

Why it is Important to Address Childhood Obesity?

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ABSTRACT

Obesity has its claws worldwide. It longer no remains a problem of adults and riches of developed countries, but it is rising rapidly among children and poor people of developing and underdeveloped countries as well. India is no exception. This manuscript emphasizes the need for urgent attention of the parents, educators and policy makers towards the rising problem of obesity and other associated health problems including commodities. This paper discusses the gravity of the health and disease burden and economic burden of obesity to the patient, his family and state during childhood and later. It highlights societal burden associated with childhood obesity. Further, this paper tries to bring to notice certain myths and misconceptions associated and explain the causes and correlates of childhood obesity. Finally, the paper suggests some preventive and remedial strategies for parents, communities, and government that would be helpful in arresting the steep rise and controlling this obesity epidemic and promote healthy and happy life.

Keywords: *Childhood obesity, economic burden, poverty, parental stress*

The increase in the rate of obesity in adults/children has reached at an explosion levels in developed as well as developing countries. The current epidemic of obesity has evolved over a relatively short period of time, about two to three decades. The rising ubiquity of obesity today represents a critical public health issue. Prevalence rates of Childhood obesity have more than doubled and quadrupled among children and adolescents in the past thirty years (Dehghan, Akhtar-Danesh, & Merchant, 2005). In America the percentage of childhood obesity has increased from 7 percent in 1980 to nearly 18 percent in 2012 (Nicklas, & Baranowski, 2001). In North America, one out of six children is obese, and one out of three children is overweight and today, the country stands at the top among childhood obesity rates (Nicklas, & Baranowski, 2001). The number of overweight and obese children in the European Region is rising steadily. Over 60 percent of children aged 6-11 years are overweight if not obese (Llewellyn, & Simmonds, 2015). In China, the rates of obesity among children under the age of 15 increased from 15 percent in 1982 to 27 percent by 2018

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(Li, 2016). It is alarming that the prevalence rates of childhood obesity have been increasing like an epidemic in developed countries; however, this epidemic is spreading in developing countries as well (Dehghan, Akhtar-Danesh, & Merchant, 2005). In semi-developed countries like Saudi Arabia and Iran, one in every six children between the age range of 6 to 18 years is obese ((Llewellyn, & Simmonds, 2015)).Iran stands one of the seven countries with the highest percentage of childhood obesity (Llewellyn, & Simmonds, 2015).India is facing a critical problem of double burden related to nutrition and metabolic domain including problem of malnutrition/underweight at one end and the problem of overweight and obesity on the other among children /adolescents (Ranjani, Mehreen & Pradeepa,2016). Whether a child is overweight or obese is determined by comparing BMI levels of children at a particular age. In terms of percentile, if a child's BMI is higher than 85 percentile, they are considered at risk of being overweight and if a child's BMI is higher than 95 percentile they are considered as obese.

“Obese children are more susceptible to become overweight adults”, especially those who have higher BMI level at childhood. Numerous studies have shown the association of childhood obesity with obesity in adults. (Anderson & Butcher, 2006, Devi, 2010, Ranjani, Mehreen & Pradeepa, 2016). Contrary to the wide spread belief that the obese child is a healthy child, there is no dearth of research studies that report that obesity at childhood is the fertile ground for many diseases, health problems and comorbidities concurrently as well as at the later age (Devi, 2010).There are many other misconceptions and myths associated with obese children e.g. obese babies have more stamina. The store of extra flash of obese children can be used in times of crisis so one must accumulate it ("Childhood Obesity: Common Misconceptions", 2015).; obese children fall sick less often; obese girls catch attention and criticism but obese boys get affection from parents and society; obesity is a temporary problem and can be controlled purely by reducing sugary and sweet foods and beverages (Chaput& Ferraro, 2014); in fact no child is an obese in the eyes of his parents etc. These myths and misconceptions need to be refuted by systematic studying and understanding the dynamics of obesity.

