

Vulnerability for Life Style Disorders among Affluent Primary School Children of Srinagar, Jammu and Kashmir, India

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ABSTRACT This study explored the health status of children belonging to affluent families and aimed to gain insight into their dietary habits and activity pattern. The sample comprised of 128 school children (79 boys and 49 girls). Entire sample was drawn from 5 reputed schools of Srinagar district using random sampling techniques. The results from anthropometric measurements by sex and age gave a clear cut indication of obesity which was more profound among girls, while majority of boys were in overweight category. Mild anaemia was observed in 50% of the sample children with a statistically significant difference ($\chi^2 = 10.84$) between girls and boys. In addition, dental problems such as caries, and discolorations accounted for the highest prevalence. The data on dietary and activity pattern showed high favoritism for fast food and other junk food with T.V. watching, and computer/video games as major leisure time activities. Comparatively increased food frequency and decreased exercise was more evident among girls. To conclude, many health disorders including obesity, hypertension, anemia, dental caries were found among affluent school children though problems were at asymptomatic stage due to decreased physical activities, sedentary lifestyle, altered eating patterns, and increased fat content of the diet which were the identified significant underlying factors. The results suggest immediate intervention measures for the health of school going affluent children since the reported health concerns can even lead to cognitive delay and other serious ailments in future.

INTRODUCTION

The recent economic trends show a marked improvement in financial condition of the families belonging to middle and high income strata. Although better purchasing power has brought about improvement in living conditions, it has also affected the health of family members, in particular children, negatively due to changed activity patterns, sedentary lifestyle and wrong choices of foods. Developing countries are undergoing nutrition transition due to increased economic development and market globalization leading to rapid changes in life style and dietary habits. Poor dietary habits combined with decreased physical activity have led to an increase in over weight and obesity among affluent children (WHO 2003). The adoption of western ways of life along with increased availability and accessibility of food rich in energy and fat, inclination towards carbonated drinks, chocolate, pizzas coupled with sedentary mode of life has increased the prevalence of obesity among school children which has detrimental effect on their health (WHO/SEARO HOME/SEARCH). All this points towards the need to urgently focus on the health of children from affluent families.

Affluent family refers to those families who are with the abundance of prosperity and wealth (Oxford Dictionary). The children who are privileged with wealth and prosperity in the society are highly influenced by life style and economic status of the families. Recent studies have cautioned that every 15th school going high income group child is obese (www.healthandnutrition.co.in) and nearly 80% of these children grow up to be overweight adults.

Studies on dietary intake have indicated that altered eating patterns and increased fat content of the diet among affluent children have given rise to many health problems especially among the children. Food in urban area has been replaced by high calorie snacks and junk food which is a major factor leading to health problems among affluent children. Thus, it has been opined that poor dietary habits and lack of exercise are the main causes of health disorder among affluent children and other factors such as psycho-social, bio-ecological environment also influence children. Inadequate intake of micronutrients not only debilitate growth and development but also influence cognitive performance, academic achievements and language development of children and increase susceptibility to infections (Hatterman et al. 2001;

Benton 2001; Kapil et al. 2003; Caulfield et al. 2004). Studies have also indicated the relationship of affluence and changing lifestyle of families with increased purchasing powers, unsafe roads, lack of free space for playing, increasing hours of inactivity due to television. In addition, video games and computers have replaced outdoor games and other social activities (Bhave et al. 2004; Singh and Sharma 2008). All these factors are also increasing the susceptibility for various lifestyle disorders like overweight and obesity, insulin resistance syndrome, hypertension, dyslipidemia, diabetes, coronary heart diseases, orthopedic and many more among affluent children (Yang et al. 2005). Moreover, many family characteristics such as urban residence, father and/or mother involved in service/business, English medium school and child playing outdoor games for less than 30 minutes play important role in predisposing the children to overweight/obesity. Various studies conducted on affluent children in different settings have revealed that affluence generally leads to an increase in lifestyle disorders. A study by Bharti et al. (2008) has found that urban fathers and/or mothers service/business adds to the affluence and found to increase the risk of overweight/obesity. In a cross-sectional study by Sidhu et al. (2006), it was reported that overweight and obesity were prevalent among school going children of affluent families of Punjab. In this study, 12.24% boy and 14.31% girls were found to be overweight while 5.92% boys and 6.27% girls were obese. The prevalence of overweight and obesity was as high or higher as compared to developed countries. The study on Bengali children of Kolkata by Bose et al. (2007) revealed overall overweight and obesity were 17.63% and 5.10% respectively. A steady increase in the number of overweight individuals was observed from 6-9 years. The prevalence of overweight among affluent Bengali children was higher than those reported from other Asian countries. Results showed by Kaneria et al. (2006) on prevalence of overweight and obesity in relation to socio-economic conditions in two different groups of school-age children of Udaipur city (Rajasthan) revealed that there was significant increase in overweight (3.25%) in the affluent group as compared to the non-affluent group. Obesity in the affluent group was 3.73% but no case of obesity was observed in

