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# Nature Versus Nurture Contributions To Child Obesity

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### Introduction

Child obesity is increasing significantly worldwide! Child obesity has doubled in the United States since the late 1970's. Obesity is a serious condition associated with physical problems such as hypertension and diabetes, but also psychological problems such as low self-esteem. The causes of childhood obesity include genetics, socioeconomic status (lack of health education and stress), poor behavioral patterns and less physical activity. Child obesity can develop from genetic causes (nature) and/or environmental causes (nurture). Dealing with nature, some genetic disorders/ syndromes can lead to child obesity including Bardet- Biedl syndrome, Prader- Willi syndrome, and a mutation in leptin hormone. Other genetic disorders leading to child obesity are growth hormone deficiency and hypothyroidism. On the other hand, nurture has many environmental conditions linked to child obesity. These include diet, engagement/ non-engagement in certain types of physical activities and the socioeconomic status of the family. Through further research this paper will investigate exactly how nature and nurture interact with child obesity.

### Nature- Genetic Disorders/ Syndromes

When hearing the word nature, a person may think of genetics, things an individual can not alter about themselves or something a person is born with. People rely on "nature" or genetics to explain human behavior. Nature is comprised of one's genes. Some genetic disorders/ syndromes that lead to child obesity including Bardet- Biedl syndrome, Prader- Willi syndrome and a mutation in Leptin hormone. Research suggests that weight gain is influenced by genetic components (O' Rahilly & Farooqi, 2006). Family studies have shown that children with obese parents or siblings are five times more likely to become obese (Bouchard, 2009).

Bardet- Biedl syndrome is a genetic disorder that affects many systems of the body. Obesity is a characteristic feature of Bardet- Biedl syndrome. With this syndrome, abnormal weight gain begins in early childhood and continues as an issue through life. "Obesity is another major clinical finding and the incidence is reported to be 72–86% in the BBS population" (Forsythe & Beales, 2012). 1 in 140,000 to 1 in 160,000 people are born with Bardet- Biedl syndrome (NIH U.S. National Library of Medicine, 2016).

Another genetic disorder, similar to Bardet- Biedl syndrome is Prader- Willi syndrome. Prader- Willi syndrome causes stunted growth, insatiable appetite and low metabolism, which all are leading causes to childhood obesity (Cassidy & Driscoll, 2008). "It can occur by three main mechanisms, which lead to absence of expression of paternally inherited genes in the 15q11.2–q13 region: paternal microdeletion, maternal uniparental disomy, and imprinting defect" (Cassidy & Driscoll, 2009). Between 1 in 12,000 to 15,000 people have Prader- Willi syndrome (USA Prader- Willi Syndrome Association, 2015). Research has associated a mutation in the gene controlling leptin production with obesity (Farooqi & O'Rahilly, 2006). Leptin (a 16-kDa protein) is a hormone that is produced by the body's fat cells. A mutation in

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the leptin gene can result in hyperphagia (increased appetite). This will cause an excessive food increase, leading to obesity (Farooqi & O’Rahilly, 2006). People who have a mutation of the leptin gene have insatiable hunger; this leads them to consume more calories than they can burn off. “Approximately 3-5% of human obese populations can be regarded as “relatively” leptin deficient and could benefit from leptin therapy” (Soliman, Yasin, & Kassem, 2012). Other disorders causing child obesity, such as growth hormone deficiency and hypothyroidism, are due to endocrine functions. Growth Hormone Deficiency is an endocrine syndrome due to not enough GH (growth hormone). This can cause the bones and metabolism to not fully develop. If the metabolism does not fully develop, this can cause obesity. Growth hormone deficiency approximately affects 1 in 3,500 children (Kemp, 2016). Similar to growth hormone deficiency, hypothyroidism is where the body’s thyroid gland can’t make enough thyroid hormone to keep the body running normally. This can also result in a low metabolism, which causes obesity. Through the previous research stated, there are very few children that have these genes/syndromes that can cause obesity. Although these genetic mutations and syndromes can cause obesity, Herrera & Lindgren (2010) claimed that a genetic component occurred in 40% of children with obesity. Because of the low nature percentages, there are more nurture affects that cause childhood obesity. Brantley, Myers and Roy state, “Recent hypotheses in the scientific community suggest the current obesity epidemic is being driven largely by environmental factors (e.g., high energy/high fat foods, fast food consumption, television watching, 'super-sized' portions, etc.) rather than biological ones” (2005). Proven in several studies, environmental factors are more likely to cause child obesity than biological factors.

