RESEARCH ARTICLE

IMPACT OF NUTRITION EDUCATION ON THE LIFESTYLE PATTERN AND DIETARY PRACTICES OF OBESE CHILDREN

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ARTICLE INFO	ABSTRACT
	Childhood obesity is one among the primary priority programes of World Health Organization and is the most serious public health challenge of the twenty first century. The problem is global and is steadily affecting many low and middle income countries, particularly in the urban settings. The present study was conducted in selected schools of Kottayam district of Kerala to explore the association of childhood obesity with socio economic status, lifestyle pattern and dietary habits. A total of 720 children both male and female were selected for the study. Of these 345 were from government school and 375 were from public schools. A well framed questionnaire was distributed to elicit details on demographic profile, life style and food consumption pattern. Based on Body Mass Index (BMI) childhood obesity was in the order of three percent each in high income and middle income and two percent in low income groups. Most of the subjects had a family history of obesity. Obese population had the habit of consuming junk foods while watching television. So it was concluded that the increasing trend of the modern day epidemic of overweight and obesity in children calls for immediate action to reduce the incidence through appropriate nutrition intervention programmes involving school children, their parents and school authorities. If immediate measures are not taken the condition can lead to serious problems beyond repair.

INTRODUCTION

Childhood is an important period of life for health interventions as health-related behaviours are just in formation, and it seems possible to intervene for preventing the development of obesity. Thus, it is crucial to further understand the background mechanisms of childhood obesity to find even more effective measures to prevent it before it begins to produce more or less irreversible health damages. Both genetic and environmental factors will probably contribute to childhood obesity. Childhood obesity is one among the primary priority programs of World Health Organization and is the most serious public health challenge of the twenty first century. The problem is global and is steadily affecting many low and middle income countries, particularly in the urban settings. An alarming rate of increase is seen with an estimated 22 million children under the age of five years being overweight throughout the world and is further expected to rise by 2010 [http://www.who.int/childhood/en/childhood overweight and obesity]. Childhood obesity is one of the major public health problems in the modern world. In the period 2003–2006, 32 percent of the US children were classified as obese or overweight, and increasing trends in childhood obesity are seen all over the world. These results are especially alarming as overweight children show a high risk of becoming obese adults. The environmental factors shared by family members, such as co-twins in twin studies, have shown

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only a slight effect on the variation of adult BMI. However, they may have a more important role in childhood, where parents and their offspring live together and where siblings obviously have a much greater opportunity to be exposed to the same environment; for example, poor socio-economic family background has been found to be associated with the risk of obesity in children, demonstrating the importance of childhood social environment, and the greater role of the shared environment in childhood has also been suggested in adoption studies. The role of environmental factors in the formation of childhood obesity has important public health consequences as it may provide additional targets for effective interventions in childhood obesity.

Childhood obesity is an emerging pandemic of the new millennium. This has profound public health consequences, as 70 percent of overweight children become overweight adults. Obesity is defined as an excess of body fat as measured by Body Mass Index (BMI) ratio in adults – this is calculated by dividing weight in kilograms by height in meters squared. In adults, a BMI over 25 is classified as overweight and over 30 as obese. During the past two decades, the prevalence of obesity in children has risen greatly worldwide and this excessive fatness has arguably become a major health problem of both developed and developing countries. Overweight and obesity during childhood is a matter of growing concern in India also. Most individuals develop their eating and activity patterns during childhood. The transition in nutrition and life style by the popularity of fast foods, soft drinks, sedentary life

style and lack of exercise, increased television watching and computer use are the common trends adopted by children today. These may be the causes of overweight seen in children of both rural and urban areas. Kerala has made remarkable achievement on par with the developed countries in the field of women and children's health during the last few decades. However, overweight and obesity is a growing health concern in Kerala too; the consequences of which can cause disaster to the future generation. Considering the threats of overweight and obesity in this cyber era, the present study is carried out in selected schools at Kottayam district among children between the age group of 10 to 14 years to see the extent of overweight, obesity and underweight among the children of Kerala. Keeping these in mind the study has been focused with the following objectives to:

- Identify the prevalence of obesity in selected public schools and government schools,
- Study the socio economic status of selected school children,
- Explore the association of obesity and socio-economic status
- Study the life style pattern and dietary practices of obese and
- Impart nutrition education to the parents of obese children and assess its impact.

