The Poverty, Food Insecurity, and Childhood Obesity Cycle

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Introduction

The United States has seen its fair share of health crises that affect its children. Many diseases have wiped out populations of people as they traveled across the country. Most of these diseases hit individuals who had a weaker immune system, like children, much harder than individuals with stronger immune systems. Examples of these diseases include polio, smallpox, and tuberculosis. Polio is a potentially fatal disease caused by a virus. It is highly infectious and mainly strikes children under five years of age. This disease affects the child's nervous system and usually causes complete or partial paralysis (Global Polio Eradication Initiative, 2010). Like Polio, smallpox is also a highly infectious disease that is caused by a virus. This disease is also highly fatal and can cause brain swelling and severe bleeding. However, the trademark of smallpox is the skin lesions that cover the body of those infected with this disease (Vyas & Zieve, 2011). Tuberculosis also had a major and deadly impact on the population of children in the United States. Like polio and small pox, this disease too affected more children than it did adults. Tuberculosis is caused by a bacterium that usually infects the lungs of its victims and is highly fatal (Division of Tuberculosis Elimination, 2012).

Polio, smallpox, and tuberculosis are all highly fatal and highly infectious diseases that have been a major health crisis to the lives of children in the United States. However, with the increase in public health awareness and medical technology, the fatality of all three of these diseases has been almost completely destroyed. Polio and smallpox have been almost completely eradicated

worldwide, thanks to the invention of vaccines. With a vaccine, public health workers could scour the globe and vaccinate people to protect them against a disease, there by slowly killing off the virus itself. With the invention of the tuberculosis a test and antibiotics, public health workers have slowly diminished the fatality of tuberculosis and the number of people infected with this disease in the United States.

Although, these amazing medical and public health strides have allowed the United States to see a dramatic decrease in the mortality rate of its children due to these diseases, the country is now faced with another major health crises aimed at its children. This is a crisis of a different sort, one not caused by a single virus or bacterium but by multiple factors. This is a crisis of childhood obesity, poverty, and food insecurity and their never-ending cycle that has many American children trapped.

Introduction: Food Insecurity

According to the Institute of Medicine, food insecurity is defined as a "limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Troy et al., 2011). Because food insecurity is a very broad term and can have many varying degrees, it has been divided up into four different levels. The highest level has been given the title of high food security. Households in this category of food insecurity have no complications acquiring adequate food. The next category below high food security is called marginal food security. In this degree of food insecurity households have problems acquiring food but these problems are not experienced all the time but at certain times of the year.

Individuals of this category also do not experience reduced quantity or quality of their food intake. In the next category, termed low food security, households have "reduced quality, variety, and desirability of their diets, but the quantity of food intake and normal eating patterns [are] not substantially disrupted" (Troy et al., 2011). The last level of food insecurity has been given the title of very low food security and is the most severe range of food insecurity. Households in this category have one or more members who, at certain times during the year, experience hunger. This experience is caused by their shortage of food due to their absence of funds and other resources needed to have food (Troy et al., 2011).

The majority of households in the United States are considered food secure, however almost fifteen percent experience periods of food insecurity. Of this fifteen percent, more than five hundred thousand U.S. households have found themselves in the very low food security category of food insecurity and therefore find themselves at times with no food at all. As of 2010, about every one in five children has experienced food insecurity. This statistic means that over sixteen million children in the United States have experienced periods of hunger (National Coalition for the Homeless, 2011). Due to circumstances like these, the United States government has enacted a variety of programs to help keep all U.S. families from ever finding themselves food insecure. To monitor the effectiveness of these programs the U.S. Department of Agriculture, or USDA for short, uses a survey called the Core Food Security Module to gather vital information on the food security status of households in the U.S. This module

contains a total of eighteen questions, all of which “ask about conditions and behaviors known to characterize households having difficulty meeting basic food needs” (Troy et al., 2011). Of these eighteen questions, ten questions are asked of every U.S. household and the remaining eight are asked of households with children only. From their answers to the eighteen questions, each household is placed into one of the food insecurity categories. If a household completes the survey with affirmative responses to six or more questions if they have children in the household or if they do not have children and answer the survey with ten or more affirmative responses then the household is placed into the very low food security category.

In the United States, food insecurity has many culprits, one of which is unemployment. With the recent economic crisis, unemployment rates have dramatically risen and are not expected to stop any time soon. If just one parent is out of a job, that can cut the total family income in half, or sometimes completely off if this parent is the only source of income for the family. Families are then forced to cut back on expenses which, with bills to pay, can sometimes mean cutting back on food expenditures. Another cause that can land a family into food insecurity is a lack of access to government programs that help people stay food secure. Some families do not even know these programs exist, others think they are not qualified to get help from the government, and some are just too proud to get outside help. For some families that are currently in one of the food insecurity categories, acquiring access to a government program to help them increase the quantity and quality of their food could be just what they need

to become completely food secure. Medical cost can also cause a family to enter into one of the food insecurity categories. Medical bills can be extremely high especially for those that are uninsured, which many Americans currently are. If a family member gets hurt or really sick and comes out of the hospital with a huge medical bill to pay, it could also cause them to cut back on their expenses which could be food (National Coalition for the Homeless, 2011).

Introduction: Poverty

In 2012, the total number of people living in poverty in the United States was forty-six million five hundred thousand, the largest it has been over the past fifty years. This number of people comprises fifteen percent of the total U.S. population (United States Conference of Catholic Bishops, n.d.). Since the mid-1900's, poverty has increased in the U.S. for all of its inhabitants, especially its children who have seen a consistent increase in poverty (Institute of Research on Poverty, 2014). In 2012, one in every five children found themselves living in poverty, which is about twenty-two percent of all children in the United States. Some of these children don't just find themselves in poverty, but they also find themselves without a home. According to the National Center on Family Homelessness who "analyzed state-level data and found that nationwide, one million six hundred thousand children experience homelessness in a year" (United States Conference of Catholic Bishops, n.d.). In 2012, it was recorded that there was almost seventy-four million children living in the U.S. This number is only projected to increase to eighty-five million nine hundred thousand by

2050. Due to this steady increase of children, the U.S. should also expect to see a continued increase in the number of these children in poverty (United States Census Bureau, 2012).

In general terms, poverty is defined as the inability of the individual or family to meet basic needs including shelter, food, and clothing. However, according to individuals currently experiencing the blows of poverty, poverty entails much more than this simple definition. To these individuals poverty "is about not being able to participate in recreational activities; not being able to send children on a day trip with their schoolmates or to a birthday party; not being able to pay for medications for an illness" (Economic and Social Inclusion Corporation, 2014). For people experiencing the devastation of poverty, poverty means something that negatively affects every aspect of their lives (Economic and Social Inclusion Corporation, 2014).

