



Development Of Fatness Preventive Educational Programme For Higher Secondary Level School Children

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Abstract

Childhood fatness is an emerging health problem around the world. WHO (1998) has recognized it as the major health problem and the prevalence has increased both in industrialized and in developing Countries. It is argued that the level of fatness in Higher Secondary level children and to impart education regarding the prevention and management of childhood fatness through preventive educational programme. The aim of this study was- 1- To examine the level of fatness in higher secondary level school children. 2- To develop appropriate educational material for the purpose of imparting knowledge to school children. 3- to assess the awareness levels of higher secondary school students before and after imparting education.

This study is focused on developments of fatness preventive educational programmed by self-constructed tool. A questionnaire was developed to collect the information based on general dietary habits and physical activity patterns of the selected school's children. Participants of this study were 200 (103 male and 97 female) on the basis of government and private higher secondary school. The random sampling and purposive sampling method was used in this study. The result of this study showed that overall, the levels of fatness was more among boys than the girls. It showed that the level of fatness is increasing day by day in India and other foreign countries also it is affecting students by hereditary, environmental, metabolic and behavioral factors may all have a roll in the development and progress of fatness. Intervention programs and several other efforts are the required steps for the prevention of childhood fatness.

Keywords: Fatness, Fatness preventive educational programme, Higher Secondary level

Introduction

Fatness is the most common health problem facing Students. WHO defined Fatness as "The extent to which body fat has accumulated to a degree that health is adversely affected." The prevalence of overweight and fatness is commonly assessed by using Body Mass Index (BMI), defined as the weight in kilograms divided by square of height in meters.

Presently the scientific community has recommended the use of BMI to classify overweight and fatness in children from the age of 2 years (Dietz & Bellizzi 1999, Peitrobelli et al., 1998, Dietz & Robinson 1998, Gallagher et al., 1996). But the BMI should not be considered as sole criterion for assessment of overweight and fatness. Measurement of skin fold thickness and waist circumference provides a direct estimate of cetaceous fat distribution, which correlates well with BMI. Indian academy of pediatrics (IAP) has made the consensus guidelines for growth monitoring as per IAP action plan for 2006 and according to this for Indian children. The rising epidemic reflects the profound changes in society and in behavioral patterns of communities over recent decades.

According to Kain & Andrade (1999), the improvement of economic situation and the modernization of society have led to an increase in the consumption of high energy foods and an alarming increase in the sedentary behavior, which are probably the main reasons why obesity rates in preschool and school children doubled over the past decades.

Proctor et al., (2003) found that T.V. watching has been directly linked to childhood fatness, with a rate that is 8.3 times greater in children who watch over 5 hours of TV per day compared with those who watch two hours or less of TV per day. The past few decades have brought marked lifestyle changes throughout the world, which have resulted in a decrease in physical activity and in increase in caloric intake. Children use automobiles and other automated means of transportation, including elevators and escalators, rather than walking or climbing stairs.

Jasjeet and Anoop (2004) reported that rapid pace of economic and demographic changes in India has ushered marked nutritional and lifestyle changes. The diet in the urban and semi-urban areas contain more calories and saturated fats, less fiber as compared to the traditional frugal diets, and have become similar to the diets consumed by the people living in the developed countries and children and adolescents are highly susceptible to acquire such unhealthy lifestyle changes.

In 2002, WHO reported lists overweight as the fifth most serious factor for both developed and developing countries. According to the report of international obesity Task Force (IOTF), among the children of age group 5-17 years, 2-3% of children were reported obese globally in year 2002. In developed and affluent countries, the rate of rise in the prevalence of childhood fatness is faster as compared to the developing countries. But developing countries like India is facing more complex situation with serious social and psychological dimensions as the fatness is co-existing with under nutrition, affecting virtually all ages and socioeconomic groups. Children in the pre-adolescent age groups of 8-12 years are increasingly facing this problem. Currently, the prevalence of fatness in school students is 20% in UK Australia, 15.8% in Saudi Arabia, 15.6% in Thailand, 10% in Japan and 7.8% in Iran.

Rationale of the study

Fatness is a risk factor for many chronic diseases like diabetes, hypertension, cardiovascular complications, sleep apnea and psychological distress etc. A fatty child is more likely to become a fatty adult. According to Indian Academy of Pediatrics, BMI more than 95 percentile and 85 percentile is the criterion to determine the fatness and overweight in children. In India, there are only few studies reporting about the prevalence of childhood fatness, therefore the present study is planned to assess the level of fatness in higher secondary level students and to impart education regarding the prevention and management of childhood fatness through fatness preventive educational programme.

Statement of the problem: To assess the Development of fatness Preventive Educational Programme for higher Secondary Level School children.

Objectives of the study-

- 1- To assess the levels of fatness in higher secondary level school children.
- 2- To develop appropriate education material for the purpose of imparting knowledge to school children.
- 3- To assess the awareness level of higher secondary level school students before and after imparting education.

Methodology-

Population of the study- The Population of the study includes students of higher secondary level in Kanpur district only. The aim of the study is to determining the factors that influence fatness and also to check the development of obesity preventive educational programme.

Sample of the study- The study was conducted in Four purposively selected school, 2 private school and 2 government schools. From each school, 50 children of higher secondary level were purposely selected.

Study Tool and its administration- Technique of Evaluation (Knowledge-Attitude-Practices Questionnaire) To know about the knowledge, attitude and practices of the selected fatty students and their parents on childhood fatness, a questionnaire was developed. The K-A-P questionnaire was administered twice i.e., before and after the education programme. The questionnaire consisted of 30 questions and it was given separately to the fatty students and their parents. They were asked to tick the correct answer in their view. Each correct answer was given a mark and the scores obtained were recorded for each respondent and marked at pre and post intervention separately.

