

Childhood Obesity: An Old Problem in a New Age

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Abstract

Obesity in America is not a new problem. However, the increasing prevalence of childhood obesity is. This review will examine the literature to explain what childhood obesity is, what causes it, why it is dangerous, and how this trend can be reversed. Childhood obesity has become one of the greatest health challenges of our time and in order to implement and execute real solutions, the causes and effects of this widespread health problem must be examined in detail. Although there are a myriad of actors that contribute to childhood obesity, the main ones that shall be focused on in this review are the quality and quantity of food intake, lack of physical activity, and the influencing effect of media. This paper will explore the effects of childhood obesity on the individual, in terms of physical and psychological health, and on society, in terms of the cost society pays for its obese population. If the goal is to decrease the amount of obese children in America, then the ultimate solution may lie in one of its contributors, the media. If media is truly an important actor in creating this pandemic, then turning it around and utilizing its power to educate the public may be the solution needed to stop this escalating trend.

Introduction/ History

The Department of Health and Human Services was the first to formally convene and recognize child and youth obesity as a national epidemic in 1977. Since then, many other major organizations including the American Medical Association, the Health Resources and Service Administration, and the Centers for Disease Control and Prevention (CDC) have joined in to aid in the fight against youth obesity (Barlow, 2007). Due to the improvements in quantitative measuring techniques and in qualitative evaluative methods, the scientific knowledge base of this condition has been allowed to grow and this has allowed more effective and objective discussions to proceed on this subject. This growing knowledge base, anchored with scientific experiments and research studies, is growing rapidly. There are now a variety of studies that range from, showing the link between childhood obesity to adult obesity and associated health risks to those that show the true monetary cost to society that occurs due to childhood obesity. The purpose of this paper is to explore factors that cause childhood obesity in America and its resulting ramifications. The following sections will describe: (1) What obesity is and how it is measured quantitatively, (2) consequences of childhood obesity and why this trend is important, (3) biological mechanisms of obesity, (4) factors the cause obesity, and (5) possible solutions and future directions.

The Quantitative Measurement of Obesity

The World Health Organization defines obesity as “an abnormal or excessive accumulation of fat that presents a risk to health” and the current way that assesses whether one is obese or not, is the body mass index. This index, popularly known as BMI, was created in the early 19th century and originally determined to be of unfit for individual diagnosis, used only in population studies (Eknoyan 2007). But due to the simplicity its calculation, it is now widely

used as a convenient measure for the amount of body fat a person or child has in order to assess health outcomes objectively.

The calculation standards and categorization techniques for the BMI of children take into account the variety of body compositions found in children during their growing stages. While adults are classified simply as underweight, normal, overweight, or obese, the BMI calculation for children utilizes age-specific and gender-specific percentiles rather than fixed categories. According to these BMI percentiles, a child can now objectively be defined as being overweight if they are above the 95th percentile.

Consequences of Obesity

In 2001, the CDC released startling facts regarding childhood obesity. They stated that in America “one in six children are obese, that it costs the US about \$150 billion dollars per year, and that it is a major cause of death attributable to heart disease, cancer, and diabetes” (CDC). While these assessments were very vocalized at the time and received much attention from both the media and the public, not much progress has been made since then. A study, published just this year examined data from the National Health and Nutrition Examination Survey and found that the childhood obesity rate of 14.5 percent observed in 2000 has increased to the 17.3 percent currently observed (Skinner, 2014). This highlights an important point, which is that this trend is not decreasing and therefore more viable and effective methods are needed to deal with this epidemic.

There are numerous problems that are caused by this growing epidemic and because many of them are not easily discernable, it is important to examine exactly how childhood

obesity relates to them. Only then can we clearly comprehend the true cost of childhood obesity, both for the individual and for the society at large.

Physical Health Implications

There is a multitudinous array of well-documented health consequences tied to childhood obesity. Chronic conditions such as hypertension, type II diabetes, coronary heart disease, and congestive heart failure, all of which lead to early morbidity, have been proven to be caused by obesity (Brown, 1998; Dietz, 1998; Anrig, 2003; Skinner, 2014). If a child is obese then there is a much greater chance that they will be obese as adults and develop the numerous chronic diseases associated with adult obesity. An obese child at the age of four increases his or her likelihood of being an obese adult by twenty percent, and that number increases to eighty percent if the child is still overweight in adolescence (Anrig, 2003). Because childhood obesity has been proven to increase the chance of adulthood obesity, all the major health consequences correlated with adulthood obesity can be explained, to a degree, by childhood obesity. In fact, the prevalence of chronic diseases is, similar to the prevalence of childhood obesity, also on the rise suggesting a direct relation between childhood obesity and these chronic conditions (Partridge, 2003).