The United States' Census Bureau measures poverty for its citizens by looking at two aspects of their lives; their finical income and their measure of need. The bureau determines an individual's money income by accounting for the person's earnings whether it's pay from their job, government benefits (like social security and veteran's payments), pension or retirement income, trusts, and or even alimony and child support. When they account for these earnings, the bureau does not take into account their taxes, but rather looks at them prior to taxes. They also exclude noncash benefits, such as food stamps and housing subsidies, and capital gains or losses. If the individual lives with a family, which is defined as a spouse and or relatives, then their income is added to that of all

other family members. The measure of the individual's needs, or poverty thresholds, is also taken into account to measure the person's level of poverty. These poverty thresholds are defined by the United States' Census Bureau as "the dollar amounts used to determine poverty status" (United States Census Bureau, 2014). Each member of the family is assigned to one of the forty-eight possible thresholds for poverty. Which threshold is assigned is determined using the size of the family and the ages of the family members. These thresholds are updated every year according to the current inflation rates documented by the Consumer Price Index for All Urban Consumers. The poverty thresholds are then compared against the pre-tax income for the individual or family, and a family is considered to be in poverty if their total income is less than the appropriate threshold level determined for that family. If the family is considered in poverty, then every member is also equally considered to be in poverty in the United States. Therefore, if a family is in poverty then all the children of that family are also considered to be in poverty. If an individual does not live with a family then they are deemed in poverty if their own individual income is less than their appropriate threshold.

Like the United States' Census Bureau, the U.S. Department of Health and Human Services has its own version of the federal poverty measure. This measure, called the poverty guidelines, is issued each year and is designated for that year, which makes it different from the bureau's poverty measure. These guidelines on poverty are set to determine if a person or family is eligible for assistance from different federal assistance programs. The programs that use

these guidelines “in determining eligibility include Head Start, the Supplemental Nutrition Assistance Program (SNAP), the National School Lunch Program, the Low-Income Home Energy Assistance Program, and the Children’s Health Insurance Program” (U.S. Department of Health and Human Services, 2013). Unlike the U.S. Census Bureau measure for poverty, this measure has different guidelines for both Alaska and Hawaii, and they do not take into account the individual’s age or whether or not they are living with family. Even though many of the federal assistance programs use these guidelines in determining an individual’s eligibility for the program, the majority of assistance programs in the U.S. use other forms to determine eligibility (U.S. Department of Health and Human Services, 2013).

Introduction: Childhood Obesity

Since the 1990’s, the United States has seen an ever increasing epidemic of obesity in children (Holohan, 2011). According to the Centers for Disease Control and Prevention, “childhood obesity has more than doubled in children and quadrupled in adolescents in the past thirty years” (Centers for Disease Control and Prevention, n.d.a). In the U.S. in 1980, the percentage of obese children ages six to eleven was a mere seven percent compared to the eighteen percent it was as of 2012. Also seen from this same time span, the percentage of adolescents ages twelve to nineteen who were considered obese rose from just five percent all the way to twelve percent. Overall, in 2012 more than one third of all children and adolescents in the United States were overweight or obese.

These children are categorized as either overweight or obese depending on their body mass index, or BMI, number. This number is calculated using an individual's height and weight to asses that individual's amount of body fat. With the BMI, there is a predetermined scale of what weight a person should be according to their height. In determining this number for children, both their age and sex also play a factor. To calculate the child's BMI number in pounds, their weight (in pounds) is divided by their height (in inches) squared. This number is then multiplied by seven hundred and three, which is a conversion factor. To interpret this BMI number, it is compared to a body mass index scale for children called the BMI-for-age percentile, which takes into account for the child's age and sex. Unlike adults, both children's age and sex must be accounted for due to the fact that the amount of body fat changes with age and differs between girls and boys. After comparing the calculated BMI-for-age percentile and results, the child's weight is then placed into either the underweight, healthy weight, overweight, or obese category. To be considered as underweight the child's calculated BMI-for-age percentile must be less than the fifth percentile. For a child's weight to be healthy, their calculated BMI-for-age percentile must fall between the fifth and eighty-fifth percentile according to their age and sex. If a child's calculated BMI-for-age percentile falls between the eight-fifth and ninety-fifth percentile, then the child is considered overweight. A child is considered obese if their calculated BMI-for-age percentile is equal to or greater than the ninety-fifth percentile according to their age and sex. The body mass index of a child, which places them in these categories, does not directly measure the fat of

the child nor is it used to diagnose children. This tool is merely used to screen children for underweight, healthy weight, overweight, and obesity because it has been shown to directly correlate to direct measures of body fat in children. The BMI is a widely used tool that is recommended not only by the Centers for Disease Control and Prevention but also by the American Academy of Pediatrics (AAP) as a method for screening children two years and older for overweight and obesity (Centers for Disease Control and Prevention, n.d.b).

A variety of causes have been assigned to this obesity epidemic in children. One of these explanations is sugary drinks and less healthy food at schools. The United States alone has about fifty million children enrolled in schools across the country. Some of these students bring their lunch with them to school; however, the majority of children get their meals from their school. The problem with this situation is that these students can buy unhealthy food and sugary drinks in over half of the middle schools in the United States. Therefore, most children spend over half of their day in schools that give them access to unhealthy snack options whenever they want them. Another cited cause of childhood obesity is the advertisement of unhealthy foods. Not only are foods high in calories, fat, and other nutrient lacking substances marketed directly to children via their television and specifically kid friendly channels, but these unhealthy foods and drinks are also being promoted at their schools as well. According to the Centers for Disease Control and Prevention, “nearly half of U.S. middle and high schools allow advertising of less healthy foods, which impacts students’ ability to make healthy choices” (Centers for Disease Control and

Prevention, n.d.c). With both promotional products at their school and commercials on their televisions at home that make unhealthy foods seem cool to children, it's no wonder so many children today eat so much junk food. The lack of daily physical activity has also been named a possible culprit behind the childhood obesity epidemic. Although most schools across the nation have physical education classes for their children, not all of them go and hardly any of them go every day. If the child is not getting daily quality physical activity then they do not burn any of the calories they have consumed thereby storing those calories as body fat.

Literary Review Methodology

The main search engines used in this paper include: the Institute of Medicine, College of Charleston Library Database, National Center for Biotechnology Information PubMed and PMC, Healthy Eating Research, WhiteHouse.gov, Centers for Disease Control and Prevention, and Google. The main key words used to find articles in these search engines included: childhood obesity, poverty, food insecurity, disease, malnutrition, hunger, children, United States, facts, overweight, BMI, cognitive development, cognition, government, policies, community, school, prevention, statics, and nutrition. The resulting articles produced by using these key terms where then read though and their relevancy was determined, and those found to be relevant to the research topic where chosen and used in the paper.

Literary Review

Poverty

The current poverty rates in the United States are alarming. According to the 2012 National Census, almost forty-seven million people, accounting for fifteen percent of the entire population, are currently living in poverty in the United States. The percent then becomes twelve percent for families living at or under the poverty line. This means that almost ten million families in the U.S. lack enough means for a proper existence. For a family of four to be considered poor and in poverty they must make no more than $23,492 a year. This number only accounts for the family's total income; it does not budget in their groceries, bills, or house payments. The greatest poverty percent can be seen with children, with over a fifth of them living at or below the line of poverty. Therefore, as stated in the 2012 National Census, there is currently just over sixteen million children that find themselves at or below the poverty line in the United States ("Poverty in the United States," 2013).