Damage caused by obesity

It is high time to recognize that childhood obesity is a curse in disguise concurrently as well as at a later age. As reported by Butcher & Carson, (2013) during the childhood years,it is associated with many adverse health problems. It is a serious hazard to health and may harbor many co-morbidity. e.g. Metabolic syndrome favoring cluster of conditions that can put children at risk of developing heart disease, high blood pressure, high triglycerides, cholesterol and excess abdominal fat, hormone imbalances causing early puberty or menstruation, high blood sugar, Type 2 diabetes (Ranjani, Mehreen & Pradeepa, 2016., Smith, 2007.,Guo, 1999). Diabetes and cardiovascular diseases are the most common found health problems of obesity (Su, Huang et al, 2015). Obesity may result in sleep disorders including obstructive sleep, non-alcoholic fatty liver disease (NAFLD) and variety of cancer (Levi, Rayburn, Segal &, Martin, 2015). Furthermore, respiratory diseases, musculoskeletal disorders, digestive problems have also been reported in several studies as the diseases

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associated with obesity (Bahia, Coutinho et al., 2012., Oliveira, Santos et al & Krueger., 2015). Other than physical health, obesity has its severe effects on neuropsychological functions. Obese children with higher BMI have been found to have poorer executive control than children with normal BMI (Liang, Matheson, Kaye, & Boutelle, 2014) and obese/overweight adolescent have double the rate of executive dysfunction and show poor / decreased performance on tests of attention as compared to the normal weight children (Liang, Matheson, Kaye, & Boutelle, 2014). A few studies show the prevalence of mental health disorders (depression, hyperactive disorders, social phobia, distressed mood, etc.) associated with obesity (Pitayatiennanan et al., 2014., Su & Huang et al; 2015).

Cost of Obesity

Today the health systems throughout the world are struggling with increasing direct and indirect costs and declining resources from people and nation in meeting the challenges of increasing demand for health care. There are some studies that focus on the direct health cost of obesity. Dobbs & Sawers,(2014) reports that the over all global economic impact of obesity in 2014, as estimated is US \$ could be 2.0 trillion/ 2.8 (Gross domestic product)). The annual health costs of obesity in Canada ranged from 1.27 to 11.08 billion dollars (Tran, Nair, Kuhle, Ohinmaa, & Veugelers, 2013). The medical cost associated with overweight and obesity in China as estimated in 2008 could increase to 37 billion Yuan (Zhao, Zhai & Hu, 2008).) The annual direct costs of obesity in Germany amounts to approximately €9.39 billion and the indirect costs to an additional €3.65 billion. A total of 102,000 people die prematurely each year because of obesity, and there is a significant excess of unemployment, long-term nursing care, and pain and suffering due to obesity. From a lifetime perspective, every obese man is equal to an additional burden of €166,911 and each woman of €206,526 for the social security system in Germany (Effertz, Engel, Verheyen, & Linder, 2016). In Japan, the estimated indirect cost attributed to obesity was 3.2% of the total care costs (Kuriyama, 2006). Health cost of obesity in developed countries such as U.K and U.S are estimated to increase by \$48–66 billion per year in the U.S and by £1.9–2 billion per year in the UK by 2030 (Wang, McPherson & Marsh, 2011). Looking at the statistics of economic burden of obesity in developing countries, in Brazil, the estimated total costs in one year with all diseases related to overweight and obesity are US\$ 2,1 billion; due to hospitalization could be US\$ 1,4 billion and and bariatric surgery cost could be totalled to US\$ 17.4 million in 2011 (Bahia, Coutinho, Barufaldi & Azevedo Abreu, (2012); Oliveira, Santos & Silva, 2015). Besides, the cost of morbid obesity in women was five times higher than it was in men in Brazil (Oliveira, Santos & da Silva, 2015). Some studies have focused on indirect cost which includes expenses incurred from cessation or reduction of work productivity due to obesity including morbidity and mortality as measured by longevity and health improvements which are highly valued by society, but not captured by economic accounts (Wang, McPherson & Marsh, 2011).

It is a cause of concern that the economic burden of childhood and adult obesity is increasing over time in developed and developing countries. Obesity is the main driver of direct healthcare costs and indirect cost with costs rapidly rising in the obese adult/child (Alter Wijeyesundera, Franklin, Austin, Chong, 2012) reports that in comparisons to those of normal

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BMI, costs are increased by approximately 10 percent of the overweight adult/child and by approximately 30 percent of the obese adult/child (Cawley, 2004). There is evidence from the studies that increasing obesity is associated with reduced productivity alongside increased health costs (Alter Wijeyesundera, Franklin, Austin, Chong, 2012). Comparing the direct and indirect costs of obesity, indirect costs were exorbitant than the direct health care costs (Cawley, 2010 & Cawley, 2004). Both these costs of obesity affects the personal cost of an obese individual directly and indirectly e.g. obesity is related to poor physical and mental functioning and limitations in performing daily routine activities; some of obese adults/children may have to hire assistance in day to day routine because severely obese are restricted in their mobility and agility which may be costly for an individual (Seidell, 2009) obese adults may earn less than their normal counterparts because of multiple health problems caused by obesity, job discrimination and related stigma associated with obesity, (Seidell, 2009) many insurance companies and policies charge higher premiums of insurance from people with increasing weight (Trasande & Chatterjee, 2009).

