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Prevention of Childhood Obesity Food Preferences and Physical Activity

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ABSTRACT: Diet plays an important role in the overall health of the children, proper and balanced diet is essential to maintain the daily calories of the people. Overweight and obese children and adolescents are at greater risk for being over weight or obese as adults as well as developing one or more chronic diseases. Approximately one third of children in India are either overweight or obese. The causes of obesity are complex and multifactorial, an interaction between biological, psychological, and environmental factors. Regular exercise and dietary habits are two major contributing changeable factors in one's health and weight status. Intercession is essential to help curb the obesity epidemic by working toward improving the health status of children and adolescents. Childhood obesity prevention programs that directly expose children to a variety of food choices and also support activity, by providing a variety of physical activity options and focus on increasing self-efficacy, may positively influence child health in India.

Keywords: Obesity, physical activity, diet, children

I. INTRODUCTION

The origin of obesity may be complex or multifactorial and it may be an interaction between biological and environmental factors. The excess energy intake to energy expenditure ratio leads to weight gain in most of the cases. Genetic component also contributes to the advancement of obesity. Environmental factors, lifestyle preferences, and cultural environment play pivotal roles in the rising prevalence of obesity worldwide. In general, overweight and obesity are assumed to be the results of an increase in caloric and fat intake. (Krushnapriya Sahoo *et al.,* 2015). Obesity has reached epidemic levels in developed countries. The highest prevalence rates of childhood obesity have been observed in developed countries; however, its prevalence is increasing in developing countries as well.

The decrease in physical activity another significant contributor to the "Obesogenic" environment as the modern way of living has become more sedentary. The increased time used up in watching television and playing video games is two major factors to enhance sedentary behaviour. Further, modern sedentary activities encourage overconsumption. Children on average spend at least 7.5 hours a day on electronic media. Present society promotes overconsumption through television, billboards, product packaging, and magazine ads. The influence of advertisement has played a vital role for food choices among children. Often times high sugar cereals and junk food items target young children through the use of recognizable animated characters and bright colors. Even shopkeepers stock up shelf placement of these items is designed to target children who become soft victims of these foods.

Extensive television viewing and the use of other electronic media has contributed to the sedentary lifestyles, other environmental factors have reduced the opportunities for physical activity. Opportunities to be physically active and safe environments to be active in have decreased in the recent years. The majority of children in the past walked or rode their bike to school.

Childhood obesity showed an increasing trend in a short period of 2 years. Hypertension was common in overweight children. The results suggest the need for greater public awareness and prevention programmes on childhood obesity and hypertension (Raj *et al.,* 2007).

A significant difference was noted in height, weight and BMI between LSES and USES. The prevalence of overweight and obesity in USES children was 16.75 % and 5.59 % in boys and 19.01 % and 5.03 % in girls respectively (Marwaha *et al.,* 2006).

II. PHYSICAL ACTIVITY AND OBESITY

The physical activity of children is a successful strategy for to reduce obesity. The activity choice is available to the child with pronounced impact on physical activity than the influence of both parent and home. Participation in the physical activity program was associated with improved physical activity self-efficacy. Childhood obesity prevention programs need to be implemented in India that will support a variety of activity options for betterment of children. Physical activity is necessary for maintaining a healthy lifestyle as physically active helps reduce stress; risk for chronic health diseases such as CVD, obesity, and helps keep one's mind and body fit, energized, and free from injury.

Children and adolescents should be participating in at least 60 minutes of physical activity each day in order to remain healthy. One way to categorize the intensity of energy expenditure is by using metabolic equivalents of task (METs), which is the physiological energy cost to perform an activity. Activities of greater physiological demand will have a greater MET value, indicating a more intense exercise. The physical activity performed by children and adolescents should be age-appropriate and include moderate (3-6 METs) to vigorous (>6 METs) intensity aerobic activity each day. The strengthening of muscle and bone must be performed at least three days per week.