Data collection-The selected school students were briefly informed about the purpose of the study, which helped in getting their desired cooperation. Prior to the data collection, sufficient rapport was established with the school children during the initial days of investigation. The information on anthropometric measurement general dietary habits and physical activity patterns of the school children was collected using a structured questionnaire.

SELECTION AND DESCRIPTION OF TOOLS

Data on general dietary habits and physical activity patterns

A questionnaire was developed to collect the information based on general dietary habits and physical activity patterns of the selected school students. The questionnaire was prepared in an easy language, which could be easily understood by the school students. All the questions were designed in a manner, which helped to extract the desirable information from the school students. The questionnaire was pre-tested with 30 respondents outside the present study. The pre-testing of the questionnaire helped to make suitable modifications before finalizing the actual questionnaire for the study.

The questionnaire included the general information, questions on general dietary habits and the physical activity patterns of the school students, which relates them to fitness.

DEVELOPMENT OF EDUCATION MATERIALS

Audio-Visual Aids- For the purpose of imparting education about childhood fatness, its causes, consequences and prevention and management to the selected fatty children and their parents, education material was developed which included 2 charts, 2 posters, 2 models, 1 food pyramid and 4-5 food recipes. Programmed instruction by the use of various audio-visual aids helps to focus the attention of the target group due to their great impact and flexibility to be used on different age groups. All the charts, posters and pamphlets were designed so that they can facilitate the smooth flow of information to the selected children and their parents.

To make the education material interesting, attractive, clear and visible, bright colors and simple words were used so that students can easily understand. ACD was developed on causes, consequences and prevention and management of childhood fatness.

The selected fatty students and their parents were informed personally about the education programme. The programme was conducted in one of the schools included in the study after seeking the permission from the school authorities.

The developed education material was used in the programme to make it effective and interesting. The education programme was conducted in two sessions. The first session dealt with the childhood fatness, its causes and complications, while the second session covered prevention and management of childhood fatness.

STATISTICAL ANALYSIS

The anthropometric data and the data collected through the questionnaires were coded, classified, tabulated for statistical analysis. Mean values and standard deviations of the anthropometric data of the school students were calculated. Two sample t-test was applied to analyze the significance of difference between fatty and non-fatty students of private schools and government schools. For the purpose of tabulation and interpretation of results, the data was presented as mean and standard deviations. Paired t-test was applied to calculate the difference between the scores before the education programme and after the education programme.

Result-

General Result- The study sample, which included 103 boys and 97 girls, was assessed for the height, weight and waist circumference. BMI of each subject was calculated and using the Indian Academy of Pediatrics growth monitoring guidelines, students were categorized as fatty, overweight and non-fatty (Table 1). By using the above criteria, the results of the study revealed that, the overall prevalence of fatness and overweight in the study sample is 7% and 21.5% respectively (Table 2).

The prevalence of fatness and overweight are shown in Fig 1 and Fig 2. It was found that the prevalence of fatness (11%) and overweight (32%) in students was more in private schools as compared to fatness (3%) and overweight (11%) in government schools. In private schools 13.7% of boys were fatty which was 3.8% in government schools. The prevalence of overweight in boys of private schools was 35.2% and 11.5% in government school's boys. The prevalence of fatness in private school's girls was 8.2%, while 28.5% of girls were found overweight.

Table 1: levels of fatness and overweight among the school children.

S.No.	Categories	Percentile	Private schools (n=100)	Government Schools(n=100)	Overall % (n=200)

			Boys % (n=51)	Girls % (n=49)	Total %	Boys % (n=52)	Girls % (n=48)	Total %	
1.	fatty	>95	13.7	8.2	11	3.8	2.1	3	7
2.	Overweight	>85-95	35.2	28.5	32	11.5	10.4	11	21.5
3.	Non-fatty	<85	50.9	63.3	57	84.6	87.5	84	71.5

- Fatty>95 percentile
- Overweight>85 percentile
- Non-fatty>85 percentile

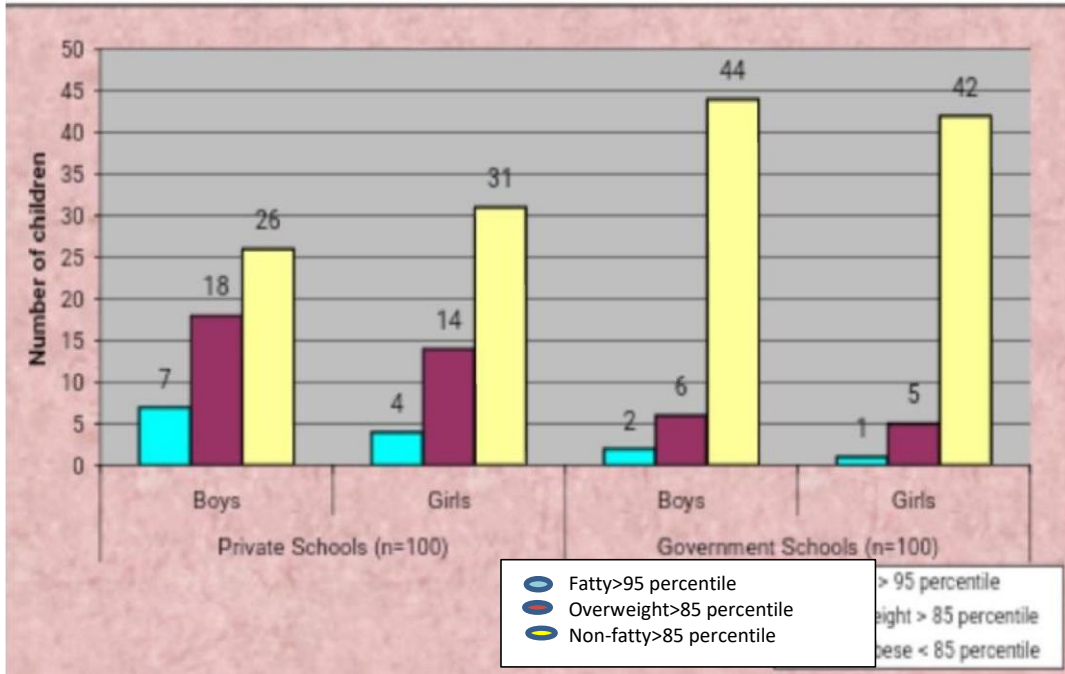


Fig 1: levels of fatness and overweight among the school children.