The costs rise with increasing overweight/obesity varies from country to country depending on the prevalence of overweight/obesity in the nation, the state policies and state, patterns of health care usages and characteristics of the health and social welfare systems in different countries and need to be studied in that context (Seidell, 2009). There is a need for particular country estimations of the costs of obesity.

The developed and some of the developing countries have done extensive researches on obesity (USA, UK, Canada Germany etc.), India has not focused on it in the proportion and intensity, required. There are studies that have estimated the health as well as the economic burden of diseases like diabetes, in India, but systematic studies calculating and/ or estimating disease as well as economic burden of obesity in India are not amply reported. If this problem of obesity among children is not addressed timely in India, what shape this epidemic may take in times to come, what cost burden it would impose on the patient as well as the state etc.? All these would cause future challenges. These issues need to be gauged in right perspective and correct proportion. We need to devise some measures to estimate the performance and productivity loss, cognitive neuro functioning loss, reduced longevity and mental health parameters and cost estimate of infrastructures and facilities creation to address the giant problem of obesity when it becomes massive in its different dimensions. Studying economic burden, along with its causes and correlates of obesity will also support work on modelling the future burden and costs of obesity and identify the means and ways to control it. Such studies would give new impetus to the researches on obesity.

In order to address the growing problem of obesity among children, controlling the health and economic and societal burden associated with it we need to understand its psychosocial and sociocultural correlates that directly or indirectly (moderating or confounding factors) may add to obesity.

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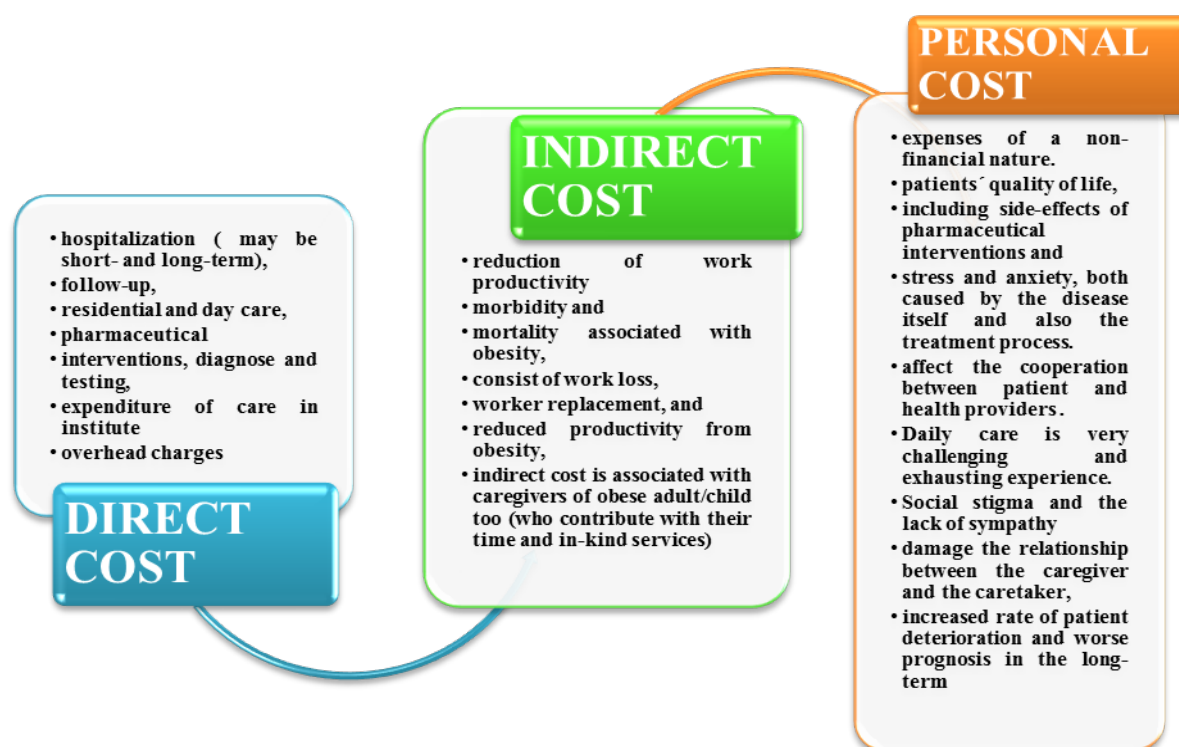