the non-affluent group. Hence, the comparative data clearly delineates that obesity is increasing badly due to affluence in populations. In a study of prevalence of obesity in affluent school children of Delhi (Sarma et al. 2006), it was concluded that the rise of obesity among children is because of their change in life style and nutrition education can play an important part in reducing the incidence of overweight/obesity and its associated complications.

Several studies (Singh and Sharma 2008; Malenfant 2009) on physical activities of affluent children have revealed that more physical activities have been recorded among Indian children. Boys were playing more than girls specifically outdoors. Giammattei et al. (2003) also reported that children who spent more time watching television had a higher BMI and a higher per cent of body fat and were physically less active. The rate of overweight and obesity among children worldwide have been increasing dramatically in the last few years (WHO 1998) with similar trends being observed in recent years among children and adolescents from developing countries (Lobstein et al. 2004). Less involvement of children in physical activities due to television, video games, and computers has increased various lifestyle disorders. Physical activities have many positive effects on children's health while TV viewing has been associated with adverse health outcomes. Parents are likely to be an important influence on their children's physical activities. There is an absence of information about the association between parents and children's physical activities.

Rationale for the Study

Increasing affluence is engulfing the health of children due to improper eating habits and life style disorders during early years. Due to this there is an increasing need for special attention to the health of this vulnerable group of children. Furthermore, studies cited above have been conducted in metropolitan cities where westernization is more prevalent. Hardly any research data is available for children residing in smaller cities. In order to fill this gap, the present study has been planned to find out whether the metropolitan trends relating to eating habits and life style disorders are prevalent

among the affluent children in Srinagar (winter capital of Jammu and Kashmir State, India). In addition, since these children are residing in a city presently affected by armed conflict, it was felt that these children were more vulnerable than other children residing elsewhere. Keeping in mind these two factors, the present research exercise was undertaken.

The results were also expected to prove helpful not only to parents, school authorities but also to health educators, policy planners etc. This information would be valuable to show the way forward for improving the health status of children by implementation of well- designed programs for health and nutrition education and other intervention measures.

Objectives

The present study was carried out with the following objectives:

1. Assessing the present health status of children belonging to affluent families from Srinagar district.
2. Analysing the life style and physical activity pattern of children.
3. Assessing dietary pattern with respect to the food frequency.
4. Determining the vulnerability for various health disorders among affluent children.

METHODOLOGY OF THE STUDY

The sample group comprised 128 school children studying in primary classes (2nd – 5th standard), falling in the age group of 7-11 years. The sample was taken from five most reputed schools of Srinagar district having uniform monthly fee structure of Rs.500-700. The schools from which the sample group was obtained were selected by random sampling technique

Sampling Procedure

List of affluent primary schools of Srinagar District was obtained from the Directorate of School Education. Those five schools which fulfilled the criteria of the study were randomly selected. Finally, the consent of school authorities was obtained after explaining the objectives as well as the method of study and data collection was started. The tools used in the present study have been presented in Table 1.

Table 1: Tools used in the study

S. No.	Name of the tools	Description
I.	<i>Socio-economic Scale</i>	By Madhosh and Raffique (2002) was used for selection of affluent sample.
II.	<i>For Analysing Present Health Status</i>	
(1)	<i>Anthropometric Measures</i>	It is concerned with the measurement of various physical dimensions and gross composition of human body.
a)	Non-stretchable steel tape	For measuring height.
b)	Weighing machine	For measuring weight.
c)	Tape	Mid-arm circumference.
(2)	<i>Clinical Examination</i>	
a)	Observation	General health observation was done to assess the presence of deficiency signs.
b)	Snellens eye-chart	For assessing vision.
c)	Rennes hearing test	For assessing the auditory acuity of the sample children.
d)	Cynmethomoglobin method	For testing haemoglobin
e)	Clinical test	For stool checkups
f)	Sphygmometer	For testing blood pressure
III.	<i>For Analysing Dietary Pattern</i>	
(a)	<i>Food diaries</i>	Food diary was obtained for information about the food consumed by the sample child during four days in a week.
IV.	<i>Vulnerability Questionnaire</i>	For health disorders questionnaire was prepared for parents of the sample children to elicit the information regarding familial history of any health disorder and their perception about the health of their children.

