 200 subjects included in the study, most of them belonged to the age group of 13-16 years and prevalence of females was higher than males in both schools. The average age of the study subjects was 14 years which is similar to the mean age of participants as in the study of **Sharma SJ *et al.,*** [22] conducted in Muzzafarnagar city.

Majority (74%) of the students from Private school belonged to middle socioeconomic class while majority (84%) of students from Government School belonged to lower socioeconomic class. Majority (93%) of parents of Private School children were literate whereas 54% mothers of government school were illiterate while 57% fathers were literate. The prevalence of underweight, overweight and obesity among Private School children was 23%, 61%, 15%, 1% respectively. Underweight prevalence was more in Government School (51%) when compared with Private School (23%) which shows the mid-day meal plan in the Government school is less than enough to meet the caloric needs of children which is similar to the study conducted by **Prakash PS *et al.,*** [24] and the socioeconomic status also affects the nutritional status like in the study conducted by **Ashok NC *et al.,*** [26] The overweight prevalence was more in Private School (15%) than Government School (1%) which is in line with a study conducted by **Ali MS *et al.,*** [29] The prevalence of normal weight was more in Private School (61%) when compared with Government School (46%) while the prevalence of obesity was more in Government School. Majority of students from both schools followed mixed diet. Prevalence of obese student was more in females in both schools, whereas underweight prevalence was more in males (14%) of Private School and 27% of females in Government School which are in contrary to the study conducted by **Sharma SJ *et al.,*** [22]

It has been found out that there is no statistically significant association between body mass index and diet pattern which was contradictory to the study conducted by **Slowik J *et al.,*** [21] and **Abduelkarem *AR et al.,*** [36] which showed an association between BMI and diet pattern. And also there is no statistically significant association between waist- hip ratio and nutritional status unlike the study conducted by **Patnaik L *et al.,*** [25] where waist-hip ratio was significantly higher among private school students.

Among Private and Government schools, most of the students from the category of underweight, normal weight, overweight and obesity preferred regular meals over fast foods, cakes and pastries .Snacks and junk foods consumed at home and outside home is one of the main risk factor for overweight and except 5 or 6 %, rest of all used to eat bakery products on a regular basis.

There was no lack of outdoor game activity found among the children from both Private and Government School which is in contradictory to the study conducted by **Sharma SJ *et al.,*** [22] where lack of outdoor game activity was significantly associated with obese private school children.

There is an association between the time spent on watching television/using mobile (>1 hour/day) and increased prevalence of overweight in children from Private School which was similar to the study conducted by **B Michael *et al.,*** [28] Majority of underweight subjects (60.89%, 72.5% respectively) from Private and Government school sleeps less than 8 hours which can be a risk factor of being underweight.

CONCLUSION

Nutrition is the key foundation that determines a healthy childhood and promotes healthy eating habits among children that they will practice for life. The aim of this study was to compare the nutritional status among children from Private and Government schools and also to assess the risk factors among

them.

According to the findings, majority of the children from Government School belonged to lower socioeconomic status and also the underweight prevalence was higher among them, which shows that the socioeconomic status affects their nutritional status and the mid-day meal plan in the Government school is less than enough to meet the caloric needs of children. It was also found that there is no significant association between BMI and the diet pattern of the students from both schools. Snacks and junk foods consumed at home and outside home is one of the risk factor for overweight in Private School. And also there is an association between the time spent on watching television/using mobile and increased prevalence of overweight in children from Private School. And from this study, it was also found that there is no significant association between waist-hip ratio and nutritional status.

In a nutshell, by imparting proper educational interventional strategies, evaluating a child's nutritional status will aid in identifying risk factors, which in turn helps in preventing future health related consequences through awareness, prophylaxis, sustainable intervention in regard with healthy nutritional practices, encouragement of physical activity and thus leading a healthy lifestyle. And also, effective mid-day meal plan has to be implemented and executed so as to prevent the prevalence of underweight among children in Government School.

FUTURE DIRECTIONS

- The study needs to be done among larger number of subjects and thus more information regarding nutritional status and risk factors can be assessed.
- Interventional strategies can be developed among children to provide proper nutritional education and awareness that helps in better development of health in the future generation.
- Further study based on comparison between the actual calories they intake and the expected caloric requirement has to be studied for a better vision of their nutritional status.

LIMITATIONS

The study has certain limitations.

- The data collected was only from selected schools and it may not be the representative of nutritional pattern across the city.
- The sample size of the study was comparatively less.
- The study couldn't expound much information regarding risk factors that are related to malnutrition among children.

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