Table. 1 Cost of Obesity

Psycho-social and socio-cultural dynamics of obesity

Attachment style- Individuals without a secure attachment foundation are likely to develop negative views of the self and risk of obesity (Maras, 2013). Pazzagli & Laghezz et al (2014; Latzer & Yael, 2002). The families of obese children were found to have uncertain attachment style (less cohesive, less expressive, and less encouraging). Further, mothers' insecure attachment style exhibited higher BMIs (index of obesity) among children and fathers' insecure attachment was related to the severity of obesity in children due to use negative regulation strategies in response to child distress, which have important adverse consequences for interpersonal contexts, and development of faulty eating habits among children. Bost (2014) reported that the pattern of punishing or dismissing a child's sad or angry emotions by parents (attachment style) was significantly related to children's unhealthy eating which may lead to the risk of childhood obesity.

Locus of control: Mills & John (1991) reported that adolescent females showed external locus of control over their unhealthy eating habits. Milks, (1992) reported that obese adolescents show external locus of control orientation due to the perceived loss of control over personal eating and drinking behaviours. Gale & Batty (2008) reported that an external locus of control generally relates to depression, anxiety and obesity making adolescence more likely to give up instead of persevering and facing the problems of routine life. Stone (2012)

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suggested that externally focused obese individuals receive and respond poorer to treatment from dieticians due to lack of patience and time for their health behaviours.

Food habits: if wisely selected, and regulated with appropriate frequencies and right amount of promotes health, whereas, frequent snacking, meal skipping or taste driven fast foods and soft drinks consumption lead to health problems including obesity. Savige, Farlane, Ball, Worsley & Crawford (2007) reported that a dietary pattern of frequent snacking is commonly associated with undesirable health outcomes, including obesity, As per WHO (2016 June 5), poor dietary habits combined with decreased physical activity lead to an increase in weight and obesity among children. Roblin (2007) reported that poor eating habits, including inadequate intake of vegetables, fruit, and milk, and eating too many high-calorie snacks, play a role in childhood obesity.

Screen time: Using smart mobiles, watching T.V., and playing video games among preadolescence is on a steep rise and hampers physical activities, social interactions and encourages unmindful and unhealthy eating pattern (Essay, 2003). A cross-sectional study of 2761 parents with young children in New York reported that 40% of the 1- to 5-year-olds had a bedroom TV, and those who did were more likely to be overweight or obese (Jordan, 2011). Strasburger (2011) reported in a longitudinal study of 1000 subjects from birth to 26 years of age that, viewing more than 8 hours of TV per week at age 3 was associated with an increased risk of obesity at age 7 and average weeknight TV-viewing between the ages of 5 and 15 years was strongly predictive of adult BMI.

Sleep pattern: A good night's sleep is one of the keys to good health and healthy weight. There is evidence that people who get short sleep, disturbed sleep, late bedtimes and disturbed routine of sleep have a higher risk of weight gain and obesity than people who get seven to eight hours of sound sleep. Alison, Miller, Monique & Bourgeo (2015) found that late bedtimes were associated with adiposity and risk of obesity, independent of sleep duration among school children of age 8-17 years. Miller & Bourgeo (2015) reported an association between late bedtimes, increased cumulative energy intake and more screen time among 13 year olds adolescent. Ferranti (2016) Reported that alterations in sleep patterns and sleep efficiency is often associated with unhealthy habits and lifestyle alterations, such as lower physical activities, consumption of high calories foods and beverages which becomes unique contributing factors to the risk of obesity.