The use of social cognitive theory that include personal, proxy and collective agencies, to make useful decisions for making the society free from obese children. With the help of Government agencies different programs need to be diverted in this direction. Personal agency, also known as direct agency, leads to individual decision-making through self-efficacy, or belief in one's "effectiveness or competency to perform a specific behaviour successfully". Proxy agency is the belief that a personal behaviour or outcome will be achieved through the dependence on others. One example of a proxy agency regarding physical activity is proxy-efficacy: confidence in one's ability to get help from others in order to build a supportive environment for physical activity. Collective agency requires a collaboration or group effort to reach a common desirable outcome.

Physical activity that was not related to parent-proxy was considered week in this direction by the earlier researchers. Home environment did not have a significant effect on physical activity in the children participating in the different wellness Programs. For these reasons, childhood obesity prevention programs focused on increasing physical activity level in children should incorporate ways to increase self-efficacy through increased physical activity options. Providing children with different types of activities that they can choose from rather than limiting the number of activities or assigning activities may be an effective way to increase the level of physical activity, and ultimately help prevent obesity for children.

III. NUTRIENT INTAKE OF SCHOOL GOING CHILDREN

Daily nutrient intake of school going children recommended by RDA has been presented in Table 1, Fig 1 and 2. Meme *et al*. (2007) reported that the energy consumption of school children with feeding program was higher (86 % of RDA) than without feeding program children (76% of RDA).

Handa *et al*. (2008) studied the protein intake of school going children of Allahabad district and reported that protein intake was 30.17g/day. The food habit was based on the staple food items without sufficient inclusion of protein sources or good nutritional sources such as animal foods and dairy products.

Table 1: Mean daily nutrient intake of school going children.

(n=100)

Nutrients	RDA	Mean daily nutrient intake	Z value	Overall intake (% of RDA)
Energy (Kcal)	1690	1283.71±285.50	-14.23*	75.95
Protein (g)	29.5	22.52±7.71	-9.06*	76.33
Fat (g)	30	16.12±7.73	-18.02*	53.73
Calcium (mg)	600	359.12±64.26	-64.40*	59.85
Iron (mg)	16	10.75±2.91	-18.10*	67.18
β- carotene (ug)	4800	1278.40±486.96	-72.32*	26.63
Thiamine (mg)	0.8	0.53±0.17	-15.88*	66.25
Riboflavin (mg)	1.0	0.36±0.15	-42.66*	36.00
Niacin (mg)	13.0	4.75±1.57	-52.54*	36.53
Vitamin C (mg)	40	21.82±5.12	-35.50*	54.55
Folic Acid (ug)	120	78.41±37.04	-11.24*	65.34
Vitamin B_{12} (ug)	0.2-1.0	0.13±0.05	-174.00*	21.66

Values are mean ± SD
* Significant at 5% level
RDA-Recommended Dietary Allowances (ICMR 2010)

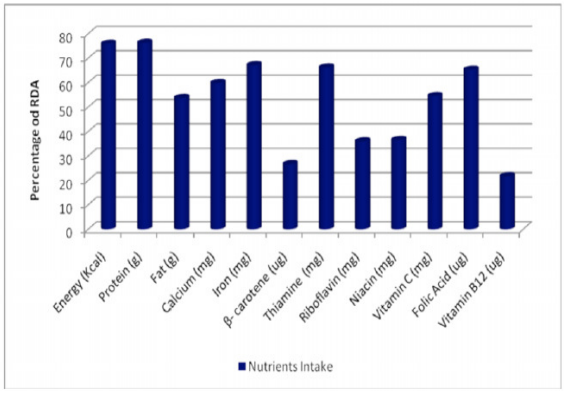

Fig. 1. Mean daily nutrient intake of school going children.

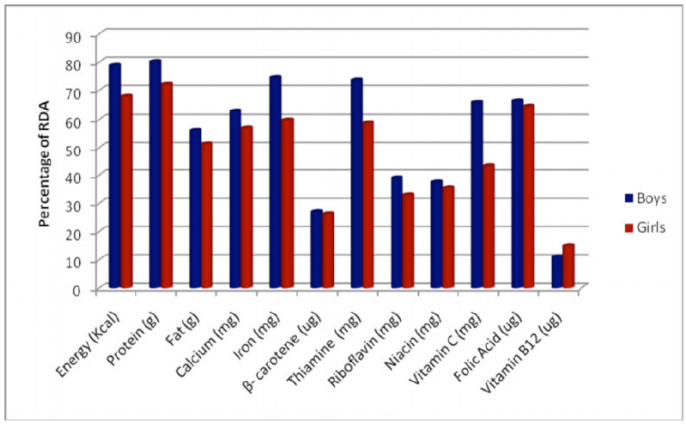

Fig. 2. Comparison between mean daily nutrient intake of boys and girls.

