**Review Article**

**Review on the Causes of Obesity and the Malleability for Change in Children**

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**Abstract**

Obesity is one of the largest issues currently facing American Children, with lifelong effects. Therefore it is important to find ways to reduce obesity in Children, so it does not become a chronic issue as the child grows older. The purpose of this paper is to review the causes of obesity and the malleability of each cause for change. The main causes of obesity are attributed to the intake of more calories, a more sedentary lifestyle, and lower level of fitness, These are rather simple to pin point and understand, however the causes of causes become much more complicated and cyclical such as the availability of high calorie low costing foods, SES, food marketing, restaurant potions sizes, the education system, and genetics. Some of these causes of causes are highly malleable, but other causes require large systematic changes. It is important to understand which causes are fixable, so the U.S healthcare system won’t blindly spend money on programs that will not work.

**Keywords:** Causes of obesity; Malleability of obesity; obesity; obesity in children.

**Introduction**

Obesity has become an increasing source of harm to the health of Americans. Obesity is defined as having a Body Mass Index BMI over 30. Childhood obesity is particularly important because obese children have high chance of becoming obese adults. The prevalence of obesity in children aged 2 to 19 is 19.3%. About 14.4 million children are obese [1]. And obesity rates are increasing. About 33% of public high schools in Boston had a BMI that was considered overweight or obese [2]. Even though the prevalence of obesity is less than the national average, more than half of Boston adults had BMIs that were overweight or obese. Since 1990, obesity has been on a steady increase in Massachusetts [3]. Obesity is a significant risk factor for high blood pressure, diabetes, stroke, heart disease, lower quality of life, and some causes of morbidity and mortality [4]. This harms the health and life of those affected and harms family and friends (say how it does so). Obesity and subsequent diseases are very expensive to treat. Fortunately, obesity is very preventable as long as the proper measures are implemented. This makes it important to understand how to reduce harm from obesity in children.

**Causes and Malleability of Causes in Obesity**

The trend of increasing obesity rates in children can be attributed to the intake of more calories, a more sedentary lifestyle, and lower level of physical activities. These three causes can describe why there is an increase of obesity, but it does not pinpoint a cause to target. Therefore, the causes to these causes must be explored and separated into malleable and impregnable causes. Some are powerful and others are weak. This section begins by discussing the powerful and malleable causes. These are the causes whose power will be mitigated by effective programs-programs that reduce harm.

One factor that contributes to larger intakes of calories is the availability of tasty high-calorie low-cost food. Fast food restaurants, snacks at the convenience store, and vending machines are all readily available. All offer low costs and large portions. Lower-income children have decreased access to healthier foods [5]. Moreover, these foods are also very large in portion. Research compiled by the CDC shows that people tend to eat more when portion sizes are larger. People are often unable to tell the difference in portion size throughout the course of the research study [6]. One of the main causes of larger portion sizes is due to consumer mentality of wanted more value for the dollar spent. Research has shown that people choose restaurants based on the size of food portions [7]. From a marketing standpoint, large portions have more appeal and makes more profit [6]. When eating out, it is much harder to control portion sizes. However, at home, families can purchase smaller bowls and serve less each meal. Therefor controlling portion size is malleable.

Recent trends have shown that people are eating far more away from home. From 44% 1987 to 50.2% in 2010 [7]. This is an issue because foods are prepared outside of the home are found to have fewer fruits and vegetables, more calories, fat, and sodium [7]. Therefor eating away from home is also associated with obesity. One possible reason for people eating out more is due to work life balance. 36% of young adults had no time to cook at home and therefor eating out was more convenient [8]. People are working more and eating out is just more convenient. Moreover, since women have started to enter the workforce, there is no one at home to prepare meals 24/7 [8]. Another reason is that the restaurant industry spends over $10 billion dollars on advertising and that can entice consumers to buy food instead of cooking [8]. Eating out has become more than just the act of eating and has become a form of entertainment. Even though these causes affect older adults, it is those adults bringing their children to eating outside as well. Some of the causes to eating away from home is systemic and some of the causes can be controlled. This makes eating away from home somewhat malleable.

Exercise is a widely accepted method to burn calories and to lose weight. Women’s physical activity has decreased from 19% to 52% and men’s from 11% to 43% between 1988 and 2010 [9]. Due to the increase in inactivity, there is also an increase in weight. This could be partly due to a decrease in free time that a child has due to afterschool programs, which has contributed to higher level of inactivity [10].Currently, many children have increased loads of homework which affects the amount of free time children have and data suggests that most children spend their free time on physical activities Since many children spend their free time doing physical activity, and if children has less free time, then there would be higher levels of inactivity [11]. Moreover social economic statuses are a good indicator for lack of physical exercise. Children in lower economic statuses have lower access to for outdoors and sport programs [11]. In Boston, a very urban area, there is a large demand for safe playgrounds. Studies has shown that children that live farther than two-thirds of a mile to a playground were 5 times more likely to have an unhealthy weight [12]. Exercise is one of the simplest methods to lose weight. However, there can be many factors that affect the ability to exercise effectively and safely. Even so, it is still one of the most malleable causes of obesity.