Data Collection

1. Anthropometric Measurements: Height was measured to the nearest 0.5 cm with non-stretchable steel tape. The subjects were asked to stand erect barefoot, feet together and heels back against the wall. A mark was made on wall to make Frankfurt plane horizontal. The reading was taken by placing the tape from the lower edge of the wall to the mark. Body weight was measured to the nearest 0.5 kg with the subject standing motionless on the weighing scale and weight equally distributed on each leg. B.M.I. was calculated as it correlates well with the subcutaneous fat and yet allows a variation in the lean body mass, it is given by the formula:

$$\text{BMI} = \frac{W \text{ (Kg)}}{\text{Ht (met)}^2} = \text{Kg / met}^2$$

The calculations were later compared with WHO (1995) standard for classification of sample.

WHO Standards (1995):

Body Mass Index

Below 18.5 – Under weight

18.5 – 25.0 – Normal

25.1 – 29.1 – Over weight

30 above – Obese

MUAC is the circumference taken at mid point between top of the shoulders and tip of the elbow. During the measurement children were asked to fold their left arm at right angle at elbow, keeping it close to the body, Distance from top of the shoulder to the tip of the elbow was measured.

2. Clinical Assessment

- a) General health of the sample children was assessed for the presence of deficiency signs through observation.
- b) Vision was assessed by Snellens Eye Chart which was fixed on the wall of the class room below a well-illuminated lamp. Since 6 mts. distance was not possible, so children were asked to stand near the opposite wall and asked to read from one eye at a time, by closing the other one with the palm of the hand.
- c) Rennes hearing test was used for assessment of the auditory acuity of the sample children. At first tuning fork of 256 Hz was activated and base of the fork was held on the mastoid bone. After the child can no longer hear the sound, the tuning fork was immediately placed near the external auditory meatus.
- d) Haemoglobin estimation of children was done in collaboration with well reputed clinical laboratory by cyanmethemoglobin method. The reading were compared with WHO standards for classification of anemic samples.
Haemoglobin Values
 Mild - 10-11 gms
 Moderate - 7-10 gms
 Severe - Less than 7 gms
- e) *Stool*: Parents of the sample children were requested to submit the latest stool examination report of their wards, which were later analysed for the presence of intestinal infections.

- f) Blood pressure was recorded by mercury gravity sphygmometer.

3. Daily Dietary Diary: The dietary pattern of children was studied by using food recall diary for four consecutive days. The data was obtained about the daily meal pattern. The number of meals taken by each child per day were classified as major meals including breakfast, lunch, dinner and minor or in-between meals including snacks, tea, food etc. The total number of meals (major and minor) were calculated to get the meal frequency.

4. Vulnerability Questionnaire: A questionnaire was prepared for parents of the sample children to elicit the information regarding familiar history of any health disorder and their perception about the health of their children. The main sections of the questionnaire were:

- 1) History of health disorder in the family.
- 2) Present health status of children.
- 3) Immunization status of children

Questionnaire was given to the parents of the sample children for the information after explaining them the objectives and method of filling.

RESULTS AND DISCUSSION

The data collected was analyzed and interpreted under the following headings.

1. Basic information about sample respondents.
2. Present health status of children
3. Life style and physical activity pattern
4. Dietary Pattern
5. Vulnerability for health disorders.

1. Basic Information

The present study was conducted on 128 school children belonging to affluent families from Srinagar district of Kashmir Province. Table 2 depicts the age, academic grade and sex of the respondents. It is clear that there were more boys (79) than girls (49) in the sample group. 62% children belonged to the age group 9⁺-11 years.

More mothers than fathers were graduates. Majority of fathers had M.B.B.S. and B.E. Degrees while a large number of mothers had Ph.D. and P.G. degrees. As far as occupation is concerned large number of fathers were medical doctors by profession (33.59) while majority of mothers were home-makers which is depicted in Table 3.