Psychological Health Implications

Along with the well-documented physical health concerns associated with childhood obesity, there are also many associated psychological health risks that are just starting to be recognized. While many think that the worst effect caused by childhood obesity is the increased likelihood of developing chronic conditions, this may not be the worst effect after all. The psychological effects are harder to study and therefore more dangerous because of their insidious

manifestation and perpetuation. According to a recent study, the emotional and psychological consequences of being overweight is much higher in young children and particularly for girls (Cornette, 2008). While an obese adult may receive some negative attention for their extra weight, it seems that for children, bullying and harassment are much larger players that significantly influence self-esteem. Overweight girls who were 5 to 12 years of age had an increased likelihood of suffering from low self-esteem and high dissatisfaction with their bodies (Sands and Wardle, 2003; Janssen, 2004). These psychological consequences must be taken into consideration when trying to assess the true cost of obesity.

Economic costs

In addition to the individual health risks that are brought upon by childhood obesity, the extent to which childhood obesity strains a nation's economy must also be accounted for. Financial costs, not usually focused on in the examination of obesity, are important nonetheless. The actual monetary value of US expenditure used to deal with childhood obesity is astounding. Researchers found that in 2005, 190 billion US dollars were spent on obesity-related medical care alone. Through their empirical findings they were able to show, beyond a doubt, a strong positive correlation between excessive weight and medical expenditures (Lehnert, Sonntag, Konnopka, Riedel-Heller, & Konig, 2013). This serious economic burden reveals, in monetary terms, the cost society is already paying for this continually rising epidemic. An analysis of these financial burdens suggests the need for a better way to control this rising trend and utilize this expenditure more wisely.

Biological Mechanism of Obesity

There are several survival mechanisms that have evolved in the human body in order to allow humans an optimal chance of survival. However, such mechanisms depend on correct food intake and accurate energy output in order to function properly. When there is an imbalance of either one of these, the body's beneficial mechanisms can become detrimental. One mechanism, the storage of energy as an energy-dense fat known as triglycerides, is of particular importance to the development of childhood obesity. The purpose of storing energy as triglycerides is to store as much energy as possible in order to survive periods of food deprivation. While this evolved as an advantage for vertebrates, it has become a disadvantage in regards to obesity.

Storing energy in this highly efficient form involves many signaling molecules, proteins, and enzymes. Leptin, one such signaling molecule, is a hormone secreted by the body's adipose tissues to maintain constant fat stores (Bado 1998). A study done on mice with leptin revealed that leptin is a signaling molecule that operates in a negative feedback loop along with many proteins and enzymes, in order to maintain a constancy of adipose tissue mass (Friedman & Halaas, 1998). In other words, leptin works to maintain the natural weight of the animal. Leptin is only one example of the molecules that function in the highly complex system of our bodies that help maintain a homeostatic system and increase survival.

The leptin mechanism acts by decreasing leptin levels, during periods of starvation, in order to allow food intake to exceed energy expenditure. When there is an increase in adiposity, due to excessive food consumption, there is an increased release of leptin which works to inhibit food intake and promote energy expenditure. It is when this process is imbalanced that obesity is allowed to occur. One way this process can go wrong is when the body develops a relative or absolute insensitivity to leptin. This insensitivity to leptin, like the insensitivity to insulin in

diabetes, is due to a variety of factors, including incorrect food consumption habits (Friedman & Halaas, 1998).

Causes of Obesity

Quality and Quantity of Food

For many diseases it is not one factor alone that acts to create the disease, but many that come together and through their interaction cause the disease. Likewise obesity does not occur just because of one actor. It is instead under the influence of a cast of many actors, of which, food is a major contributor. Research has shown strong evidence of the effect of diet composition on body weight regulation, with high fat diets producing obesity in rodents (Horton 1995). Clearly the quality and composition of food matters when examining how obesity occurs.

A recent study found that obesity for kids, ages 3-5, was heavily connected to incorrect consumption of food. They conducted, with parental consent, their experiment of 236 children diagnosed with obesity. They feed the children a controlled diet, that changed the amount and quality of fat and carbohydrates consumed, while keeping the level of protein consumption the same (Zywienia 2006). This fixed diet caused the children to lose significant body mass, highlighting the effect of the quality and quantity of diet to a child's weight. This suggests that appropriate changes in children's diet can be targeted as a solution to the obesity epidemic.

Physical Exercise

The sheer consumption of increased low quality fat and sugar alone does not cause obesity but combined, with an increased lack of exercise, they come very close to describing how obesity is caused. At the biological level our body works to maintain homeostasis. It is a simple matter of calories in and calories out. What causes obesity is when homeostasis can no

longer be maintained as discussed above with the role of leptin in body weight regulation. The amount food consumed and exercise performed together influence the body physiologically affecting more or less signals to be circulated in response (Dietz, 1998; Barlow, 2007). The body needs physical activity in order to keep the body running and to send all the correct signals. Without exercise and with increased fat intake obesity cannot be avoided. When this type of overfeeding occurs and there is no physical activity to allow the energy to be released as heat, the excess energy will be stored and lead to fat accumulation (Horton 1995). The lack of physical activity increasing in children of this generation most certainly plays a huge role in the rising trend of childhood obesity.