Poverty and Food Insecurity

Poverty is a major issue that affects millions of people and can cause them to be food insecure. Along with poverty, food insecurity is a major public health concern and affects a high percentage of the world's population. As of 2010, nearly fifteen percent of people living in the United States reported having limited or unpredictable access to food (Robert Wood Foundation, 2010). Recent studies have shown a negative correlation between income levels and food

insecurity. Therefore as income levels rise, the risk of being food insecure decreases (Gundersen et al., 2011). The reason behind this correlation can be seen in the ever increasing food market. The majority of food prices for consumers has increased in the last year and according to the U.S.'s consumer price index (CPI) forecast, they are going to be even higher next year (Volpe & Kuhns, 2013). With the prevalence of food insecurity and the increasing cost of food, the United States government has enacted federal nutrition assistance programs to help supplement food to those that are food insecure. The largest of these programs is the Supplemental Nutrition Assistance Program, or SNAP for short. A recent study conducted on this program researched a population of five thousand one-hundred and ninety-three children who were between the ages of four and nineteen. This study obtained data by analyzing NHANES, or the National Health and Nutritional Examination Survey for 1999 to 2008. These surveys are "part of an ongoing cross-sectional survey program conducted by the National Center for Health Statistics and asses the health and nutritional status of both children and adults in various cultures in the United States. Of the children surveyed, the ones who were reported to be at or below one-hundred and thirty percent of the federal poverty level had the nutritional level of the food they consumed assessed. The researchers found that "both SNAP participants and low-income nonparticipants were below national recommendations for whole grains, fruits, vegetables, fish, and potassium" (Leung et al., 2013). They also found that one in five of the low-income children that participated in the study did not meet a single national dietary recommendation (Leung et al., 2013). These

supplemental nutritional programs enacted by the United States government to help relieve food insecurity may be helping those that have limited resources, however it is not helping these children meet the nation's dietary recommendations. These children are not getting an adequate amount of vital nutrients because they are not getting enough healthy food that contains these essential vitamins needed for proper growth and development.

Children today are not only eating more energy-dense high-calorie foods but they are also concurrently decreasing their intake of vegetables, whole-grain breads, milk, and eggs. According to a recent health survey, the Canadian Community Health Survey, over fifty percent of Canadian children consumed fruits and vegetables less than their daily recommended intake. This survey is an annually issued survey that measures records the height and weight of children in Canada, and it also records other health information including their average food intake. According to the Institute of Medicine, in the United States "at least thirty percent of the calories in an average child's diet are derived from sweets, soft drinks, salty snacks, and fast food" (Roblin, 2007). Children on average are only getting about thirteen percent of their daily calorie intake from fruits and vegetables (Roblin, 2007).

Not only are children not getting their recommended daily amount of fruits and vegetables, they are also not getting the full amount of other important nutrient sources such as milk, cheese, and yogurt. Reportedly, more than one third of children between the ages of four to nine do not get their recommended daily intake of milk products. This malnutrition continues with the children into

their late childhood and adolescent stage. Unlike the intake of milk products, the consumption of soft drinks and fast food has dramatically increased. According to the Canadian Living Foundation—Breakfast for Learning *Report Card on Nutrition for School Children*, almost forty percent of children aged six to seventeen years old consume one or more servings of soft drinks a day (Roblin, 2007). This foundation was created in 1992 as a program that helped start lasting nutritional programs in thousands of schools; giving children healthy and nutritional breakfast, lunch, and snacks. The program not only helps give children access to healthy food but it also issues annual reports that report on the healthy eating of other Canadian children that currently do not have access to healthy food established from these programs (Our Impact, 2013). Therefore, soft drink consumption not only introduces excess calories and sugar to the child but it can also inhibit children from consuming nutritious beverages such as milk, fruit juice, and water.

Both an increased intake of sugary soft drinks and fast food have been linked by researchers to an increased risk in childhood obesity (Roblin, 2007). According to another study conducted on food limited children, “food insecurity may lead to weight gain because the least expensive food options to obtain a given amount of calories are typically high in calories and low in nutrients” and these “high-calorie foods are easy to over-consume and promote weight gain if they are part of a regular diet” (Robert Wood Johnson Foundation, 2010). The SNAP study also found high rates of childhood obesity in both the SNAP participants and low-income nonparticipants (Leung et al., 2013). These children

are therefore not only malnourished due to the lack of vital nutrients, but they are also becoming overweight due to the intake of cheaper, calorie-rich foods.

Childhood Obesity

In the past thirty years obesity has more than doubled in children, landing at a prevalence of nearly eighteen percent in 2010 for children six to eleven years old and adolescents twelve to nineteen years old. In 2010, it was reported that more than one-third of both children and adolescents were overweight or obese. These statistics are not just for the United States but are worldwide, making childhood obesity a major, universal public health concern (Centers for Disease Control and Prevention, 2013). Obesity increases the child's risk of developing various chronic diseases that not only decrease their life expectancy but also lower their overall quality of life.

Childhood Obesity and Physical Health

One of the chronic diseases that obese children are susceptible to developing is a pulmonary disease, such as sleep apnea. A child with this disorder has one or more pauses in breathing while they sleep. These pauses can occur thirty or more times per hour and can last for a few seconds to a few minutes. Sleep apnea involves an upper-airway obstruction in which the child's air way becomes blocked or collapses. This condition normally causes reduced deep sleep and thus exhaustion the following day. However, sleep apnea can also increase the child's risk of high blood pressure, heart attack, diabetes, and

arrhythmias or irregular heartbeats (Santrock, 2009; National Heart, Lung and Blood Institute, 2012).

Obesity, itself, can also increase a child's risk of developing hypertension and diabetes, both of which were once considered only adult diseases. The early onset of these two conditions is brought about because of the child's heightened risk of developing metabolic syndrome. This syndrome arises when the child possesses risk factors for it such as obesity, high blood pressure, and high fasting blood sugar. A low LDL cholesterol, or good cholesterol, level and a high triglyceride level are other risk factors associated with metabolic syndrome. Triglycerides are fat molecules that travel throughout a person's blood stream (Santrock, 2009). This risk factor along with all the others cannot only cause an obese child to develop chronic diseases as a child, but they can also increase their risk of developing life-threatening diseases in adulthood. According to one study "eighty percent of children who were at risk for being overweight at three years of age were also at risk for being overweight or were overweight at twelve years of age" (Santrock, 2009). Therefore obesity in childhood increases a child's risk of obesity into other stages of their life and eventually adulthood.

Because obesity in children causes an increase in the likelihood of adult obesity, obese children also have a greater chance of developing other chronic diseases later in life such as cardiovascular disease, diabetes, and cerebrovascular disease (Centers for Disease Control and Prevention, 2013). Obesity in childhood can not only lead to childhood diabetes but it can also cause the child to be more prone to developing adult diabetes as well. This occurrence

also arises from the increasing prevalence of metabolic syndrome in children, and as of 2003 nearly thirty percent of the entire population of obese children in the United States has been diagnosed with this syndrome (Koplan & Liverman, 2005). A key factor in the development of diabetes from metabolic syndrome is this syndrome's symptom of an increase in blood sugar levels. Diabetes type 2 is the most common form of diabetes, seen in both adult and child patients, that can develop due to childhood obesity. The key characteristic of this type of diabetes is the body's resistance to insulin. Overeating can overwork the cells and cause them to reduce their insulin receptors and thus insulin and glucose uptake. This occurance therefore leaves the patient with high blood sugar (Hecht &Hecht, 2004). Over a period of time, the increase in blood sugar can cause the child to develop diabetes as an adult, which can lead to the development of other conditions caused by diabetes such as blindness, amputation, kidney failure, and cardiovascular disease. These other conditions brought about by diabetes may soon become a normal adult condition if the childhood obesity rate continues to rise (Koplan & Liverman, 2005).

