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Leading Article

Childhood Obesity; Effects and Prevention

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Introduction:

Over last few decades, the prevalence of overweight and obese adult increased significantly.[1] It has been observed that globally near about 600 million people over 18 years of either sex are obese.[2] The problem of obesity is also increasing among children. In some western developed countries prevalence of obesity is 17% and extreme obesity 5.8% among children of 2 to 19 years. Nowadays, the problem of childhood obesity is not a concern of developed countries only; it is increasing at the rate of 40% in some developing countries also.[3.4] The consequences of childhood obesity in future life are cardiovascular diseases, type 2 diabetes, sleep apnea, Hypertension, cancer, chronic kidney diseases and Endocrine diseases, the treatment for which may be lifelong and costly.[5]

What is obesity?

Generally obesity is a condition of abnormal or excess fat accumulation in adipose tissue which may already affect health and increases health problem. Fat accumulation in children develops in two phases. During first year, fat accumulation increases and stable for few years. Second phase starts at six years. From this stage both number and size of adipocytes increases.[6,7] Degree of obesity is usually calculated by simple body mass index (BMI), weight (Kg) divided by the square of his or her height (meters). According to WHO; a BMI between 18.5 and 25kg/m^2 is normal, 25 to 30kg as overweight and more than 30Kg/m^2 as obese.[2] Different studies indicate that several causes are the main contributing factors of childhood obesity.

Factors responsible for causing obesity:

i. **Genetics:** The strongest predictor of childhood obesity is the BMI of the mother and father. A recent study observed the association with FTO (fat mass and obesity associated) gene and found strong association with BMI and weight among children.[10,7]

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ii. **Age and gender:** Age and gender have been identified as a key determinate for the development of obesity. A Nigerian study showed that males have higher BMI between 2.6years whereas females have higher BMI at age group 11-14 years and 15-18 years[8]

iii. **Birth weight:** Rapid weight gain for a low birth weight baby is now recognized as a risk factor of obesity. Another study showed that early catch up growth between birth and two years is a risk factor for childhood obesity and may be a contributor of disease in adulthood.[9]

iv. **Dietary pattern:** Fast foods play a major role to the rising prevalence of obesity among children because fast food's poor nutritional quality, as fast foods have higher total energy, total fat, saturated fat, refined carbohydrate, lower fiber with higher energy density.[7]

v. **Skipping Breakfast:** Day usually starts taking breakfast, skipping breakfast leads to make the child hungry and increased amount of lunch which causes obesity in children.[10]

vi. **Sedentary activities:** It has been observed that for rapid increase in childhood obesity, declining outdoor game and increased indoor entertainment like television viewing, internet and computer game play an important role. An European youth heart study conducted among 9-10 years old children found significant positive relationship between TV viewing and adiposity.[11,12] It is also observed by different studies that TV viewing more than 2hours in a day is associated with increased BMI.[11]

vii. Physical activities play a vital role in protections childhood obesity. Two different studies, one in Iran and another in Bangladesh showed that physical activities like running, football and travel to school by walking have protective effect on obesity in 10-15 years old school children.[11,10]

Complications of Obesity:

The childhood obesity may presents with different complications affecting variety of organ system.[2,12,13] System wise complications of childhood obesity are as follows.

i. cardiovascular: Hypertension
   Left ventricular hypertrophy (LVH)
   Atherosclerosis.

ii. Renal system: Chronic Kidney Disease (CKD)
   Nephrolithiesis
   Kidney Malignancy

iii. Metabolic: Insulin resistance
   Dyslipidemia
   Metabolic syndrome
   Type of diabetes

iv. Pulmonary: Asthma.
   Obstructive sleep apnea

v. Gastrointestinal: Fatty Liver
   Gastro esophageal reflux

vi. Skeletal: Tibia Vara
   Slipped capital femoral epiphysis

vii. Others Polycystic ovary syndrome, pseudotumor cerebri.

It is already described that obesity may affect all the systems of the body which may leads to mortality and morbidity but in this article how obesity causes CKD, Nephrolithiasis and renal cancer will be highlighted. Higher BMI is associated with the presence and development of proteinuria leads to glomerulosclerosis, leading to development of low estimated GFR causing ESRD in course of time.[14-17]

A few studies observed that abdominal obesity measured by waist circumference is associated with albuminiurea, decreased GFR. ESRD independent of BMI associated with increased prevalence of nephrolithiasis and various types of malignancy.[18,19,20]

How Childhood obesity can be prevented?

Obesity prevention strategies are now effective in children rather than adult life. So, preventive measures should be implemented at preschool institution, schools and often school care services.

At school:

School has got great opportunity to promote healthy foods and physical activity because most children spend more time in school. Therefore following school based interventions should be implemented to prevent obesity.

- In School curriculum healthy eating, physical activity should be integrated.
- Throughout the school week sessions for physical activity should be included.
- The nutritional quality foods made available to students in the school canteen.
- Such environment should be created in the school, as if children eat healthy foods and remain engage in physical activity.
- Parents should encourage children to eat healthy foods to become more active in physical activities and spend less time in screen based activities.

House based strategies:

Parental initiative is necessary to succeed the home based strategies to intake healthy diet and physical activities among children. So parents should be aware of the following:-

- Should be good role models.
- Parents should encourage children to have breakfast at home and to eat fruits, vegetables and grains and to avoid junk foods, sweets, oily foods, sweet beverage etc.
- Parents should provide the children with healthy food choice because eating habits that develop during childhood that track in to adulthood.

Conclusion:

It is clear that childhood obesity is associated with a wide spectrum of adverse outcome like adults. Obesity in childhood affects virtually every system of the body including kidneys in adverse manner. Diseases of the kidneys are CKD, nephrolithiasis and kidney cancer leading to significant morbidity and mortality and excess costs to individuals and entire society. Childhood obesity also causes psychological problems in children. So, it should be addressed urgently. Changing dietary practices and regular physical exercise, like walking, swimming, cycling and playing outdoor games through parental initiative and social support are the most important strategies to prevent childhood obesity.

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