Physical activity: Many communities are built in such ways that make it difficult or unsafe to be physically active for children and encourages the sedentary lifestyle which may lead to risk of obesity, (Kaphingst & Story, 2009). CDC (2010) also reported that half of the children in the United States do not have a park, community centre, and sidewalk in their neighborhood, Due to this lack of space for playing and exercising children are getting into inactive lifestyle leading them to risk of obesity. Modern technology in homes and work places, fewer physical demands and lack of physical education classes in schools encouraged obesity in western countries. Further, inactive adult and children are more likely to gain

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weight, NIH (2012 July 13). Similarly, Chahar, (2014) Reported that children not engaging in physical activity leads to increased chances of obesity, cardiovascular diseases, cancer and diabetes in the future and its call for attention of physical expert, health experts, parents and policy makers.

Parental stress: Parents are the first access of child and stress in parents may directly or indirectly impacts a child's life. Shankardass, Connell et al, (2013) reported that children whose parents have high levels of stress have a Body Mass Index (BMI) about 2 percent higher than those whose parents have low levels of stress. Children with higher parental stress also gained weight at a 7 percent higher rate during the study period than other children. Lizette & Borreli (2013) confirmed the hypothesis that a parent's stress could be a possible risk factor for childhood obesity Parks (2012) also supported that the number of parental stressors was directly related to child obesity and fast-food consumption (an important behavioral indicator of the risk of obesity).

Psychological well-being: Obesity could be the cause or an impact of poor well-being during preadolescence or adolescence (Luthans, 2004). French et al, (1995) reported that obese children may experience emotional distress and poor psychological well-being (General health, physical health, emotional health and school and social functioning, poor quality of life, negative self-image etc.) among children of 6-13 years of age (Karen, Eric et al, 2005; Lindsay & Alastair, 2008) Such trend was more pronounced among girls than among boys who reflects the greater tolerance and acceptance of obese males in comparison to obese females.

Poverty and Obesity

There is a very common misconception about obesity that it exists only in wealthy countries and communities. In times immemorial, it was considered that obesity is a sign richness and affluence, (Levine, 2011). But, now it is recognised that obesity is a nutritional metabolic disorder, and it does not directly relate to higher socioeconomic status. The poverty leads to food insecurity (in America about 43% of households with poor incomes are food insecure) and due to their insecurity they tend to purchase cheaply available foods such as meat, potatoes, chips, sugary drinks etc. and hence, they accumulate extra weight (Devi, 2010). People who live in depleted regions have poor access to healthy and fresh food. Poverty striking areas are usually known as "food deserts," having no source of fresh food (Levine, 2011). Further, sweet sugary foods rich in carbohydrates and fats, e.g. chips, and cookies are available at cheap prices than healthy green foods (e.g., vegetables and fruit) which become unaffordable to people with financial restrictions (one of the main reasons the obesity rate amongst women and children in African countries (Regina, 2017). Poor families eat less-healthy foods out of necessity. Similar observations are reported for about 38.9 percent Hispanic and Latino kids at public school due to their weak policies regarding school meals coupled with lack of playgrounds, parks and spacious grounds for physical activity (Obesity report, 2014; Levine, 2011).

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There is no single and simple solution to the childhood obesity epidemic. It's an intricate problem and there should be a multifaceted approach. Policy makers, state and local governments, communities, school, childcare and health experts, and parents must work together to build resource and environment that supports an active and healthy lifestyle. There are several ways from which every individual could make efforts to fight against this epidemic.

Recommendations and suggestions to combat and arrest obesity

Children themselves should check obesity

1. Children should get training for healthy food selection and join motivation programs for living a healthy lifestyle.
2. Children should try to make their schedule constructive which includes sports and physical activities, brain games etc.
3. Children should be aware of what kind of lifestyle is healthy for them and what is the cost of obesity. They need to learn to take rational and informed decisions regarding their life style, selection of food, food habits and exercise and observe certain precautions to maintain good health. They need to critically analyse what should they eat? How much, why and when to eat?