Even though diabetes has been linked to cardiovascular disease, obesity on its own has also been discovered to be a precursor for this disease. Cardiovascular disease is a disease of the heart and blood vessels that encompasses many different heart conditions such as heart attacks, heart failure, arrhythmia, and general heart valve problems. The risk factors for cardiovascular disease include hypertension, diabetes, and high cholesterol, all of which can be found in obese children. This disease is also related to a condition called

atherosclerosis which occurs when a person's arteries become hardened and narrowed due to a buildup of a substance called plaque. Plaque is a combination of fat molecules, cholesterol, and other substance found circulating in blood vessels. In normal children, the buildup of plaque is either a slow process or does not occur at all. However, a child pathological study which conducted autopsies on two hundred and four individuals between the age of two and thirty-nine has found that obese children accumulate plaque deposits at a faster rate than their normal counterparts. This study obtained their results by correlating known risk factors for cardiovascular disease with the amount of plaque found in the aorta and coronary arteries during the autopsies (Berenson et al., 1998). A more recent study was conducted on over seventy children, forty of which were obese. The study used a noninvasive imaging technique called a Carotid Intima-Media to look for thickening of the carotid walls, an early sign of both cardiovascular disease and atherosclerosis. The researchers found that seventy-five percent of the participants had arteries so thickened and aged they looked more like arteries found in forty-five year old adults. The most thickened and aged arteries were those of children suffering from obesity. Therefore, childhood obesity severely increases a child's risk of contracting both cardiovascular disease and atherosclerosis (Bridger, 2009).

Cerebrovascular disease is another chronic disease with which obese children may become predisposed. This can be seen in a study done by Pearson et al. in which fifty-three children from ages two to eighteen who have been diagnosed with cerebrovascular disease were compared to control groups on

their prevalence of weight and obesity. The cerebrovascular diseases these children had were either arterial ischemic stroke or cerebral sinovenous thrombosis, both of which have been linked to obesity in adults. Ischemia and thrombosis are both terms that signify the presence of a clot. A child with the condition arterial ischemic stroke is suffering from blood loss in the brain brought about by an arterial clot. Cerebral sinovenous thrombosis is a condition in which the individual has a clot in their venous sinuses. These researchers conducted their experiment to see if there is a link between these diseases and obesity in children. From the results of their study, Pearson et al. discovered that a higher percentage of the children suffering from cerebral sinovenous thrombosis were overweight or obese. Although they did not see this correlation in the arterial ischemic stroke patients, they were able to conclude that there is connection between childhood obesity and cerebrovascular disease (Pearson et al., 2013).

Research has also shown that obesity is associated with an increased risk of developing cancer, including cancer of the breast, colon, endometrium, esophagus, kidney, pancreas, gall bladder, thyroid, ovary, cervix, prostate, myeloma, and Hodgkin's lymphoma (Centers for Disease Control and Prevention, 2013). "One study, using NCI surveillance, Epidemiology, and End Results (SEER) data, estimated that in 2007 in the United States, about 34,000 new cases of cancer in men (4 percent) and 50,500 in women (7 percent) were due to obesity" (National Cancer Institute, n.d.). This link between obesity and cancer has several possible explanations, one of which says that high levels of estrogen have been associated with certain types of cancer. Fat cells produce

excess estrogen; therefore, the more fat cells a person has the greater the estrogen production and thus the higher the levels of estrogen circulating in their body. Another proposed mechanism links obesity and cancer through a condition known as hyperinsulinemia. This condition, also called insulin resistance, may promote tumor growth by cells of the body not properly taking up insulin and thus causing an elevated insulin level circulating in the blood. These high insulin levels are found in many obese individuals and are what researchers believe could be a cause of cancer. Fat cells also produce adipokines which are hormones that control cell growth. Some of these hormones stimulate the growth of cells while others cause them to stop growing. It is understood that some of these hormones promote cell proliferation and cause the development of tumors. It has been discovered that these cell growth hormones, for example leptin, are found in a greater concentration in obese individuals. These individuals also usually have chronic low-level inflammation of the tissues of the body, which is also linked with the development of cancerous cells. According to researchers, if childhood obesity rates continue to increase and thus adult obesity rates as well, it is estimated that by 2030 about 500,000 additional cancer cases will occur in the United States (National Cancer Institute, n.d.).

Childhood Obesity and Mental Health

Not only does obesity affect a child's likelihood of developing health problems, it also can affect their mental and social health. Studies have shown that being overweight or obese can cause low self-esteem in children. One study, done by Richard S. Strauss, MD, was conducted on 1,520 children nine to ten

years of age. The researchers used known demographic data from the children and correlated this data with the children's self-esteem they measured using the Self-Perception Profile for Children, which they then administered to the children after four years. This longitudinal study showed that by the time the children reached thirteen years of age, the obese children showed a greater decrease in self-esteem which was also linked to an increased rate of sadness, loneliness, and nervousness (Strauss, 2000). Another study concluded that obese children are perceived as less attractive and more socially withdrawn than healthy weight children and thus are sometimes excluded by their peers. This occurrence, along with the negative emotions correlated with low self-esteem, can eventually send a child into a state of depression (Santrock, 2009). Depression is a change in a person's mood that can cause interference in the child's ability to function. With depression, the child has a persistent feeling of sadness that increases a child's risk of self-harm, including suicide. These psychological burdens brought about by childhood obesity may impair the child's academic and social functioning and can be carried into adulthood (Koplan & Liverman, 2005).

Cognitive Development

Malnutrition can not only predispose a child to obesity, but it can also lead to poor cognitive development, and thus a low IQ. According to many physiologists, children are supposed to go through a series of steps, or stages, as they grow and mature. One of these psychologists, Jean Piaget, came up with a list of certain stages a child must go through from infancy to adulthood based on cognitive development. . According to Piaget, as children age, they move to

the different stages and acquire higher cognitive abilities. However, whether or not children gain the different process of cognition in each of these stages is dependent on a healthy brain. When children do not obtain appropriate nutrients from their food, their brains suffer because the brain needs many nutrients like vitamins, iron and protein to function properly.