Table 2: Distribution of children according to age and sex

Age (Academic Grade)	Boys (N = 79)		Girls (N = 49)		Total (N = 128)	
	n	%	n	%	n	%
7 ⁺ -8 years(2 nd class)	15	18.98	8	16.32	23	17.96
8 ⁺ -9 years(3 rd class)	15	18.98	11	22.44	26	20.31
9 ⁺ -10 years(4 th class)	24	30.37	15	30.61	39	30.46
10 ⁺ -11 years(5 th class)	25	31.64	15	30.61	40	31.25

Table 3: Occupation of parents

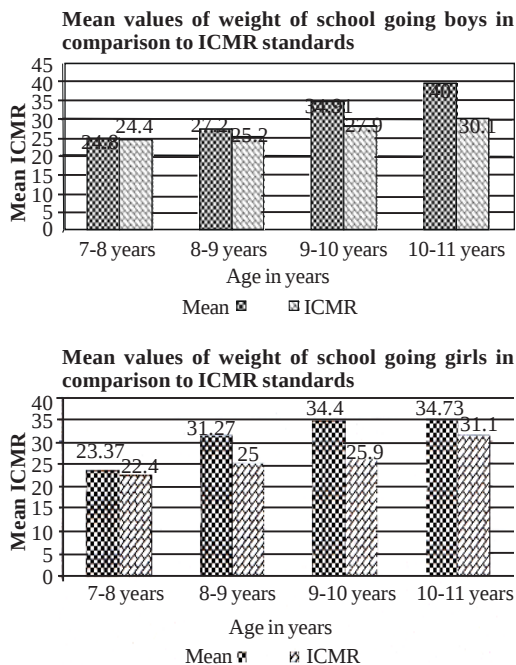
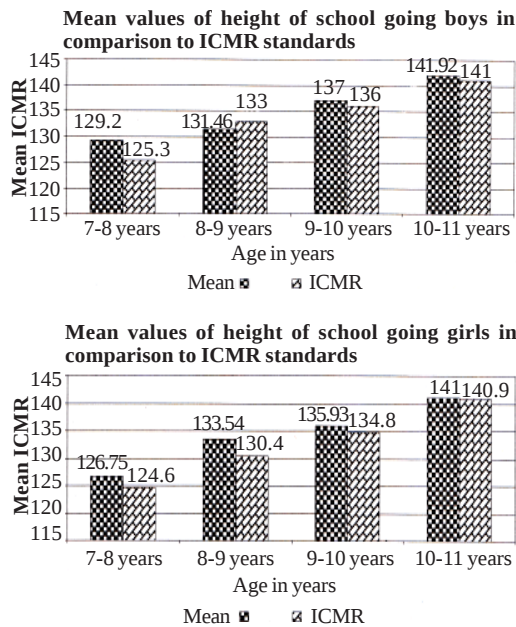
Occupation	Fathers	Mothers
Doctor	46	02
Engineer	30	31
Business	28	-
Teacher	-	31
Housewife	28	51
Other administration services	35	13

2. Present Health Status of Children

Figures 1 and 2 present the anthropometric data (Weight, Height) of sample children along with ICMR data about the normal weight and height for each age group. For all age groups the mean weight of the boys exceeded 95th percentile of ICMR norms, though the deviations were more profound in the age group of 9-11

years (± 10.7 kg for +9 years and ± 9 kg for +10 years). Similar pattern was observed in the mean height of boys with an exception in 8-9 years where the mean height was less than 95th percentile (SD ± 1.84). Likewise, the mean weight and height measurements exceeded the 95th percentile of ICMR, indicating that these children enjoyed the highest level of nutrition and growth. In case of girls, similar trend was observed. The weight and height of girls also increased up with age as per ICMR norms.

Figure 3 depicts the mean and standard deviation of mid upper arm circumference of sample children in comparison to ICMR standards. The result reveals that the mean value of MUAC for both boys and girls were higher than the ICMR norms for all the age groups which is a clear cut, indication of increased body mass among them.

**Fig. 1. Mean values of weight of school going children (boys and girls) in comparison to ICMR standards****Fig. 2. Mean values of height of school going children (boys and girls) in comparison to ICMR standards**

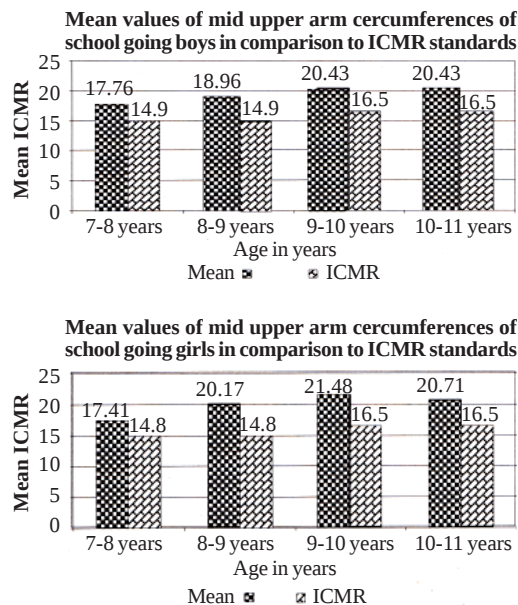


Fig. 3. Mean values of mid upper arm circumference of school going children(boys and girls) in comparison to ICMR standards