MATERIALS AND METHODS

Selection of samples

Considering the good response, ease of communication and familiarity of the place the researcher selected two government schools and two private schools in Kottayam District, Kerala. The children studying in the government schools were belonging to low and middle income group whereas the children in private schools were from middle income and affluent group. A total of 720 children both male and female in the age group of 6-14 years were selected for the study. Of these 345 were from government school and 375 were from the private schools. Since the age group selected for the study was ranging from 6-14 years, all the students both male and female studying from 1st standard to 9th standard were selected.

Conduct of study

A schedule embracing the details of demographic data, monthly income and expenditure pattern, dietary habits, details of food expenditure, consumption of junk foods, duration of television watching, extracurricular activities, duration of indoor and outdoor games, physical activity pattern, type and frequency of snacks and beverage consumption, food preferences of the subjects, type and amount of oil used in the family and heredity of obesity was formulated in English and Malayalam the local language of Kerala and collected these data from the parents of all the selected children. Anthropometric measurements such as height and weight were taken for all the selected children by following the standard procedure.

Body Mass Index (BMI)

Body Mass Index (BMI) is a key tool for relating a persons body weight to their heights, based on the result it can indicate

over nutrition or under nutrition (Margolis, 1990). BMI values in children are much lower than in adults, and BMI changes with age. So BMI cutoffs to define obesity in adults are not appropriate for children. National BMI reference data are now available and are widely used and recommended. According to this >95th percentiles were obese and 85th -95th percentiles were overweight. Based on this BMI of the children were found out and assessed. In accordance with the procedure laid down by NIN, Hyderabad, a twenty four dietary recall survey method was followed for three consecutive days to elicit details on the quantity of food items consumed by selected sub samples. From the food consumed the quantity of raw equivalents of ingredients were computed and the mean intake of raw ingredients was calculated. Using the Nutritive Value of Indian Foods by ICMR, the mean food and nutrient intake of the selected 18 sub samples were calculated and compared with the ICMR Recommended Dietary Allowances (RDA) to understand the adequacy of food consumption.

A pamphlet was prepared on obesity focusing on its causes, complications, remedial measures and the importance of diet in preventing obesity. The pamphlet was distributed to all the selected subjects and they were asked to give it to their parents. The private school authorities made arrangements for giving nutrition education to the parents of the subjects. The parents were made aware of the causes of obesity, its complications, importance of the diet in its prevention and the need for physical activity during a Parents Association (PTA) meet organised by the school authorities. The session lasted for one hour. The government school authorities provided the researcher with an opportunity to give individual diet counselling to the parents of obese children. Pamphlet was formulated in English and Malayalam which contain all the necessary information regarding obesity and it was distributed to the parents of the obese children. Before the nutrition education session the investigator gathered first hand information about the nutritional knowledge of the parents by interview schedule. After the one hour lecture question session was opened to the gathering. The investigator cleared the doubts of parents regarding obesity. The effect of nutrition education given by the investigator was analyzed by the same interview schedule after a month.

RESULTS AND DISCUSSION

Income Pattern: Subjects were grouped on the basis of income of the parents. Twenty six percent of the samples had an income between Rs.5000- 15,000 per month whereas 31 percent and 43 percent had an income range of Rs. 15,001-25,000 and Rs. 25,001-45000 per month respectively. This shows that maximum of subjects had an income of more than Rs.15, 000 per month indicating the standard of living has been increased.