One of these major nutrients that impact cognitive development is iodine. According to the Dietary Reference Intakes chart developed by the Food and Nutrition Board at the Institute of Medicine of the National Academies, children from birth to six months should have 110mcg per day to meet the nutrient level required to stay healthy. From the ages of seven to twelve months the daily dosage is set at 130mcg, while the dosage for both one to three years and four to eight years of age groups is 90mcg. The daily amount for children between ages nine and thirteen is 120mcg and between fourteen and eighteen it is 150mcg. ("Dietary Supplement Fact Sheet: Iodine," 2011, pp. 1 & 2)

Iodine is mainly acquired from iodinated salt, however, it also can be found naturally in many food groups. Seaweed is one of the major sources of iodine with one gram containing about 989% daily value. Seaweed, however, is not a common food on many plates of children. More common sources of iodine include both dairy and grain products. Just one cup of milk contains 37% of the daily value suggested by the U.S. Food and Drug Administration. Likewise, 30% of the daily value of iodine can come from just 2 slices of white or enriched bread. Some vegetables also contain adequate amounts of iodine, but the

amount is usually fairly low and depends on the iodine concentration of the soil in which they are grown. (“Dietary Supplement Fact Sheet: Iodine,” 2011, p. 2)

Iodine is a major nutrient for many reasons; one of which is that it is the “most common cause of preventable mental retardation in the world” (“Dietary Supplement Fact Sheet: Iodine,” 2011, p. 3). Iodine is required for the production of thyroid hormones, triiodothyronine and thyroxine. These two hormones are essential for the brain’s growth and development. (Bryan et al, 2004). These two hormones play a crucial role in the development of the cerebellum. Thyroxine, or T_4 as it is called, circulates throughout the human body until it makes its way to the brain and crosses the blood brain barrier via amino acid transporters. This hormone is then taken up by a glial cell and then converted into the other thyroid hormone, triiodothyronine, or T_3. Triiodothyronine is a “bioactive ligand for nuclear thyroid hormone receptor (TR)” which “regulates the expression of target genes that play an important role in cerebellar development” (Koibuchi, 2013).

By affecting the development of the cerebellum via the production of thyroid hormones, iodine also affects cognitive development, because the cerebellum itself plays a role in cognition. Studies have shown that impaired or damaged cerebellums can lead to destructions in executive function. This form of cognitive function covers skills like “verbal fluency, abstract reasoning, and working memory” (Schmahmann & Caplan, 2006). A malfunctioning cerebellum can also lead to poor spatial cognition, which is “visual spatial organization and memory” (Schmahmann & Caplan, 2006). Linguistic processing is another cognitive process that is hindered from an impaired cerebellum.

The lack of iodine not only affects the production of thyroid hormones triiodothyronine and thyroxine, but it also can lead to chronic hypothyroidism. Hypothyroidism is a medical condition in which the thyroid gland makes too much thyroid hormone. This condition affects all ages, causing individuals to suffer from both physical and cognitive effects. The physical effects include “seizures and motor dysfunction, where as both “visuomotor planning and abstract thinking” (Bryan et al, 2004, p. 296) are cognitive elements affected from hyperthyroidism. (Bryan et al, 2004)

Some studies completed on iodine deficient individuals have provided evidence of the harsh effect iodine has on cognition. One of these studies is a metaanalysis study completed by Bleichrodt and Born. From their analysis of eighteen studies, Bleichrodt and Born found that in a chronically iodine-deficient population, individuals suffered on average a loss of 13.5 IQ points compared to non-deficient individuals. In a number of other studies, “urinary iodine states has been found to be positively related to cognitive performance” in school-aged children (Bryan et al, 2004, p. 297). Another iodine study done by van den Briel et al. was completed to determine whether iodine supplementation for 196 school-aged iodine-deficient children would help boost their cognitive development. (Bryan et al, 2004) The results of this study showed that “children with increased urinary iodine concentrations had a significantly greater increase in performance on the combination of mental tests than did the group with no change in urinary iodine concentrations” (Van den Briel et al, 2000, p. 1). In conclusion, iodine supplementation used to improve iodine status in iodine-

deficient children can “catch-up” (Van den Briel et al, 2000, p. 1) to other students in the terms of cognitive development. Therefore, children who are deficient in iodine have the chance to undo the damage done to their cognitive development by eating good nutritious foods filled with iodine.

Like iodine, iron is another nutrient which, if lacking, can affect cognitive development. According to the Dietary Reference Intakes chart, children from birth to six months need 11mg of iron a day for their bodies to stay healthy. Children from the age of seven months to twelve months also need 11mg of iron, while children from one to three years of age need only 7mg. Ten milligrams of iron is needed a day for children between the ages of four to eight and 8mg of iron for children between the ages of nine and thirteen. When children reach the age of fourteen the amount of iron needed daily differs between the two sexes. Females between the ages of fourteen and eighteen need only 11mg of iron per day to stay healthy, whereas males in this age range need 15mg a day. (“Dietary Supplement Fact Sheet: Iron,” 2007, p. 2)

Iron can be found in many naturally occurring sources of both plants and animals. Spinach is a great plant source with one half cup containing 18% of the daily value suggested for iron. Another major plant source is beans. Kidney beans contain 29% of the daily value in just one cup, while the same amount of lima beans gives 25% of the daily value of iron. A popular meat source is dark meat turkey which contains 11% of the daily value of iron per three ounces of turkey. Ground beef, another source of iron, contains 12% of the daily iron intake in just three ounces, whereas three ounces of dark meat chicken only contains

6% of the recommended daily value. Although white bread is not a major source of iron, it does contain 5% of the daily value in just one slice. ("Dietary Supplement Fact Sheet: Iron," 2007, p. 2)

Iron is an important nutrient to the brain for many reasons, one of which is its required presence for proper myelination. Myelination is the production of myelin, which is an insulating substance that covers almost all neuronal axons and allows for quick signal transmission. It is an essential part of the neuron and its transmission. Iron is also a co-factor of enzymes involved in the production of neurotransmitters, the chemical messengers are released from neurons and transferred to other neurons. The neurotransmitters that require the presence of iron, include serotonin, norepinephrine, and dopamine. Studies done by Youdim and Yehuda have found that the "distribution of iron in the brain overlaps with the distribution of the neurotransmitters dopamine and gamma-aminobutyric acid. This overlap shows that iron is involved in maximum functioning of the neurotransmitters and thus cognitive development because this overlap takes place in areas of the brain that regulate cognitive processes. In these areas, if the levels of dopamine change due to the lack of iron it can lead to "deficits in executive functions" (Bryan et al, 2004, p. 297).

Iron is not only needed for proper neurotransmitter functioning, it is also needed for proper hemoglobin functioning. Hemoglobin is a protein structure found in human blood that functions as the oxygen transport molecule. It is composed of four protein subunits and an iron molecule. Iron is a very important molecule in hemoglobin because it is the actual binding site for the oxygen

molecule. Without iron, oxygen cannot bind to the hemoglobin and therefore cannot be transported to organs, like the brain, that need it. Hemoglobin has also been associated with cognitive performance. Some correlation studies have found associations between concentrations of hemoglobin and "cognitive performance or school achievement scores" (Bryan et al, 2004, p.298).

Studies have also been completed on iron-deficient individuals to determine what happens when their iron levels are brought back to normal for both a short and long period of time. According to these studies, short-term iron supplementation has very little effect on the cognitive development of iron-deficient individuals. Similarly, the results of the long-term iron supplementation treatment showed that it too was unable to effectively help iron-deficient children "catch up to the development level of non-iron deficient children" (Bryan et al, 2004, p.298). The results of these treatments show that once cognitive development is hindered in an iron-deficient child's brain, it cannot be undone. Thus, children need to eat a diet rich in nutrients as soon as they can before more damage is done.