## **Nurture- Diet, Exercise and Wealth**

When people think of a child being obese, they may automatically relate it to environmental factors such as, diet, exercise and wealth. Nurture is the environmental factors that lead to the cause. Globally, 41 million preschool children were classified obese in 2016 (World Health Organization, 2017). Obesity is usually the result of an imbalance between calories consumed and calories used (World Health Organization, 2017). The World Health Organization (2017) claims that supportive environments and communities are fundamental in shaping people’s choices and preventing obesity. Diet plays an important role in childhood obesity. The average recommended calorie intake for most children between 6 and 12 years old is 1,600 to 2,200 per day depending on how active the child is (Gavin, 2018). If a child eats too many calories, the body will exchange it for fat. Too much fat can lead to obesity. “High-calorie foods — such as sugary sodas, candy, and fast food — quickly add up to too many calories” (Gavin, 2018). Obesity rates have only increased in the last decade. Today, there is more availability to fast food and drive-thru’s. It is easier for parents today, with their busy schedules, to go through a drive-thru and get fast food, rather than spending time to make a healthy balanced meal. Exercise and playing are other important factors, because physical activity burns calories and fat. Gavin (2018) states, “it is a great idea to play and be active for an 1 hour or more every day.” This means an hour or more spent playing sports, playing outside, or riding a bike. In today’s society technology is so advanced, children spend more time on their phones/computers rather than outside playing. Gavin (2018) states, “Watching TV and playing video games won't burn many calories at all, which is why you should limit those activities to no more than 2 hours per day.” A person burns only about 1 calorie per minute while watching TV (Gavin, 2018). Wealth or socioeconomics of a family are also important in childhood obesity. Wealth of a family could determine where the family lives. A higher-class family may be able to afford to live in a low-crime, gated neighborhood, which would make it easier for the children to

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play outside in their yard or ride a bike down the street. On the other hand, a family who cannot afford much may live in a high crime area and it might not be as safe for the children to play outside. Families with low income also may not be able to afford healthier foods. It could be easier for the family to buy a frozen pizza for five dollars, than to buy ten dollars on chicken and seven dollars plus on healthy sides. A low-income family may not be able to afford extra expenses such as a child playing a recreational sport, or even affording a gym membership. "Household wealth influences the material environment to which children are exposed. Low-income may be related to food access dilemmas resulting from resource constraints and adverse food environments" (Liu, Ma, Jiang, Song, Fan & Wen, 2018).

## Conclusion

Through the research stated, nurture plays the biggest role in child obesity. This results from many children not eating balanced diets, not getting enough exercise/ physical activity and wealth of the family. Although nature, genetic diseases/ syndromes can cause obesity in some children, it is more likely for a child to become obese due to nurture. Previous research stated that 40% of childhood obesity cases were caused from a genetic mutation. That leaves the other 60% to lead to the nurture side. Obesity has reached epidemic proportions globally, with 2.8 million people dying each year as a result of being overweight (World Health Organization, 2017). Do not worry, though; this is good news! Through the research stated, most cases of childhood obesity can be prevented and are caused by environmental factors. If a child is suffering with obesity, it is the job of the parents and community citizens to guide these children in the right direction. Parents, limit phone/ computer time; make it required that your child spends at least 30 minutes a day doing an activity; this could be playing outside or riding a bike. Also, make sure that the child is eating a healthy, balanced diet. As a community citizen, make sure our community areas are kept safe, such as parks, trails, etc., to make it easier for children to enjoy these things. If enough is done child obesity rates can decrease; let's get this thing going!

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