Several workers (Mitra *et al*., 2007, Sati and Dahiya 2012 and Mehta *et al*., 2013) also reported that the protein intake was relatively lower among school children. Calcium intake by the study group was 71.32 per cent of RDA. Handa *et al*. (2008) and Bisht and Raghuvanshi (2008) reported that calcium intake was more than RDA among school children living in Allahabad and Kumaon Hills, respectively. Sankhla *et al*. (2004) found that intake of calcium was 58.7 per cent of RDA by children (7-9 years) of Udaipur city. Iron intake of school children was significantly ($P<0.01$) lower than its respective recommended level. This is due to lower consumption of green leafy vegetables and fruits by majority of children. Bisht and Raghuvanshi (2008) reported similar pattern of low consumption of green leafy vegetables which resulted in less iron in the diet of children. Sankhala *et al*. (2004) noted that iron intake of children was 10.1 mg (38.8% of RDA). Findings of earlier studies (Kumari and Jain 2005, Srihari *et al.,* 2007 and Neelam *et al.,* 2007) reported same trend that diet of school going children was deficient in iron. Jood *et al*. (2002) noted that iron intake of 7-9 years old children was below 50 per cent of RDA. The average intake of β- carotene, B- complex vitamins, folic acid and Vitamin C in study population was less as per recommendations. Low intake of these nutrients was due to inadequate intake of food stuff namely green leafy vegetables, other vegetables and fruits in their diet. According to Sankhala *et al*. (2004) diet of school children of Udaipur district was deficient in β- carotene (294µg or 12.3% of RDA), vitamin C (21.1 mg or 52.9% of RDA), riboflavin (0.5 mg or 41% of RDA) and niacin (7.9 mg or 60.8% of RDA). Lower content of folic acid, riboflavin and Vitamin C in diet of affluent Indian school children was observed by Srihari *et al*. (2007) too. Sati and Dahiya (2012) reported that the diet of school children of Hisar was lacking in β- carotene, B- complex vitamins and Vitamin C. According to Bisht and Raghuvanshi (2008) intake of iron, β- carotene and riboflavin was most inadequate among school going children of Kumaon hills of Uttarakhand State.

III. FOOD PREFERENCES AND OBESITY

Food is very essential for the maintenance of growth and development. The food must supply all the essential nutrients i.e. carbohydrates, proteins, vitamins, minerals, fibers, water content in exact concentrations. Exposure to a mixture of well-known and new foods that are pleasing in overall appearance could be the main focus of future studies in getting more children to eat a wider variety of healthy foods. A child's environment has an impact on

whether or not they are exposed to healthy foods. Allowing children to eat “family style” along with their peers may also encourage children to make healthier choices. The appearance of junk food has casued adverse impact on the health of children. Further, readymade food available in the market has made the situation worse. A study examining peer influences on child candy consumption found that children are vulnerable to peer eating and there may be a greater influence when exposed to an over-eating peer. It is widely accepted that increase in obesity results from an imbalance between energy intake and expenditure, with an increase in positive energy balance being closely associated with the lifestyle adopted and the dietary intake preferences. However, there is increasing evidence indicating that an individual's genetic background is important in determining obesity risk. Research has made important contributions to our understanding of the factors associated with obesity.

The foods that are rich with different nutrients need to be encouraged and must be offered in a separate location, like the salad bar. Children should be encouraged to visit the separate location to provide exposure to the food. A little over fifty percent of campers chose the vegetable offered. The green leafy vegetables must be the part of diet apart from all other diets. Programs need to be diverted to make the campaign successful. The government of India must initiate the National Programme of Nutritional Support to Primary Education to improve the effectiveness of primary education by improving the nutritional status of primary school children.