Like both iron and iodine, zinc is also an essential nutrient which, when lacking can affect cognitive development in children. According to the Recommended Dietary Allowance chart for healthy children, infants between birth and six months require 2mg of zinc daily. For children between the age groups of both seven months to one year and one year to three years, the recommended daily dosage of zinc is 3mg. The daily dosage increases to 5mg for children aged four to eight years and then to 8mg for children aged nine to

thirteen years old. Males and females between the ages of fourteen and eighteen have different recommended daily intake values of zinc with females needing 11mg and males needing 9mg. ("Dietary Supplement Fact Sheet: Zinc," 2013)

Children can meet their daily intake values of zinc by eating both plant and animal products rich in zinc. One of the highest animal sources of zinc is beef. Chuck roast beef contains 47% of the daily value in just three ounces, while the same amount of broiled beef patty contains 35% of the daily value of zinc. Another animal source of zinc, dark meat chicken, contains 16% of the daily value in 3 ounces as well. Dairy is also a great source of zinc, with one ounce of Swiss cheese containing 8% daily value of zinc and one cup of milk producing 7% of the daily value recommended for zinc. Cashews are a top ranked plant source of zinc, providing 11% of the suggested daily value. Almonds and kidney beans are two other highly ranked sources of zinc where both provide 6% of the daily value; it only takes one ounce of almonds and one half cup of kidney beans. ("Dietary Supplement Fact Sheet: Zinc," 2013)

Not receiving the daily recommended dietary allowance of zinc can affect the cognitive development of children of all ages. Zinc is essential for many processes of the brain including neurogenesis. Neurogenesis is the process by which neurons are generated. Another brain function zinc is required for is neuronal migration, which is the process by which neurons travel from the place they were created by neurogenesis to their functioning position of the brain. The final brain zinc-required function is synaptogenesis. Synaptogenesis is the

formation of synapses between neurons in the nervous system. Neurons communicate and pass signals through synapses created between them. When these brain functions are affected due to the lack of zinc, children can suffer "alterations in attention, activity, neuropsychological behavior, and motor development" (Bryan et al, 2004, p. 298). Results from research done on animals showed that severely zinc deficient animals, during gestation and adolescence, had alterations in both brain development and "less accurate performance on measures of attentions and short-term memory" (Bryan et al, 2004, p. 298).

A few studies have also been completed on cognitive performance of zinc-deficient individuals with zinc supplementation. The results of one of these studies showed that the supplementation of zinc helped increase the cognitive performance on school-aged children in China. Thus, because supplementation was able to help the children increase their cognitive abilities, giving them the right nutritious food that contains an adequate amount of zinc should also help them regain and continue developing their cognition. (Bryan et al, 2004)

The lack of iodine, iron, and zinc can have a devastating impact on many of Jean Piaget's stages of cognitive development in children. An absence or deficient amount of each of these nutrients in children can have a profound effect on the brain which in turn affects cognition. A child suffering from malnutrition of iodine may suffer from impaired visuomotor planning, abstract thinking, working memory, or abstract reasoning abilities. These impairments arise from the malfunctioning thyroid hormones, triiodothyronine and thyroxine, and possibly

hyperthyroidism which can develop in iodine-deficient children. The cognition of children with low iron concentrations could be hindered due to deficient neuron and hemoglobin functioning. Zinc is essential for the creation, positioning, and functioning of neurons, causing zinc-deficient children to also suffer from cognitive development. The lack of just one of these nutrients can hinder a child's cognitive development; the effects of the lack of all three can be even more severe.

Unfortunately, in today's world, many children are suffering from malnutrition of all three of these nutrients and many more. The average American diet for a child aged two to seventeen has a "total healthy eating index" score of just 59 ("Health6 Diet Quality," 2012). Their diet is composed of only 78% of their recommended dietary intake values for total fruit and 46%for total vegetables. Milk, which is a good source of both iodine and zinc, averages out at 84% of the recommended dietary intake values for children ages two to seventeen. Children in this age group also only receive 85% of their dietary intake value for meat, which is a great source for both iron and zinc. ("Health6 Diet Quality," 2012) Therefore, the average American child's diet does not meet the daily dietary intake values recommended by the U.S. Food and Drug Administration for healthy children, causing the majority of American children to be considered malnourished.

Childhood Obesity and Cognitive Development

Like malnutrition, obesity has also been reported to cause poor cognitive development in children. A recent study was conducted on low socioeconomic

status children in Chile compared the cognitive abilities of one-hundred and nine obese preschool children and one-hundred and six normal-weight preschool children. The children's cognitive development was assessed by trained psychologists using the Wechsler preschool and primary scale of intelligence. This scale scores children in different categories including: "information, comprehension, vocabulary, similarities, and arithmetic for the verbal scale; and object assembly, block design, geometric design, picture completion, and labyrinths for the manual scale. The results of this study showed that the normal preschool children had an IQ of about six or more points higher than the obese preschool children (Galván et al., 2013). Another study on the effects of obesity on cognitive development showed similar results. This study was conducted on one-hundred and two obese and non-obese children who all attended a primary school and all of which were assessed for their intelligence which was determined using the Welcher Intelligence Scale for Children. The researchers then compared the resulting intelligence numbers of the obese and non-obese children. The outcome of this study showed that the children in the severe obesity category had a significantly lower IQ score than normal-weight children (Li, 1995). Therefore obesity can not only cause physical and psychological damage to children, but it can also cause an intellectual disadvantage in children as well.

Although obesity has been shown to go hand-in-hand with poor cognitive development, research has shown that it is not the excess weight that causes lowering of the IQ, but factors that a child is predisposed to because of their

obesity. One of these factors is hyperinsulinemia, which disturbs glucose metabolism and thus affects the body's energy production (Galván et al., 2013). This effect can limit the energy received by the brain which can lead to poor brain functioning and thus affect the child's cognitive development. One study on obesity and cerebellar hypoplasia has shown that early childhood obesity can hinder cerebellar development and thus cognitive development as well (Miller et al., 2009).

Cognitive development and Poverty

Poor cognitive development in children due to obesity or malnutrition can leave them with a lower IQ than normal children and thus an overall lower intelligence level. These consequences can not only affect the children in their lower education levels but can also be carried with them throughout the rest of their lives. Poor cognitive development can cause children to perform poorly on their general academic tests and even on college admission tests such as the SAT and ACT. Adolescents need to score in a certain range to be considered as a competing candidate for the limited college admission. In today's economy, people without a college degree can only earn up to so much money. As can be found in the National Center for Educational Statistics, the average yearly salary of a person with less than a high school diploma in 2011 was $22,860, while the average salary for a person with a high school diploma or its equivalent was $29,950 (U.S. Department of Education, (n.d.). Therefore, an individual who does not hold a degree of any kind makes below the poverty line while a person with a high school degree makes barely above the poverty level.