Discussion: Possible solutions and Future Directions

In trying to find a solution to this problem many health care professional have attempted to articulate guidelines for the identification and treatment of childhood obesity. While the identification of childhood obesity rests on a simple calculation of BMI, the treatment options are diverse and attempt to attack the problem from all sides. Some health care professionals recommend that BMI be monitored regularly and any significant increase above the 95th percentile be reported and taken care of right away (Ball and McCargar 2003). However this tactic of “handling the situation” as it arises may be the reason why the obesity trend is not decreasing in spite of efforts.

Education

The reason childhood obesity is a more attractive problem to tackle than adult obesity is because the obese adult has a mindset and bad habits that have already set in and are more difficult to change. One the other hand, children do not yet have these long-term habits and

therefore are easier to teach correct habitual practices in regards to both food and exercise. That being said, waiting until the child becomes obese to deal with it is similar to attempting to affect adult obesity. By the time the child has become obese, above the 95th percentile; habits and mindsets have already set in and will be more difficult to change.

In order to truly stop and reverse the trend of childhood obesity, education has to start with the parents. Most parents are unaware of the health risks associated with childhood obesity and some don't even know if their child is obese. Researchers who tested parental knowledge on health factors and risks of obesity found that while 23% of the parents surveyed had overweight children, their level of concern about the excess weight and their knowledge of healthy eating patterns were no different from parents who had children of a healthy weight. They also found that parents of overweight children tend to underestimate the weight of their children (Etelson et. al 2003). These results are alarming but not unexpected. The fact that parents don't know what an overweight child looks like or how to even begin to change eating habits demonstrates the serious lack of nutrition education in our school systems.

A practical initiative to implement would involve educating parents through communal food garden. Such initiatives have already been put in place and have been proven to be effective. In upstate New York, the formation of food gardens have promoted health and educated parents and children alike, through the formation of informal networks, renewed social support, and the emphasis place on change at the community level (Armstrong, 2000). These gardens not only serve as a teaching tool for parent, but also promote an environment of care for the food children put into their bodies. Furthermore they are an actual source of healthy foods that deals with the income and transportation problems common for low income families (Shih, Dumke, Goran, & Simon, 2013).

The manipulation of the food in our food system is also a major contributor to the obesity epidemic. But finally, after years of letting food manufacturers add and do whatever they wanted, the quality of the food we consume is finally coming under scrutiny. Foods are constantly being manipulated and processed by large corporations for monetary purposes with little to no consideration for the health outcomes of such actions (Martin, 2007). Part of the childhood obesity problem can be attributed to the changes in diet that have occurred due to the manipulation and market value of certain foods. For example, trans-fats were created by food manufactures that wanted to preserve the shelf life of those foods. They chemically manipulated liquid oils into solid fats and incorporated it into many foods that now are unrecognizably processed. This was done with no consideration for the harmful health effects it could have on consumers (Martin, 2007). But there is hope. For example, through educating the public of the dangers associated with these manipulated trans-fats, such as their characteristic lowering of good HDL and raising bad LDL cholesterol, the public was outraged and demanded policies be put in place to prevent the use of trans fat in foods. Now many products in the market even advertise no trans-fat on labels, due to the stigma now attached to such fats (Valenzuel, 1999). This shows that educating the public is the best way to create change and eventually gear the public towards healthy consumption and exercise habits. These dietary and activity changes will then lead to a reversal in the obesity trend, as indicated by the strong connection between food consumption, exercise, and obesity.

The Media

The media is a powerful tool can be wielded in order to combat the trend it influences. Food advertising is a multi-billion dollar industry and is currently working against healthy consumption habits. A study, done on the exposure to television food advertising and its

associations with children's fast food, soft drink consumption, and obesity, found that 40% of all food commercials viewed by children ages 2-11 in 2004 were of ready-to-eat cereal, regular and dietary carbonated soft drinks (CSDs), and fast food restaurants (Andreyeva, Kelly, & Harris, 2011). That percentage represents more than 2000 television commercials for these categories alone. Their results affirmed the connection between the amount of exposure to TV advertising and the higher consumption of soft drinks and fast food in children. The more exposure the children had to the advertising of calorie-dense nutrient-poor food, the more overall unhealthy foods consumed (Andreyeva 2011). These advertisements directed to children clearly have a huge effect on their consumption habits. If this industry were to begin to advertise and promote healthy foods, then a decrease in childhood obesity would surely be attainable. These are only a few solutions that can be incorporated throughout our society in order to attain a more overall healthy population. However, their implementation will require healthcare professionals, medical professionals, teachers, CEOs, parents, and children to come and work together. When we set aside our own selfishness and prejudices we begin to see that this issue affects all of us. Only then can we work together to attain a truly effective solution.

Conclusion

In summary, we now know through a variety of research studies how obesity occurs. We know both the factors that contribute to it and what is occurring on the biological level. Moreover, we also know its detrimental effects on the health of an individual and its financial implication for society. It is clear this trend needs to decrease, but in order to implement and execute real solutions to this difficult problem there are a myriad of people that need to come together and play their part. This solution will require people of all areas of specialty, from the medical field to the business sector to the community level. Food intake, physical activity, and the influencing effect of media are all areas that must be considered in order to combat the detrimental effects caused by childhood obesity. With the realization that this epidemic affects us all, we can work actively to overcome this 21st century dilemma.