A lack of sleep can disrupt the hormone balance which can boost weight. When someone does not get an adequate amount of sleep, hormone levels of ghrelin and cortisol rise and leptin falls. Cortisol and ghrelin are associated with weight gain, and leptin informs your body that the stomach is full [13]. Children are spending an average of 7 hours on electronics and social media. More than 50% of teenagers spent time on their phones past their bedtimes. The light from the screen increases stress on the body and the brain which causes a further lack of sleep [14]. This makes the lack of a sleep a very malleable cause. However, even though it is malleable it may not be a very large cause to obesity.

Factors such as pressure to succeed academically, financial problems, domestic responsibility, and holding a job during school greatly increases a student’s stress level. Similar to a lack of sleep anxiety, when the body is faced with long term stress, cortisol is released and increased motivation to eat [13]. Stress and anxiety is hard to cure just by itself and it is more important to cure the underlying cause of stress and anxiety. Stress and anxiety can be caused by a variety of reasons, and due to the complexity, it is not very malleable.

Among impregnable causes, genetics play a major role in the development of obesity. There have been over 50 discovered genes that are associated with obesity, even though different genes have varying effects, conservative estimates suggest that genes can contribute 40% of the obesity prevalence today. [15] For example, the Fat Mass and Obesity-Associated Gene (FTO) is found in approximately 43% of the population [15]. When in the presence of food this gene can cause, increased hunger levels, increase calorie intake, reduce satiety, reduced control of overeating, and increased tendency to store body fat. Since genes can contribute to 40% of the obesity prevalence, that already makes 40% of the causes of obesity impregnable.

Even though this may not be a large contributor sometimes having multiple complications can cause you to be more likely to become obese. For example, during treatment some drugs and steroid require for treatment may also cause weight gain. Moreover, some illness such as Cushing disease and polycystic ovary syndrome will also cause weight gain.

Social economic status plays a major part in obesity. In the short term, factors such as race, income, and education are impregnable in the short term. To fix this issue it would require large scale policy changes. For example, in women obesity prevalence increase as income and education decrease. However, non-Hispanic black and Mexican American men have decreased obesity prevalence as income decreases. These complex relationships between race, education and obesity make it hard to implement effective change [16].

Race and ethnicity are impregnable causes that play major roles in the cause of obesity. Race in America is tied closely with social-economic status and to many other causes. Living in high-poverty areas is related to worse food options, lack of outdoor spaces, concern for safety, and worse living conditions. 38% of African American children and 23% of Latino family lives below the poverty line and these two groups have the highest levels of obesity prevalence [17]. Along with racial factors, ethnicity and culture can also play a role as well. For example, non-Hispanic Black men report having a preference for women to have larger body sizes than non-Hispanic white men [18].These cultural differences are deeply ingrained within the culture and not likely to change. The effects of race and ethnicity can be seen throughout the various causes and can impact the development of obesity.

Since there are so many causes of obesity, it is important to determine the relationship between how powerful, and malleable each cause is. Since the causes of obesity are hard to quantify the chart above helps put the causes relative to each other. The most malleable cause would be the lack of physical activity. Since one can exercise anywhere, it is also the most accessible. Moreover, it does not require any large policy changes to promote exercise. Large portion size is also something that is construable. However, when eating out sometimes it may not be so easy to control, but at home, it can be very simple to control. The availability of high-calorie food is powerful but a bit harder to manage. It may require policy change to see results. Similar to lack of physical exercise, getting adequate sleep is also highly malleable. However, even though it may not require a policy change or political support, it is weak cause of obesity. Anxiety, depression, emotional and mental health issues are very malleable but very difficult to navigate.

One of the more impregnable causes is obesity that is the cause of other disease and medications. Comorbidities are hard to deal with, but it is not a big contributor to obesity. Another powerful cause of obesity would be the social determent of health. Income and living condition can play a major role in obesity. For example, a person’s income does not allow them to buy good healthy food. They have to resort to high calorie fast foods. The most impregnable cause of obesity would be genetics. Genetics is something that is not changeable as of now. Moreover, those born with certain gene are predisposed and have a higher likely hood of being obese as all age ranges.

**Conclusion**

Obesity is a one of the largest problems that affect the U.S healthcare system currently. Therefor it is important to understand the causes. The causes and causes of causes for obesity are widespread and often circular. Therefore, to make any change it is important to gauge how malleable the causes are. If a cause is not malleable it would not be cost-effective in targeting that cause. One limitation in this section is that not all causes or causes may have been explored or listed. By understanding the costs of obesity throughout life will help understand how large the problem is and will help determine what programs and policies will be cost-effective in targeting the various causes.

**Conflicts of Interests**

We have read and understood your journal’s policies, and we believe that neither the manuscript nor the study violates any of these. There are no conflicts of interest to declare.

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