Duration of television viewing by the selected children: Thirty two percent of the subjects from middle income category watched television for a duration of 2-4 hours. While seven percent subjects from affluent group watched television for more than four hours daily, only four percent from the low income family watched television for more than four hours. Thus within the three income level, middle income watched television more than by the high income group. By the time average American children graduated from high school, they

Table 1. Type of food consumed by the samples while watching television

	INCOME RANGE (Rs)					
Foods consumed	5000-15,000	%	15,001-25,000	%	25,001-45,000	%
Snacks	21	2.9	103	14.3	83	11.5
Tiffin	20	2.8	50	6.9	19	2.6
Meals	14	1.9	37	5.4	27	3.8
Beverage	19	2.6	73	10.1	60	8.3
None of the above	111	15.4	49	6.8	34	4.7
Total	185	25.6	312	43.5	223	30.9

Table 2. Extracurricular activities of the samples

	INCOME RANGE (Rs)					
Activities	5000-15,000	%	15,001-25,000	%	25,001-45,000	%
Craft	28	3.9	88	12.2	24	8.3
Singing	47	6.5	89	12.4	67	9.3
Dancing	49	6.8	42	5.8	33	4.6
Sports	61	8.5	93	12.9	99	13.9
Total	185	25.7	312	43.3	223	31

Table 3. Food habits of samples

	INCOME RANGE (Rs)					
Food habit	5000-15,000	%	15,001-25,000	%	25,001-45,000	%
Vegetarian	31	4.3	65	9.0	32	4.4
Non-vegetarian	149	20.7	185	25.7	143	19.9
Ova vegetarian	5	7	62	8.6	48	6.7
Total	185	25.7	312	43.3	223	31

Table 5. BMI of samples

Percentile	BMI status	INCOME RANGE (Rs)					
		5000-15,000	%	15,001-25,000	%	25,001-45,000	%
>95th	Obesity	7	1.0	19	2.6	23	3.1
85th-95th	overweight	14	1.9	27	3.8	17	2.4
5th-85th	normal weight	143	19.9	263	36.5	183	25.4
<5th	under weight	21	2.9	3	0.4	-	-
	Total	185	25.7	312	43.3	223	30.9

Table 5. Parents awareness about nutritional aspects (n= 567)

Scores	<10	%	10 – 20	%	20 – 25	%
Before education	219	39	267	47	81	14
After education	112	20	136	24	319	56

have watched 15,000 hours of television and spent 11,000 hours in the class room. School age children watched television on an average of 23 hours or more per week, whereas pre school children average about 27 hours per week. The number of hours of television viewing, as a marker of sedentary behaviour, has been the most consistent risk factor for childhood obesity (Jackson, 2004).

Type of food consumed by the subjects while viewing television: Children prefer to eat something while watching television. Table I gives a list of items eaten by the subjects while viewing television. It was noted that 37 percent of the samples from middle income family consumed food in front of television whereas 4 percent from the high income group do not consume food in front of television. Normally the subjects had snacks and tiffin in front of television. Table III reveals the fact that most of the samples especially12 percent from high and 14 percent middle income category preferred snacks while watching television. When 10 percent of the samples from middle income family consumed beverages or soft drinks in front of television it was only three percent from low income group. Hence it is clear that irrespective of income children consumed food while watching television. However it

is obvious that one fourth of the children were devoid of consuming food item while watching television. This is mainly because the parents insist the children to have food in the dining area and not in the living room.

Television can also be detrimental to growth and development because it encourages inactivity and passive use of leisure time. Indeed, television viewing and its multiple media cues to eat have been suggested as a factor contributing excessive weight gain in school age children (Dietx and Gortmaker, 2001). Children who received the television reduction intervention reduced the number of meals consumed during television viewing and trend towards lower intake of high fat food was observed (Robinson, 2001).

Type of play involved by the subjects: The detail on the type of play in which the selected samples are engaged is discussed below. When 20 percent of the samples from low income group were interested in outdoor games, 20 percent from the affluent group were interested in indoor games. Among the middle income family 26 percent were interested in indoor games, whereas 17 percent were interested in outdoor games. Although the increase in childhood obesity is frequently

attributed to a decline in physical activity and remarkable lack of consistency exists in the relations between level of physical activity and degrees of fatness (Parsons, 1999).