Discussion

Poverty, food insecurity, and childhood obesity are major issues that affect a vast majority of people living in the United States. Poverty is a prevailing problem that spans the entire nation and affects a total of forty-six million five hundred thousand U.S. individuals, and this number is only expected to increase over the next few years. U.S. children have also seen a consistent increase in their population's numbers, with one in every five children suffering with the effects of poverty. In poverty, individuals and or entire families cannot meet basic needs including shelter, clothing, and even food. Therefore, the lack of funds associated with poverty can leave people with a limited or uncertain ability to acquire food, or food insecurity. Like poverty, food insecurity also affects almost fifteen percent of the United States population, and almost one in five U.S. children have experienced what it feels like to be hungry and not know from where their next meal will come. With food insecurity children are not getting adequate nutrients and they are also not getting their recommended daily intake of fruits and vegetables. Instead, they are eating foods such as sugary soft drinks and fast food because they have a lower cost than nutritious food. This increased consumption of sugary soft drinks and fast food over healthy and nutritious fruits and vegetables has been determined to be a cause of obesity in children. Childhood obesity, like poverty and food insecurity, is a growing epidemic in the United States. Current statistics indicate that the rate of this epidemic has more than doubled in the past thirty years and currently affects about twelve percent of the U.S. population. Obesity affects multiple aspects of a

child's health including their physical and mental health. This condition increases the child's risk of developing chronic diseases such as pulmonary disease, hypertension, diabetes, cardiovascular disease, cerebrovascular disease, and cancer both during childhood and into adulthood. Childhood obesity can also cause a child to have low self-esteem which can lead to depression. The malnutrition that can cause obesity in children and the obesity itself can also lead to poor cognitive development in children. While children are growing and learning, their brain needs many essential nutrients in order to develop properly. These nutrients include iodine, iron, and zinc, and are all found in vegetables, grains, meat, and dairy products. If these nutritious foods are lacking from a child's diet it can impair their cognitive development and therefore hinder their cognition and lower their IQ. Children with poor cognition and a low IQ normally do not do well in school and therefore usually do not obtain a college degree and sometimes do not even obtain a high school diploma. In today's world individuals with an absence of these degrees do not normally make above the poverty threshold and are consequently considered to be in poverty. Therefore, poverty, food insecurity, and childhood obesity create a cycle that can leave a family trapped for generations.

Poverty, food insecurity, and obesity are major public health concerns that may need to be dealt with individually to prevent the continuation of their never-ending cycle. The best way to put an end to this epidemic in the United States would be to initiate both primary and secondary preventive measures in all aspects of a child's life, which include their home, school, community, state, and

nation. Although all of these areas are considered separate, they affect each other. Hopefully, by promoting preventative measures in some aspects of a child's life, these will be sustained in all areas to reduce or eliminate these major public health concerns.

Discussion: National and State Level

The national and state level includes the federal government and state legislatures. The main changes that need to occur at this level are the implementation of policies. These government levels need to establish policies that will help reduce the percentage of people in poverty so that they will have enough funds to purchase nutritious food rather than cheap unhealthy food. For those who will still find themselves in poverty, these policies need to be able to help reduce their food insecurity and give them adequate access to healthy food. These policies also need to address physical activity in the lives of children and bring awareness about a child's diet and the effects of childhood obesity to the public.

The federal government has issued many national policies over the years to try to help decrease the population of people living in poverty in the United States. These policies include those that have attempted to lower the rate of unemployment through government benefits, grants, and financial aid, such as Social Security and Welfare. Children in poverty are helped through the Child Support Enforcement Program which was enacted in 1975 by the United States Congress and is currently maintained by the U.S. Department of Health and Human Services and state legislatures ("Child Support Enforcement Program,"

2000). This program helps single parents and their children by “locating noncustodial parents, establishing paternity when necessary, and establishing and enforcing child support orders” (United States Department of Health and Human Services, 1996). In other words, this policy helps to give the custodial parents more access to funds so they do not have to support their child or children on one income. This program was strengthened in 1996 by the enactment of the Personal Responsibility and Work Opportunity Reconciliation Act. This act requires employers to document and report important information about all new hires to the government along with important information about the new hire that will better help the government. This information helps the government more effectively enforce child support (United States Department of Health and Human Services, 1996).

Another policy enacted by the federal government to combat poverty is the No Child Left Behind Act which took effect in 2002. This law was established to reform all public school systems in the United States, and thereby better the education of U.S. children. This reformation affects almost every aspect of the public school system, including the way funds are spent on children’s education, what students are taught, and how they are tested. As part of this act National standards were introduced into the school curriculum and standardized tests are given each year to students so that all children receive the same education. Each state must ensure that their schools comply with all the terms and regulations of this act. The federal government, however, leaves the task of developing achievement standards up to each state.

The No Child Left Behind Act can benefit teachers, their students, and the schools. For the teachers, this law gives the schools grants which can be used for teacher training or for teachers to receive other certifications. These grants can also include merits and bonuses for science and math teachers, who are considered to be in high-need. Another benefit for teachers includes grants for reading instruction, which can help build and/or strengthen a school's reading program. Children also benefit from this act in two ways. The act gives the students the option of changing schools if a different school has better achievement standards or better teachers. Before the enactment of this law, children were required to attend either the public school in their district or go to a more expensive private school. However, with this act eligible children can go to the public school of their choice. The students can also receive free tutoring. Schools benefit from this act through grants, which can be used to attract and hire "top-notch teachers or other school programs" (GreatSchools, 1999).

The United States government has also implemented more recent policies on the issue of poverty. One of these policies, The American Recovery and Reinvestment Act, was passed in 2009 as a way to help "alleviate the poverty made worse by economic crisis" (WhiteHouse.gov, n.d.). To accomplish this, the act provided billions of dollars to help strengthen current poverty funds such as the Neighborhood Stabilization Funds and the Homeless Prevention Funds. These funds help sustain poor neighborhoods and help keep individuals from becoming homeless. This act also provides funding to increase job training and income support for those individuals with low income or who are unemployed,

and provides tax breaks for working families with children. Also included in this act were billions of dollars in funding for the Supplemental Nutritional Assistance Program, or the SNAP program. This Program helps alleviate hunger that many people in poverty constantly face (WhiteHouse.gov, n.d.).

The SNAP program is a program that was started by the federal government as a way to help reduce food insecurity for low income families. This program helps these families pay for food by providing them a monthly stipend which comes in the form of a debit card called an Electronic Benefit Transfer, or EBT, card. This card is refilled every month with an amount of money which is based on the income of the individual or family and the number of people living in the household. The EBT card can be used to buy almost any food at a store that accepts SNAP benefits, however, SNAP cannot be used to purchase "beer, wine, liquor, cigarettes or tobacco; any nonfood items…, vitamins and medicines; food that will be eaten in the store, [or] hot foods" (United States Department of Agriculture, April 2014). Therefore, SNAP benefits can help individuals with food insecurity to purchase healthy nutritious foods, but it also allows them to buy non-nutritious junk food and sugary sodas for their children, which can cause them to become overweight or obese. This program should be restructured to either restrict or completely terminate the individual's ability to buy unhealthy food for their children. This would force parents to provide their children with a more nutritious diet.