IV. HEALTH IMPLICATIONS OF OBESITY

Childhood obesity has been associated to numerous medical conditions. These circumstances include, but are not limited to, fatty liver disease, sleep apnea, Type 2 diabetes, asthma, hepatic steatosis (fatty liver disease), cardiovascular disease, high cholesterol, cholelithiasis (gallstones), glucose intolerance and insulin resistance, skin conditions, menstrual abnormalities, impaired balance, and orthopedic problems. Obese children may experience immediate health consequences which can lead to weight-related health problems in adulthood. Obese children and teens have been found to have risk factors for cardiovascular disease (CVD), including high cholesterol levels, high blood pressure, and abnormal glucose tolerance. In a sample of 5-to 17-year-olds, almost 60% of overweight children had at least one CVD risk factor and 25% of overweight children had two or more CVD risk factors. In addition, studies have shown that obese children and teens are more likely to become obese as adults. Childhood overweight and obesity has both immediate and long-term health outcomes. Increasingly, obese children are being diagnosed with a range of health conditions previously seen almost exclusively among adults. Childhood unhealthy weights may result in serious medical problems in childhood such as:

- type 2 diabetes
- high blood pressure and elevated blood cholesterol
- liver disease
- bone and joint problems
- respiratory problems such as asthma
- sleep disorders such as difficulty breathing while asleep (sleep apnea)
- earlier than normal puberty or menstruation
- eating disorders such as anorexia or bulimia
- skin infections due to moisture from sweat being trapped in skin folds
- fatigue

Overweight or obesity in childhood can also result in serious psychological difficulties. Overweight or obese children are more likely to be teased and bullied, likely to bully others, poor self-esteem and may feel socially isolated, increased risk for depression, poorer social skills, high stress and anxiety, behaviour and/or learning problems as a result of psychological difficulties related to childhood obesity. Obesity in adulthood leads to high blood pressure, strokes, certain types of cancer (endometrial, breast and colon among others), heart disease
liver disease, type 2 diabetes, dementia. There will also be an increase in health care costs, and a high risk of lost productivity in the Canadian economy as a result of an anticipated greater level of absenteeism and weight-related illnesses among Canada’s aging and more obese workforce. An adult who is obese at age 40 years can expect to die 3-7 years earlier than someone who was of normal weight at the same age. The loss of years is the same as if that person had been a smoker. It is essential that families do all they can to prevent obesity in children and to have it treated it should it occur (PHAC, 2012; Singh *et al,* 2008). Childhood obesity affects children's and adolescent's social and emotional health. Obesity is one of the most stigmatizing and least socially acceptable conditions in childhood.

They also face various other hardships including negative stereotypes, discrimination, and social marginalization. Inequity against obese individuals has been found in children as young as 2 years old. Obese children are often excluded from activities, particularly competitive activities that require physical activity. It is often difficult for overweight children to participate in physical activities as they tend to be slower than their peers and contend with shortness of breath. These negative social problems contribute to low self esteem, low self confidence, and a negative body image in children and can also affect academic performance.

V. CONCLUSIONS

The physical activity and dietary habits are two major contributing factors in determining one's health and weight status. Interventions are needed to help curb the obesity epidemic by working toward improving the health status of children and adolescents to foster sustainable, healthy lifestyle changes among children. Intervention in the form of nutrition, physical activity, gardening, and culinary education will reduce the obesity problems.

Direct exposure to foods could be the main focus in getting more children to eat a wider diversity of foods. A child's environment has impact on whether or not they are directly exposed to healthful foods. Parents, schools, daycares, and summer camps are the environmental niches that most children receive their nutritional experiences, knowledge, perceptions, and habits. Childhood obesity prevention programs focused on increasing physical activity level in children should incorporate ways to increase self-efficacy through increased physical activity options. The assess of children to a variety of activities that they can choose from rather than limiting the number of activities or assigning activities, may be an effective way to increase the level of physical activity, and ultimately help prevent obesity for children. Parents must enforce a healthier lifestyle at home, many obesity problems could be avoided. What children learn at home about eating healthy, exercising and making the right nutritional choices will eventually spill over into other aspects of their life. This will have the biggest influence on the choices kids make when selecting foods to consume at school and fast-food restaurants and choosing to be active. Focusing on these causes may, over time, decrease childhood obesity and lead to a healthier society as a whole.

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