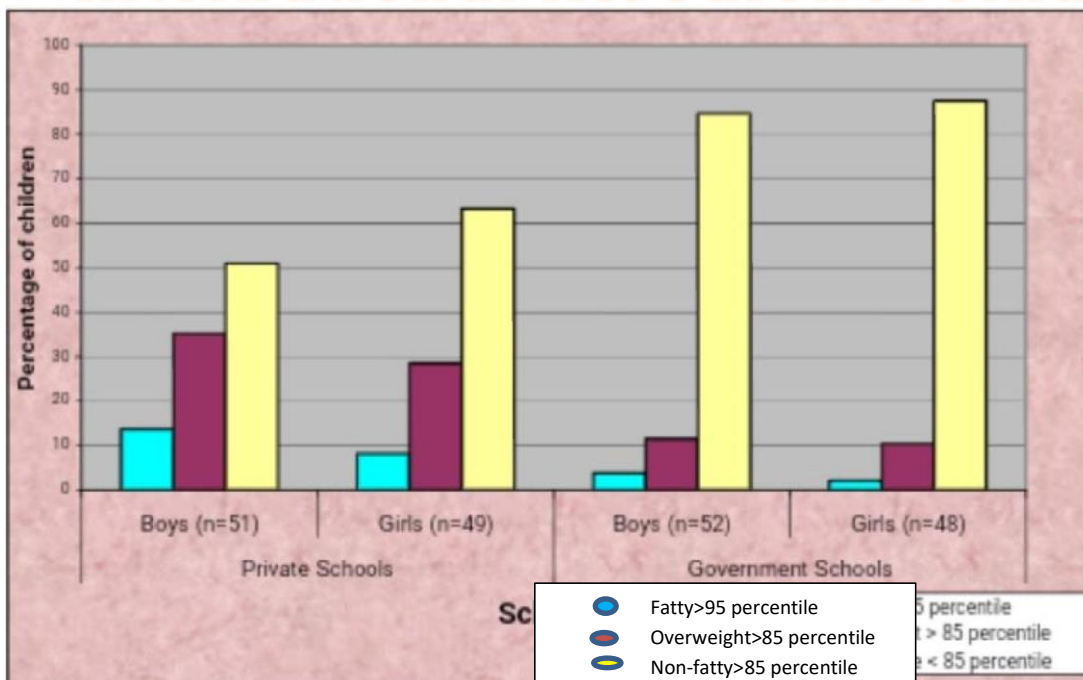


Fig2: % of levels of fatness and overweight among the school children.

In government schools, only 1 girl (2.1%) was reported obese and 10.4% as overweight. The levels of overweight in boys and girls were also found to be more in private schools (35.2% and 28.5%) as compared to government schools (11.5% and 10.4%).

fatness results from an imbalance between the amount of energy consumed and the amount of energy used. Modernization, decline in regular physical activity and an increase in sedentary lifestyle, passive overeating and socio cultural and economic influences create an obesogenic environment around the child and can be taken as the main cause towards the increased prevalence of fatness among children. Studies carried out by Vedavathi S. et al., (2003) in Chennai and Kapil U. et al., (2002) in Delhi reported a similar trend of 6.2% and 7.4% respectively in the prevalence of childhood fatness. In another study, which was carried out in a city of South West region of Brazil, the prevalence of fatness and overweight among the children was observed as 7.7% and 20.5% respectively (Monteiro et al, 2003).

The anthropometric parameters of fatty and non-fatty children are presented in Table 3. The BMI of fatty children was 24.92 ± 1.21 , whereas in case of non-fatty children, it was 15.90 ± 2.03 . Similar patterns were also observed in waist circumference (31.75 ± 3.06 , 23.07 ± 2.63) in fatty and non-fatty children. The difference observed between all the anthropometric parameters of fatty and non-fatty children was significant.

The anthropometric parameters of fatness boys of private and government school are presented in Table 4. There were significant differences between the BMI and waist circumferences of private and government school boys. Both the parameters (BMI and Waist circumference) were found more in private school boys i.e., 25.70 ± 1.54 and 34 ± 1.15 respectively, whereas in governments schools they were reported as 24.6 ± 0.17 and 30.25 ± 1.1 respectively.

Marwaha et al., (2006) reported a significant difference in height, weight and BMI between low and upper socioeconomic status children. The prevalence of overweight and fatness in upper SES children was 16.75 % and 5.59 % in boys and 19.01 % and 5.03 % in girls respectively. Significant disparity in anthropometric parameters between children from low and upper socioeconomic status children, with a high prevalence of overweight and obesity in upper SES children was also reported.

Currently, India is undergoing a rapid epidemiological transition with increased urbanization. Socio-economic development over the last 40-50 years has resulted in a dramatic change in lifestyle from traditional to modern, leading to physical inactivity due to technological advancement, affluence leading to consumption of diets rich in fat, sugar and calories and a high level of mental stress.

Table 2: Anthropometric parameters of fatty and non-fatty children

S.No.	Parameters	fatty(n=14)		Non-fatty (n=143)		T-Value
		Mean	S.D.	Mean	S.D.	
1.	BMI	24.92	1.21	15.90	2.03	24.60**
2.	Waist circumference	31.75	3.06	23.07	2.63	10.23**

The T-values with stars shows significant difference.

** $p < 0.001$.

Table 3: Anthropometric parameters of fatty boys of private and government schools.