Parents should check obesity

1. In any part of the world, may it be developed, semi-developed, and underdeveloped, it should be the first responsibility of the parent and caregiver to provide healthy food, not the fatty food. Parents should inculcate a habit and encourage children to eat fresh and healthy foods with natural selection of nutritious but not high calorie food e.g. fresh milk, buttermilk, seasonal fruits, simply cooked food and low-fat food etc.(Devi, 2010).
2. Parents of school going children should acquire knowledge of nutritional requirements, and their rich sources along with their effects on the body of the children. They need to plan and prepare the tiffin of their children carefully including foods providing to their requirements.
3. The Concept of eating together should be encouraged in the family so, that child observes elders and learns to eat healthy food mindfully (elders need to observe their food habits also) (Ranade, 2005). Fat parents grow children fat, due to their faulty emphasis on carbs/fat food/sugary/sweet drinks, develops a faulty eating pattern and also practice faulty cooking. This available food is obesity causing create a culture and routine of obesity causing lifestyle (faulty eating patterns, sedentary life etc.).
4. Eating while watching T.V, mobile or other electronic media is common among children. This encourages unconscious selection of unhealthy food and un mindful eating/ overeating. Mother and child indulge in a vicious circle of child watching T.V while eating unmindfully- mother feeding and allowing watching TV till child eats. Mother and child both get trapped in unhealthy eating- feeding pattern.
5. Ambitious and worried parents and teachers give undue focus to academics, and undermine the importance of games, sports, physical activities and socializing of their children's life for well-being. The child gets into a rut of academics.

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School should check obesity

1. Schools and administration should keep a regular check on students' tiffin, eating behaviour and keeps parents informed. It would be interesting to study the midday meal/food provided by institutions/ food cooked at home/food practiced in packed lunch/food available in school containers and approachable vendors/vending machines in light of their nutritional and caloric values along with its palatability and cost.
2. Physical activity and proper dietary lessons should be incorporated as a part of regular curriculum of the schools. Nutrition education including and healthy food sources with health play or quiz methods need to be fostered to children. They could be encouraged to participate in nutrition- health activities (e.g. Making salads, and other nutritive simple but healthy dishes)
3. Every education centre must have play grounds and must encourage the student to involve in varieties of physical activity. Light regular exercises should be added as a part of morning assembly in schools.
4. Schools, institutions, and coaching centers should eliminate the junk food such as chips, soft drinks, burgers etc. in their cafeteria/canteens.
5. In schools, regular health check-up including height, weight, BMI should be conducted.

Communities should check obesity

1. The government should make efforts in providing healthy and fresh food (fruits and vegetables) at an affordable cost to all classes of people. The government should monitor of marketing and advertising agencies (e.g., advertisements of delicious foods, chocolates, drinks, video games) which attracts innocent children by their misleading innovative and creative ideas
2. Nutrition, supplements and, healthy diet programs and projects should be given due focus in the schools by the government.
3. Every community, society must have provisions or parks, playgrounds and safe places for physical activities.
4. Providing cycle paths, sidewalks, and safe and clean surroundings for children by incorporating these issues during the city and town planning by the government and communities.
5. Indian government should promote its traditional Ayurveda medicines and indigenous health practices such as Yoga, Panchakarma in India and promote them at the international platform. Empirical researchers should be encouraged and funded to promote Yoga and Panchakarma in controlling obesity (Joshi & Pareek, 2017). The school must incorporate these measures into the routine of their school curriculum. .

Future Directions and Curse of Action

A baby or a child looking cute and plump is a new fashion trend among the globe. Let it be a star kid or a baby of a common parent/caregiver everybody wants their babies to fit in the lines of “chubby cheeks and rosy lips”. But are we aware of the fact that this sign of a child becoming cute and chubby is a sign of future risk of obesity? It's not only about the beauty of the child, which could affect his/her personality, but one has to face emotional, social, and

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mental health challenges too. What all problems could he/she face when he/she becomes an obese adult? Can we think of the world where the whole globe becomes obese and ill? It's a simple truth and a hard fact that a parent of an obese child need to be blamed for shoving an innocent baby in the trap of childhood obesity who has to suffer lifelong with its ill effects (Joshi & Pareek, 2017). We need to initiate a campaign for social change for healthy living and healthy eating. This article raises some thought provoking questions that need to be addressed by the future researches.

The pertinent question is:

- If childhood obesity is viewed as severe and as much a cause of concern as other diseases like heart & lung diseases, cancer, diabetes etc.?
- What can be the motivators that enable parents & children adopt healthy life?
- How can we understand and build in depth understanding of interpersonal & interpersonal factors that affect obesity promoting behaviors in context of different race and culture?
- Are overweight and obesity, equally dangerous as underweight?

Childhood obesity is a major public health issue. Hence, implementation of the available effective intervention and strategy programs is essential. There should be more effective strategies to reduce future childhood obesity rates.

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