3. Life Style and Physical Activity Pattern

Life style changes resulting in physical inactivity and sedentary behaviour seem to be more important in contributing to the problem of obesity in children which further gives rise to other health problems. The data reveals that the mean sleeping hours of children were 8.71 with approximately equal values among boys (8.64 hours) and girls (8.79 hours). The data pertaining to the physical activity shows a large number of children (54.68%) were not involved in any sort of physical exercise. At the same time, physical inactivity was more profound among girls (65.3%) as compared to boys (60.75%).

As far as leisure time activity pattern was considered, most of the children were engaged in sedentary activities like T.V. watching (43.75%) and playing computer games (26.56%) while only (29.69%) were involved in playing games like cricket, running, hide and seek etc. which is important for children to grow better in every manner. Further, irrespective of the type of activity, high involvement in activities was found on the part of boys as compared to girls which is shown in Table 4.

4. Dietary Pattern of Sample children

Food to supply good nutrition is fundamental to the overall health of the person. Food influences each stage of development. Dietary pattern are the results of the consequences of the interrelated personal and environmental factors. The dietary patterns of children are changing with the changing economic scenario. As a matter of fact, different dietary problems are becoming evident in different sections of society.

The result from the Table 5 revealed that the mean meal frequency among children was 5.57 per day. The frequency of eating was higher among girls (6.63) as compared to boys (6.52) though the difference was very less (0.11). Irrespective of the frequency of meals, majority of children (59%) showed high preference for junk foods including pizza, cold drinks, chips, most of which was induced by T.V. advertisements. Further, boys (59.49%) were found to exceed girls (57.14%) in their favoritism for junks, which shows a comparative higher inclination among boys towards fast food than girls. However, the difference in food preferences between two sexes was found to be statistically insignificant.

Table 4: Physical activity assessment of sample children

	Boys (N = 79)		Girls (N = 49)		Total (N = 128)	
	n	%	n	%	N	%
Mean Sleeping Hours Exercise	8.64		8.79		8.715	
Yes	31	39.24	17	34.69	48	37.5
Daily	15	18.98	9	18.36	24	18.75
Occasionally	16	20.25	8	16.32	24	18.75
No	48	60.75	32	65.80	80	62.53
Major Leisure Time Activities						
T.V. Watching	32	40.50	14	28.57	46	35.93
Computer Games	22	27.84	12	24.48	34	26.56
Outdoor games	25	31.64	14	28.57	39	30.46

Table 5: Dietary pattern and food preference of sample children

	Boys (N = 79) Mean		Girls (N = 49) Mean		Total (N = 128)	
Frequency of meals	6.52		6.63		5.57	
Number of major meals	3.09		3.45		3.28	
Number of in between meals	1.34		1.64		1.49	

Food preference of sample children						
	n	%	n	%	N	%
Healthy food	32	40.50	21	42.85	53	41.40
Junk food	47	59.49	28	57.14	75	58.59

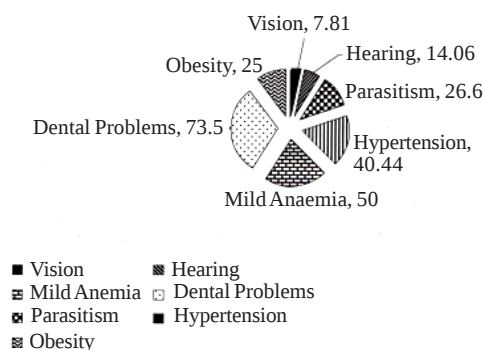
Similarly, studies on dietary intake of affluent children showed that the diet of these children was largely cereal and pulses based; milk and milk products were consumed in moderation, whereas, fruits and vegetable intake was inadequate (Seshadri et al. 1999; Vijayapushpam et al. 2003; Iyer et al. 2006;). Total fat and sugar intakes were twice the RDA (Seshadri et al. 1999).