S.No.	Parameters	Private schools		Government Schools		T-Value
		Mean	S.D.	Mean	S.D.	
1.	BMI	25.70	1.54	24.6	0.17	2.36*
2.	Waist Circumference	34	1.15	30.25	1.1	4.32*

The T-values with stars shows significant difference.

* $p < 0.05$, NS- Non-Significant.

fatness among the children has been on the rise in India for the past few years especially in urban areas and upper socio-economic status. Childhood fatness is attributed largely to sedentary lifestyle and the poor eating habits of children. More and more children prefer watching T.V. and playing computer games to outdoor games. Their dietary habits also leave a lot to be desired with fast and convenient foods finding a bigger place in their diet regimen. Easier access to pocket money and lack of quality time with parents also has contributed to worsen the situation.

The overall prevalence of fatness and overweight among the boys and girls of the study sample is presented in Table 5. The prevalence of fatness was more among boys (8.7%) than the girls (5.2%). The overall prevalence of overweight was also more in boys (23.3%) than in girls, which was 19.6%.

The present study shows that the prevalence of fatness and overweight is more in boys compared to girls. The reasons might be due to the boys are pampered more and they are given good food, both quality as well as quantity wise as compared to the girls. In addition to the gender discrimination, the family culture may also play an important role. In most of the families, girls are expected to help the family members in their household activities right from childhood itself, which adds to their more physical activity and energy expenditure. Similar results of higher prevalence of fatness in boys as compared to girls between the age group 10-12 years and 6-17 years were reported by Kapil et al., (2002) and Savva et al., (2002) respectively.

The anthropometric parameters of fatty boys and girls are presented in Table 6. Even though the BMI, waist circumference is slightly more in case of fatty boys compared to fatty girls, the difference however was not significant. Caroline et al., (2004) conducted a study on 748 subjects (> 17 y of age) to assess the effects of race, sex, and SES on the development of BMI and sum of skinfold thickness (as measures of general adiposity) and of waist circumference (as a measure of central adiposity) from childhood into early adulthood. The results of the study revealed differences for sum of skinfold thickness and waist circumference with males and females but showed no difference for BMI.

Table 4: levels of fatness and overweight among boys and girls

S.No.	Categories	Percentile	Total Boys (n=103)	Percentage	Total Girls (n=97)	Percentage
1.	Fatty	>95	9	8.7	5	5.2
2.	Overweight	>85-95	24	23.3	19	19.6
3.	Non-fatty	<85	70	68.0	73	75.3

Table 5: Anthropometric parameters of total fatty boys and total fatty girls

S.No.	Parameters	Fatty Boys		Fatty Girls		T-Value
		Mean	S.D.	Mean	S. D	
1.	BMI	25.38	1.44	24.70	1.42	NS 0.84
2.	Waist Circumference	33.16	1.94	30.3	4.46	NS 1.36

NS- Non-Significant

General dietary habits and physical activity patterns

The general dietary habits and physical activity patterns of the fatty and non-fatty students were studied through a questionnaire and the data is presented in Table 7. fatty children were found to consume more of junk foods, soft drinks, bakery products and less of fruits as compared to non-fatty.

The consumption of junk foods like pizza, burgers, French fries etc. was reported high by fatty children as compared to non-fatty children. Around 72% of fatty children consumed junk foods daily and 28% of them consume at least 2-3 times/week, whereas there were only 20% of non-fatty children who consumed junk foods at least 2-3 times/week. 14.5% of fatty children were reported to consume soft drinks daily and 78.5% of them consume 2-3 times/week. However, only 10% of non-fatty children were reported to consume soft drinks 2-3 times/week.

Bakery products like biscuits, puffs, patties etc., which are considered as a favorite snack of children are consumed more by fatty children i.e., 93% of the fatty children at least 2-3 times/week and just 30% of non-fatty. It was seen that consumption of fruits and vegetables was less in case of fatty children as compared to non-fatty children. Only 42% of fatty children eat fruits and vegetables daily and 58% of them 2-3 times/week, whereas 50% of non-fatty children are taking them daily, 40% of them 2-3 times/week and rest 10% occasionally.

The consumption of fats like butter, ghee, cheese and milk cream in case of fatty children was found more as 42% of them consume these on daily basis, 37% of them at least 2-3 times/week and 21% consume occasionally. Whereas, only 20% of non-fatty children consume these fats daily, 30% of them take just 2-3 times/week and rest of 40% were those who consume them occasionally. It is also observed that 86% of fatty children eat outside the home at least 2-3 times/week. Whereas, it is just 40% of non-fatty children who eat outside 2-3 times/week and 60% of them eat outside very occasionally, but there are only 14% of fatty children who eat outside very occasionally.

Fast food has become a prominent feature of the diet of children and increasing throughout the world, which have an adverse effect on dietary quality in ways that possibly could increase risk for fatness. Fast food pervades virtually all segments of society including local communities, private schools, and hospitals. These trends seem to have been driven by massive advertising and marketing campaigns aimed at children and their parents.

Several factors inherent to fast food may increase energy intake, thus promoting a positive energy balance and increasing risk for obesity. Children and adolescents who ate fast food more frequently compared with those who do not, consume more total and saturated fat, more total carbohydrate and added sugars, less dietary fiber, and more energy per gram of solid food. The high energy density and palatability of fat may promote excess energy intake, and total dietary fat has been directly associated with adiposity. (Tucker et al., 1997)

Although there were some differences in fast food consumption among the children of different socioeconomic groups in the present study, the prevalence was found higher in high socioeconomic group child

Table 6: General dietary habits of fatty and non-fatty school students.