Extra curricular activities of the subjects: Table II gives the details of the extracurricular activities of the subject. It was clear that when 14 percent from the high income family were interested in craft, 12 percent from the middle income family were interested in singing while 5 percent from the high income family were interested in dancing. Because of the impact on energy balance, physical activity may slow the increasing prevalence rates of obesity in the United States (Barlow, 1998).

Family history of obesity: The details regarding the family history of obesity is discussed below. From the high income group 5 percent mothers and 3 percent grandparents of the selected children had obesity. From the low income family 3-4 percent of the parents had obesity. Comparatively children from middle income group had a less incidence of obesity in the family (39 percent). However more than 74 percent of the subjects were found to be free from heredity factor of obesity. The likelihood that a child will become obese in adulthood is markedly increased if both his and her parents are obese. (Lake, 1997).

Mode of spending pocket money: Children receive pocket money from different sources. The way in which they spend this money is depicted here. It was noted that 38 percent samples from the middle income family and 25 percent of the children from the high income family get pocket money from their parents. But only ten percent samples from the low income category get pocket money to meet extra expenses. From the table it is clear that all the children spend maximum amount of pocket money for food when compared to the middle income group. It is interested to observe that low income and high income children showed interest in saving the money.

Type of diet: The type of diet followed by the selected children is depicted in table III**.** Among the three income groups non-vegetarians predominated by 66.3 percent. The remaining 18-16 percent were found to be vegetarians and ova-vegetarians. The same dietary pattern was followed between the income group also.

Body Mass Index of the selected children: The Body Mass Index (BMI) of the selected children is shown in table IV. Obesity was more prevalent in the samples of high income family (3 percent). The reason for this was their food consumption pattern and sedentary life style. In the middle group and high income category 4 percent and 2 percent of the samples were overweight and are at the risk of obesity. Three percent of the samples from the low income family were under nourished. It is noted that none of the samples from affluent group were below the 5th percentile. The prevalence of obesity in samples of low income category was only one percent.

Children from lower socio-economic status are also likely to become overweight or obese just like the children from higher social classes and all those who are obese during childhood are more likely to remain overweight or obese throughout early adulthood (Kul, 2000). Chi-square test was applied to find whether there is significant relationship between income and BMI levels. The calculated value of chi-square is 56.07 which is greater than the table value of 16.01 and significant at $P < 0.01$ level. Since the calculated value is greater than the table value it is inferred that there is a significant relationship between income and BMI levels.

Parents awareness about nutritional aspects: Table IV gives a clear picture of the scores secured by parents of overweight and obese subjects in relation to various nutritional aspects. It was seen that before nutrition education 39 percent scored less than 10 marks and 47 percent scored between 10 and 20. Only a few percentage of 14 scored more than 20 marks. This clearly bring out the fact that majority of the parents were unaware about nutritional aspects. After nutrition education 56 percent of the parents scored between 20 to 25 marks, indicating that there was a rapid rise in the nutritional knowledge of the parents. Obesity is easier to prevent than to treat and prevention focuses in large measure on parent education. In childhood, parent education should centre on proper nutrition, selection of low fat snacks, good exercise or activity, good food habits and monitoring on television viewing (Bouchard *et al.,*1990).

Acknowledgement

Conclusion

The study showed that most of the obese children had a family history of obesity. From the dietary pattern it is clear that the obese children preferred to have snacks and high carbohydrate and fat rich foods. The children were influenced by the television advertisements, in the selection of food items. The activity pattern of the obese children revealed the fact that they spent more time for indoor games than outdoor games and most of them had less physical activity. In spite of the knowledge of nutritious food and complications of obesity among the high income family, obesity was more prevalent in this category because of their sedentary life style and improper food habits. So it was concluded that the increasing trend of the modern day epidemic of overweight and obesity in children calls for immediate action to reduce the incidence through appropriate nutritional intervention programmes involving school children, their parents and school authorities. If immediate measures are not taken the condition can lead to serious problems beyond repair.

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