5. Vulnerability for Health Disorders

Affluence is marking its presence among young lives. This is evident from Figure 4, which gives a gross health status of affluent children. Clinical assessment of sample of primary school children of Srinagar district included assessment of vision, auditory acuity, haemoglobin, stool check ups, blood pressure etc. which was done with the help of laboratory technicians. The results witnessed the presence of increasing obesity as 25% children were found to have excess body weight. Similar results were found by Ramachandran et al. (2002), Chatterjee (2002), Kapil et al. (2002), Subramanyam et al. (2003), Chhatwal et al. (2004), Khadilkar and Khadilkar (2004), Sidhu et al. (2005), Iyer et al. (2006) who reported on the prevalence of overweight and obesity among children.

In the present study it was also opined that 40% suffered from symptomatic hypertension which was higher among boys as compared to girls. The dental problem arises as a major concern with 73% suffering from one or more than one dental problems. These indicate poor knowledge and awareness about oral health. Apart from these, mild anemia was found in 50% of these affluent children (Fig. 4). Information on the prevalence of anemia was available from 3

studies (Verma et al. 1998; Seshadri et al. 1999; Siva Kumar et al. 2006) in which the overall prevalence of anemia among children from Middle High Socio-Economic Status (MHSES) ranged from 14% in the upper class in Punjab to 88% in Chennai. In Punjab study, Verma et al. (1998) reveal that more than half (55%) children had anemia caused by iron deficiency. Large number of children were found free from vision errors and any kind of hearing impairment.

**Fig. 4 . Overall health profile of sample children**

DISCUSSION

The available data showed a progressive increase over the years in both the sexes, while in girls the yearly increment in height, weight and mid upper arm circumference followed a declining trend with age, a sudden shoot up was observed in boys after 10 years. This indicated that initial growth spurt was maximum in girls which for boys was observed after 10 years.

The comparison of anthropometric measurements with ICMR standard showed that the mean height, weight and mid upper arm circumference of children exceeds 95th percentile of ICMR for all ages, with an exception in 8-9 years where mean height of boys was less than ICMR values. The mean values exceeding the 95th percentile of ICMR in itself indicates the presence of excessive body mass (Tremblay et al. 2003).

The data pertaining to the physical activity showed that large number of children (54.68%) were engaged in sedentary behaviour with television viewing (43.75), and playing computer games (26.56%) as major leisure time activities. Lack of a regular habit of exercise further increased the state of immobility among them.

The analysis of food diaries revealed that mean frequency of meals was slightly higher in girls (6.63%) than boys (6.52%). Though the meal frequency was the number of major meals (0.36) and in between meals (0.3), though the difference was not considered statistically significant ($\chi^2 = 0.97$, table value = 3.84, df = 1).

From the overall profile of the sample children, it is evident that the haemoglobin estimation identified approximately 50% of children having mild anemia, placing girls at a higher risk in coming years. The results are in accordance with Gupta et al. (1997), Agarwal et al. (1999) and Bambewala and Subbulakshmi (2001) who reported high prevalence of anemia among school going girls especially those belonging to affluent classes (Kapil et al. 2003). Further, anemia was irrespective of parasitic infection which was reported only in 26.6% children. The evaluation of arterial pressure showed an overall presence of hypertension in 40.44% children. Apart from these, dental problems such as caries, discoloration, etc. were found to be common among affluent children which points towards poor oral health and hygiene as well as high consumption of sugar rich food. The high prevalence of dental problems among school children was also observed by Gupta (1999) and Dash et al. (2002) in their studies.

CONCLUSION

On the basis of the above discussion, it can be concluded that various lifestyle disorders like obesity, hypertension, anemia, dental problems along with mild deficiencies of some important nutrient marked their presence in sample affluent children. A sedentary mode of life due to lack of proper physical exercise and easy accessibility to modern gadgets like T.V., computer along with high favoritism for junk could be important causative factors, which if not timely corrected increase the susceptibility of these children for serious problems like Coronary Heart Disease, Diabetes etc. and can also affect their cognitive development in future.

RECOMMENDATIONS

On the basis of results discussed earlier the following recommendations are suggested

- Consumption of high fat and high energy (junk foods) and snacking in between the meals should be avoided by children.

- Health education should be given to parents, teachers and children regarding dietary habits and sedentary life style.
- The children should be motivated to participate in various physical activities both inside school and outside home.
- The change in lifestyle should be taken under small steps so that the family could accommodate and appreciate them. The provision of additional clinical services should be provided which includes access to dieticians family, psychologist who specialized in nutrition, physical activity and health.

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