S.No.	Variables	% Of fatty children			% Of Non-fatty children		
		Daily	2-3 times/week	Occasionally	Daily	23times/week	Occasionally
1.	Consumption of junk foods	72	28	0	0	20	80
2.	Consumption of soft drinks	14.5	78.5	7	0	10	90
3.	Consumption of bakery products	0	93	7	0	35	65
4.	Consumption of fruits and vegetables	42	58	0	50	40	10
5.	Consumption of butter/ghee/cheese /milk Cream	42	37	21	20	40	40
6.	Consumption of food outside home	0	86	14	0	40	60

Children of higher socioeconomic status may have more discretionary money and consequently greater access to fast food, and this fact may account for the relationship of higher income to greater consumption of fast food in the study.

The physical activity patterns of the fatty and non-fatty students are presented in Table 8. Information pertaining to their sleep duration, hours spent in front of T.V./ computer/ videogame, exercise routine, morning/evening walk routine, indulgence in extracurricular activities and mode of transport was collected. When the physical activity patterns of fatty and non-fatty students were studied, it was found that the fatty children are less active in comparison to non-fatty children. It was found that 71.5% of fatty children and 40% non-fatty children sleep for more than 8 hours (Fig3).When fatty and non-fatty children were studied with respect to screen time, it was found that 93% of fatty children spend at least 4-5 hours/day in front of T.V. in a day, while the population of non-fatty children who spend 4-5 hours in a day in front of T.V. in a day was quite less i.e. 20%, 80% of non-fatty children spend less than 8 hours in a day in front of T.V. against the 7% of obese children. When it comes to computer and videogames, 35% of fatty children spend 3-4 hours in a day, 65% spend at least 2 hours in a day. In case of non-fatty children, 20% of children spend 2-hours in a day and rest of 80% of children spend less than 2 hours in a day.

Television, along with other sedentary behaviors, may contribute to fatness by competing with more physically active behaviors, as well as setting the occasion for eating. Carlos et al., (2001) showed that the prevalence of fatness is greater among children who watch 4 or more hours of television a day which is consistent to the present study as 93% of fatty children watch T.V. for 4-5 hours in a day. Spending more time for T.V. watching and in front of computers and videogames encourages the child for snacking habits, which can be eating some chips, biscuits or soft drinks. Consumption of sugar-sweetened beverages, particularly carbonated soft drinks, may be a key contributor to the epidemic of overweight and fatness, by virtue of these beverages high added sugar content, low satiety, and incomplete compensation for total energy (Vasanti et al., 2006). It can be concluded that those who watch more TV are more likely to go with less healthy food options like consuming sweets and soft drinks on a daily basis and less likely to consume fruit and vegetables.

It was also observed that only 10.5% of fatty children have a daily exercise/morning/evening walk routine compared to 65% of non-fatty children. Only 28% of the fatty children were reported to indulge themselves into extra- curricular activities like swimming, karate, dance classes etc. in comparison to 80% of non-fatty children who were found more active. 69% of obese children were reported to use car/bike/bus as their daily mode of transport, 9% of them uses bicycle, where 80% of non-fatty children were those who use bicycle and rest 20% prefer to walk.

An increasing number of children are becoming overweight. Physical activity is one of the important contributory factors towards the escalation of fatness in children. The students spend their major part of the day in school. Most of the children get busy in tuition classes and homework after coming from the school. Due to very hectic schedule of the schools, they hardly get the time for any exercise, walks or extracurricular activities. Children have also become less active as a result of their easy access to technological advances and they prefer T.V/computes/videogames etc. to the outdoor playing. Spending more time in front of screen leaves the child for binge eating, less physical activities and more of calorie intake ultimately leading to fatness. Children like to use automobiles like cars over walking to move from place to place. In a study conducted by Muzaffar (2007) physical activity was significantly different between fatty and non-fatty children. Non-fatty children had more active sports like and they went to school by foot.

Table 7: Comparison of physical activity patterns of fatty and non-fatty school children

S. No	Activities	% Of fatty children	% Of Non-fatty children	
1.	Sleep <input type="checkbox"/> 8 hours	28.5	60	
		>8 hours	71.5	40
2.	Hours spent in front of T.V.	7-8 hours	0	0
		4-5 hours	93	20
		2 hours	7	80
3.	Daily exercise/morning/evening walks routine	a) Yes	10.5	65
		b) No	89.5	35
4.	Extra-curricular activities	Yes	28	80
		No	72	20
5.	Hours spent in front of computer/videogame (Hours/day)	of 3-4 hours	35	0
		2 hours	65	20
		<2 hours	0	80

6.	Mode of transport	Bike/Bus/Car	69	0
		Bicycle	9	80
		Walking	22	20

Fig 3: Sleep duration of fatty and non-fatty children.

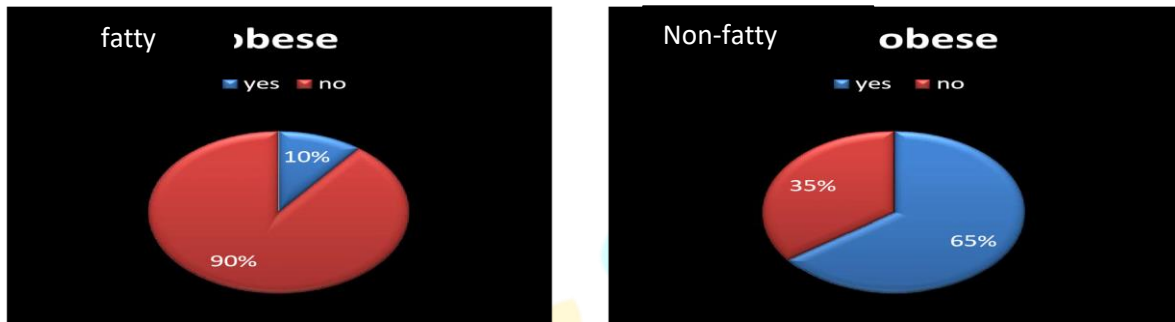


Fig 4: Daily exercise/morning/evening walk routines of fatty and non-fatty children

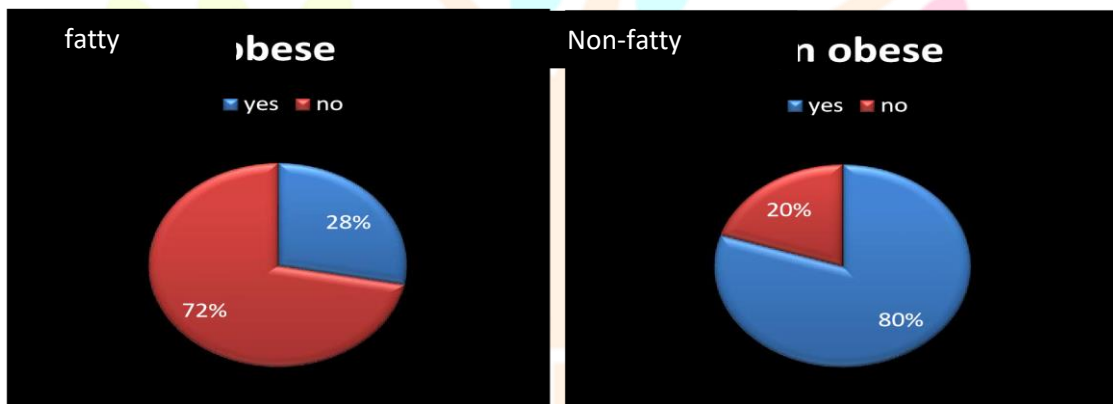


Fig5: Extracurricular activities of fatty and non-fatty children

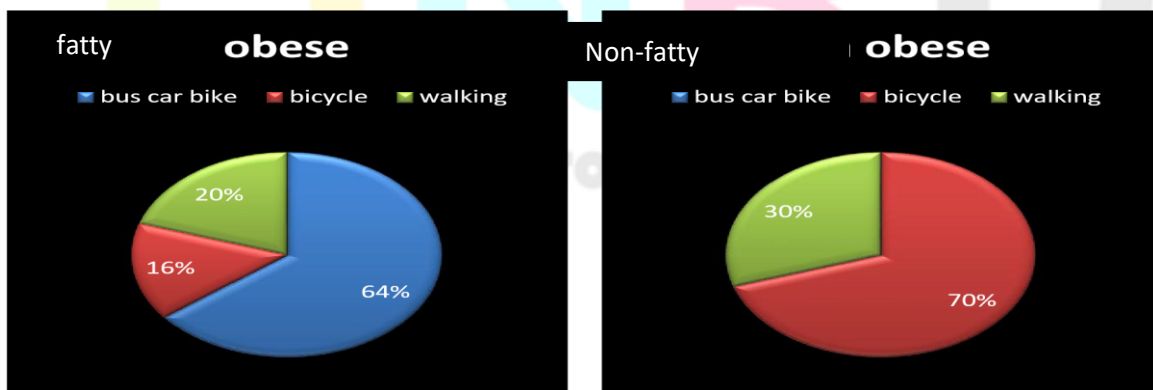


Fig 6: Mode of transport of fatty and non-fatty children.

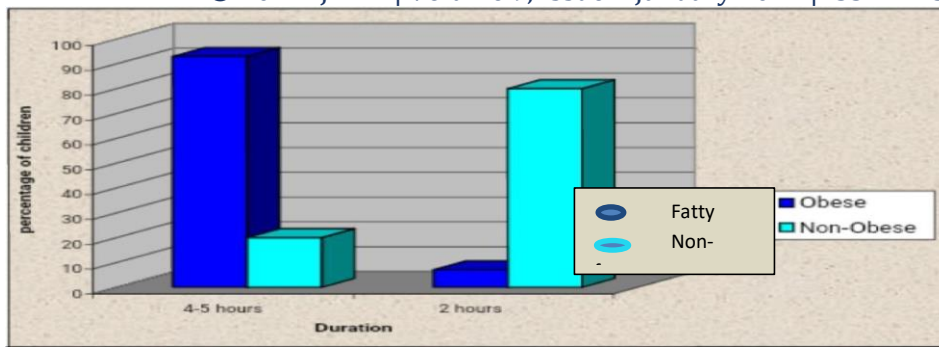


Fig 7: Time spent in front of T.V. by fatty and non-fatty children

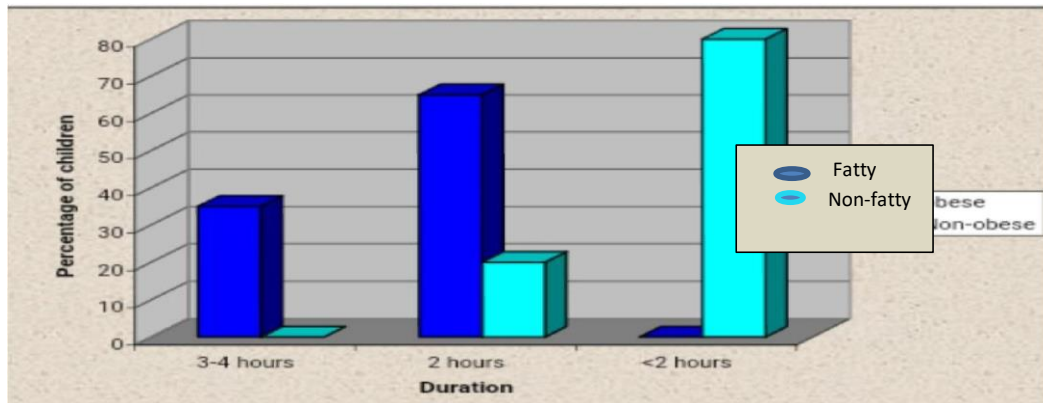


Fig 8: Time spent in front of computer/videogames by fatty and non-fatty children.

Education Programme

The increasing prevalence of fatty in children is a growing concern for all healthcare professionals and thus creating a need to design and implement an effective education programme which will be helpful in modifying the faulty behaviors and lifestyle of the children so that they can maintain the normal weight for the age. Education programs play a very important role in controlling fat through shaping the knowledge of individuals about diet, physical activity and their consequences on health status. Knowledge, Attitude and Practices (KA-P) has been identified to be influencing the food habits and life style of people. The impact of intervention programme was evaluated by a questionnaire, which was given before and after the education programme. The information was collected from the fatty children and their parents regarding their knowledge about childhood fat, its causes, consequences and prevention and management.

The knowledge and attitude scores of fatty children and their parents before and after the education programme are presented in Table 9. The mean knowledge score of the fatty children before the intervention programme was 25.35 ± 4.56 . Their knowledge levels in the area of childhood fatness were found low. Most of the children were not aware that fatness results from imbalance between the amount of energy consumed and the amount of energy used. They were also unaware of the fact that fatness can lead to many serious health complications. However, children are aware that consumption of junk foods like pizza, burgers etc. will make them fat. After the intervention programme, the knowledge scores improved significantly to 49.21 ± 4.96 and they were able to discuss about the complications of fatness and could calculate their own BMI levels.

The attitude levels of fatty children also improved significantly after the education programme from 11.71 ± 3.04 to 22.71 ± 3.75 . Before the intervention programme, their attitude was that a fatty child looks more attractive and lovable in the society and fatness is a sign of richness. However, after the intervention programme, the children were found to disagree with the above facts. The knowledge levels of the parents before the intervention programme were found low i.e., 27.95 ± 5.35 , but after the intervention programme improvement was reported to 47.14 ± 6.59 . Before the intervention programme, the parents did not know about BMI, its calculation and its relation to fatness in children. They did not know much about the types of oils and fats and their nature. They were found unaware with the fact that fatness in children in long run can lead to very serious health problems and a fatty child is more likely to become a fatness adult.

Their idea of preventing fatness in their children was either to control the dietary habits of the child or making the child to do more of physical activity. The parents were also unaware with the important role of fiber in the diet. Concept of glycemic index was totally new to them and they didn't not know that junk foods are of high glycemic index and can lead to positive energy balance condition and can easily raise the blood sugar levels in children.

Knowledge and attitude levels of fatty children and their parents before and after the education programme.

S.No.	Levels	fatty children			
		Before	After	Change%	T-value
1.	Knowledge	25.35 \pm 4.56	49.21 \pm 4.96	94.1	15.31**
2.	Attitude	11.71 \pm 3.04	22.71 \pm 3.75	93.9	10.44**

The T-values with stars shows significant difference.

** p<0.001.

But their beliefs and attitude changed after the education programme. They learned the importance of physical activity and balanced diet for healthy practices of a child. They seemed interested in knowing how best they can incorporate physical activities in their child's daily routine. Parents also asked about the limit of time their children should spend on T.V./ computer and videogames. At the end of the programme, they learned that to prevent their child from getting Fatty they have an important role to play and support from the entire family is required to transform the faulty dietary habits and physical activity patterns into a healthy lifestyle of the child. The highly significant scores in the knowledge and attitude levels of the fatty children and their parents reveal the effectiveness of the education programme.

The prevalence of fatness in childhood is increasing throughout the world and if this gain in weight will be continued at earlier stages of life, it will take the shape of very serious problem. This indicates that fatness prevention programs that commence as early as possible and are family-focused are needed which, will help in promoting healthy dietary practices, behaviors and physical activities, decreasing physical inactivity, enhancing parent-child interaction, and hence reducing the rising rates of overweight and fatness among children. A study conducted in a school setting showed that education of children about nutrition and the adverse effects of sweetened soft drinks on body weight resulted in improved food choices both at home and at school, with subsequent weight loss (James 2003). The same study also suggested that public health campaigns targeted at children might be an effective means of approaching and controlling this problem. Early and appropriate intervention is particularly valuable. There is considerable evidence that childhood eating and exercise habits are more easily modified than adult habits (Wolf et al., 1985). Behavior based treatments are reported to be effective that include parents (Epstein et al., 1987). Graves et al., (1988) used problem-solving exercises in a parent-child behavioral program and found children in the problem-solving group, reduced a significant percent of overweight and maintained reduced weight for six months. Problem-solving training involved identifying possible weight-control problems and, as a group, discussing solutions. Parents who are important role models for their children must take responsibility for their welfare by providing high-quality food, limiting television viewing, and modeling a healthful lifestyle.

Findings of the study

The present study "Development of fatness preventive educational programme for higher secondary level school children" which was carried out with the objectives of determining the levels of fatness in the children of the schools of Kanpur, Uttar Pradesh and development of education material on childhood obesity, its causes, consequences and prevention and management for the purpose of imparting education to the selected fatty children.

Four schools, which included 2 private and 2 government schools, were randomly selected for the study. A sample of 200 school children (103 boys and 97 girls) was selected for the study with 50 children from each school. The sample of the children was briefed about the purpose of the study to get their co-operation.

Anthropometric measurements like height, weight, waist circumference. BMI was calculated for each child. Children were categorized as fatty, overweight and non-fatty as per Indian Academy of Pediatrics guidelines. BMI more than 95-percentile and 85- percentiles were taken as the criteria to define fatness and overweight in children.

For the purpose of imparting education on childhood fatness, its causes, consequences and prevention and management to the selected fatty children and their parents, education material

which included 2 charts, 2 posters, 2 pamphlets, 2 models, 1 food pyramid and 4-5 food recipes was developed. To collect information about the general dietary habits and physical activity patterns of the fatty children, a questionnaire in easy and understandable language was designed. K-A-P questionnaire was also developed to assess the knowledge and attitude levels of the selected fatty children and their parents before and after the education programme.

Levels of fatness and anthropometric parameters:

The overall prevalence of fatness and overweight in the study sample is 7% and 21.5% respectively. In private schools 13.7% boys and 8.2% girls were reported fatty while the prevalence of overweight among the boys and girls was 35.2% and 28.5% respectively. In government schools, the prevalence of fatness and overweight was found to be less than the private schools. Around 3.8% boys and 2.1% girls and 11.5% boys and 10.4% girls were reported fatty and overweight respectively.

When the anthropometric parameters of the fatty and non-fatty children were compared, significant difference was reported. BMI was found higher in fatty children (24.92 ± 1.21) as compared to the non-fatty (15.90 ± 2.03). Waist circumference was also higher in fatty children (31.75 ± 3.06) than the non-fatty children (23.07 ± 2.63).

The anthropometric parameters of fatty children of private and government schools were also compared. BMI of fatty boys of private schools (25.7 ± 1.54) was higher as compared to the fatty boys of government schools (24.60 ± 0.17). Waist circumference also followed the similar trend, 34 ± 1.15 in private school boys and 30.25 ± 1.06 in fatty boys of government schools. There was a significant difference between the BMI and waist circumference of fatty boys of public and government schools. girls, it was observed higher in case of boys.

The levels of fatness were more among boys (8.7%) than the girls (5.2%). Overweight was also more in boys (23.3%) than in girls (19.6%). No significant differences were reported in the anthropometric parameters of fatty boys and fatty girls respectively. BMI was 25.38 ± 1.44 and 24.7 ± 1.42 in fatty boys and fatty girls. Waist circumference in fatty boys and girls was 33.16 ± 1.94 and 30.3 ± 4.46 respectively.

General dietary habits and physical activity patterns of obese children

The general dietary habits of the children, which relate them with fatness, were found more in case of fatty children as compared to non-fatty children. 72% of the fatty children eat junk foods like pizza, burger, patties etc. daily and 28% at least 2-3 times/week. However, there were just 20% of non-fatty children who consume junk foods daily. The consumption of soft drinks among fatty children is 14.5% daily, 78.5% at least 2-3 times/week and 7% occasionally, whereas it is 10% 2-3 times/week and 90% occasionally in case of non-fatty children. The consumption of bakery products is 93% vs 30% at least 2-3 times/week and 7% Vs 60% occasionally in case of fatty children Vs non-fatty children. The daily consumption of fruits and vegetables is 50% in case of non-fatty children, which is more than the non-fatty (42%). The daily consumption of butter, ghee, milk cream etc. is 42% in fatty children and 20% in non-fatty children, 37% of fatty children consume these at least 2-3 times compared to 30% of non-obese children. 86% of fatty children eat at least 2-3 times/week outside the home compared to the 40% of non-fatty children. The occasional consumption of food outside the home is 14% in fatty and 60% in non-fatty children.

When the physical activity patterns of the fatty and non-fatty children were compared, it was observed that fatty children were less active. 71.5% of fatty children sleep for more than 8

hours compared to 40% non-fatty. 93% of fatty children watch T.V. at least 4-5 hours in a day and rest 7% for minimum 2 hours compared to 20% and 80% of non-fatty children respectively.

Only 10.5% of fatty children had a daily routine of exercise or morning/evening walk routines compared to 65% of non-fatty children. 28% of fatty children compared to 80% non-fatty children indulge themselves in extracurricular activities in school or at home. 35% of fatty children spend 3-4 hours daily in front of computer and videogames and the rest of 65% spend at least 2 hours in a day compared to 20% of non-fatty children. 69% of fatty children use car/bike/bus mostly as the mode of transport, while only 9% of them use bicycle compared to 80% of non-fatty children.

5.4 Education programme

Significant differences in the scores of fatty children were reported in the scores before and after the education programme. The knowledge levels score of fatty children 25.35 ± 4.56 before the education programme, which improved to 49.21 ± 4.96 respectively after the education programme. Improvement in the attitude level score of the fatty children were also reported. The attitude level score of fatty children before the education programme was 11.71 ± 3.04 , which improved to 22.71 ± 3.75 after the education programme.

5.5 CONCLUSION

fatty is considered as major health problem and its level is increasing day by day in developed as well as several developing countries like India. It is affecting children, adolescents and adults. Hereditary, environmental, metabolic and behavioral factors may all have a role in the development and progression of fatness. Sedentary lifestyles associated with urbanization and industrialization, such as the proliferation of televisions (TV) and computers, access to means of transportation and the availability of energy dense and processed foods appears to be the major contributors of the childhood fatness. fatness in children poses a major risk for serious diet-related chronic diseases, including type 2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer in later life and they are more likely to become a fatty adult. The health consequences range from increased risk of premature death, to serious chronic conditions that reduce the overall quality of life. fatty children are also more likely to show evidences of psychological distress than are non-fatty children, including the poor self-esteem, depression, disordered eating, body dissatisfaction etc.

Intervention programs and several other efforts are the required steps for the prevention of childhood fatness. These programs should focus on reducing the incidence of overweight and fatness in children by modifying negative behaviors and attitudes about nutrition, physical activity and healthy lifestyle. Interventions need to be designed and delivered in a participative manner, including children, parents, teachers and other professionals, to be acceptable and sustainable in order to have an impact. Peer group and family support, especially for children and adolescents, are important for success.

Schools are key locations for intervention for health promotion and prevention of childhood fatness. The education programme organized in one of the schools of the study has shown a good impact on knowledge and attitude levels of fatty children and their parents about childhood fatness, its causes, consequences and prevention and management.

Childhood fatness is the prelude to health complications of adult life. The present study used BMI to define fatness and overweight in children, which is an indirect measure of fatness.

If combined with advance and direct parameters, it can provide an estimate of cutaneous fat distribution and may help to understand the rising rates of obesity in children in a better way.

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