Along with the SNAP program, the federal government has also implemented other policies, such as the Healthy, Hunger-Free Kid's Act of 2010,

to combat food insecurity in the United States. This policy was enacted to prolong a group of child nutrition programs for five years, which it accomplished by providing almost five billion dollars in funds to these programs. These newly reestablished programs include the National School Lunch and Breakfast programs, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Child and Adult Care Food Program (CACFP), the Summer Food Service Program, the Afterschool Meal Program, and the Supplemental Nutritional Assistance Program Education (SNAP-Ed) (National Conference of State Legislatures, 2011). The National School Lunch and Breakfast programs provide a low-cost or free lunch and breakfast to students whose family is considered to be in low income. These students can be in either public or private schools. The Special Supplemental Nutrition Program for Women, Infants, and Children, or the WIC program, is part of the SNAP program whose main focus is the health and wellness of women, infants, and children younger than five who are all at or below the low income level. The main goal of the Child and Adult Care Food program, or CACFP program, is “improving the quality of day care for children and elderly adults by making care more affordable for many low income families” (Nutrition.gov, 2014). Many of the individuals in these age groups cannot stay by themselves and therefore, have to go to a day care facility while their normal care takers are at work. These facilities can be very expensive, especially if the family is already at the low income level. The Summer Food Service program was established to ensure that low income children have access to nutritious meals during the summer. During summer months children

are often not at school to receive school lunches and breakfast. This program establishes sites in the child's community such as local churches, where the children can receive a free breakfast and lunch (Nutrition.gov, 2014). Like the Summer Food Service program, the After School Meal program also helps ensure children of low income have proper access to healthy meals when they are not in school. This program operates facilities during the week after school, where children can receive a snack and supper; and during the weekends, where they can receive breakfast, lunch, or dinner and a snack (Food Research and Action Center, 2010). Lastly, the Supplemental Nutrition Assistance Program Education, or SNAP-Ed, is another branch of the SNAP program. This branch focuses on educating children on healthy choices to increase the likelihood that SNAP participants and those eligible for SNAP will make healthy decisions regarding their diet and lifestyle (United States Department of Agriculture, February 2014).

Along with the poverty and food insecurity, the federal government has also taken steps to help halt the current rise of childhood obesity. In 2010, First Lady Michelle Obama started a campaign against childhood obesity called *Let's Move!*. The goal of this campaign is to target and "combat the epidemic of childhood obesity through a comprehensive approach that builds on effective strategies, and mobilizes public and private sector resources" (WhiteHouse.gov, 2010). This policy aims to not only provide information to parents about healthy choices and thus foster healthy environments for their children to grow, but it also provides children with healthier food in school so they will have at least one point

of access to a nutritious meal. As a part of this initiative, a Task Force on Childhood Obesity was also created by President Obama. The job of this Task Force is to "renew every single programs and policies relating to child nutrition and physical activity and develop a national action plan to maximize federal resources and set concrete benchmarks toward the First Lady's national goal" (Let's Move!, n.d.). Their action plan focuses on the "five pillars" of the *Let's Move!* campaign which include: creating a healthy start for children; empowering parents and caregivers; providing healthy food in schools; improving access to healthy, affordable foods; and increasing physical activity (Let's Move!, n.d.).

Along with the *Let's Move!* initiative created by the First Lady, the federal government has also implemented other policies to help reduce the prevalence of childhood obesity, one of which is the Childhood Obesity Demonstration Project. This project was created in 2011 by the United States Centers for Disease Control and Prevention and it "aims to improve children's nutrition and physical activity behaviors in the places where they live, learn, and play" (Centers for Disease Control and Prevention, 2014). These improvements to children's nutrition and physical activity behaviors include ensuring that children get adequate amounts of sleep, increasing both their physical activity and their daily intake of healthy foods and drinks, and limiting both the amount of time children spend in front of a TV, computer, or gaming screen and the amount of sugary soft drinks and junk food they consume daily. By implicating these measures the Centers for Disease Control and Prevention want to discover if "interventions in the pediatric health care setting combined with public health interventions in

schools, early care and education centers, and communities can reduce obesity in low income children" (Centers for Disease Control and Prevention, 2014). Although this program could potentially help many children overcome obesity and prevent many other children from becoming obese, it is still only in the experimental stages, and only being implemented in six urban and rural communities in Massachusetts, Texas, and California (Centers for Disease Control and Prevention, 2014).

Analogous to the national level of government, the legislatures of each state have the ability to construct and enact their own individual policies on poverty, food insecurity, and childhood obesity. However, one of their main functions in the prevention and discontinuation of these concerns should be accepting and enforcing the federal policies that are currently in place. It is not only up to each state to enforce these policies, like SNAP, the Child Enforcement Program, and the National School Lunch and Breakfast programs, but it is also the state's responsibility to reach all of the citizens of their state who are in need of assistance from these programs. These programs should also be monitored to ensure that they are effectively reaching and helping the people in need and are working to help prevent and reduce poverty, food insecurity, and childhood obesity. The state can also aid in the eradication of these concerns by providing funding to communities, especially those with a high prevalence of poverty, childhood obesity, and food insecurity. This funding would help enable these communities to make changes to decrease the prevalence of these major public health concerns.

Discussion: Community Level

Like the higher levels of government, the local community governments must also take initiatives to eliminate and prevent the major public health concerns of poverty, food insecurity, and childhood obesity in order for this campaign to be successful. The community level, however, should be less about policies and politics and more about local organizations coming together to help each other and those in need overcome these obstacles. There are many ways members of the public can help support individuals in their community and help them break free from the cycle of poverty. One example is the creations of thrift stores, such as Goodwill, to help ease the burden of poverty. Stores, such as Goodwill, accept donations of unwanted items, sort the items, and resell them at an extremely low price. This gives people who have little to no income the chance to purchase some of these items. These items sold by Goodwill cover a variety of categories such as clothing, home décor, books and appliances. Goodwill not only enables people in poverty to purchase goods inexpensively, but it also uses its revenues to help the unemployed by providing jobs and training to individuals. Last year, "Goodwill helped more than six million seven hundred thousand people train for careers in industries such as banking, IT and health care, to name a few—and get the supporting services they needed to be successful—such as English language training, additional education, or access to transportation and child care" (Goodwill Industries International, Inc., 2014). Therefore, communities can help end poverty by helping to establish stores such

as Goodwill in their community, or by donating unwanted items to existing stores in their area.

The building of low income housing is another way communities can help people in poverty. Housing can be hard to fund for people whose income is already at or below the poverty level. Instead of spending the majority of their income on conventional housing, individuals in poverty can stay in low income housing which is much cheaper, allowing them to have money for other necessary items such as food and clothes. For those individuals who cannot even afford low income housing, most communities offer homeless shelters at no cost. These shelters are normally run by community volunteers or by organizations, such as churches or clubs, which donate their time and recourses to the continuation of these shelters.

Today, more and more free clinics are appearing in communities around the United States. These clinics are usually run by doctors or nurses but are sometimes be run by medical students. They provide free health care to individuals who cannot afford regular medical clinics. These individuals cannot afford normal clinics for reasons such as they have little to no income, or they do not qualify for government aid health insurance like Medicare or Medicaid. Free clinics normally treat patients with routine illnesses such as hypertension and diabetes. These conditions can also be found in obese children and although they are considered to be routine, they can still be life-threatening if left untreated. This makes the establishment of these clinics all the more important.

Along with the concern of poverty, communities in the United States are also implementing programs and taking measures to help provide food to those that are food insecure. Many communities have established food banks in their neighborhoods through organizations such as Feeding America. This organization helps fight hunger by helping communities open food banks. The food banks collect food donations and distribute them to those who are food insecure. Feeding America has helped communities across the United States establish over two hundred food banks and "supply more than three billion pounds of food and grocery products" each year (Feeding America, 2014). Members of the community can help organizations like Feeding America, but they can also volunteer their time to help organize and distribute the donated food. Community members can also donate to their local food banks. Donations can be given in the form of monetary donations or packaged food items.

Communities can also help end food insecurity by working with the federal Summer Food Service program and the Afterschool Meal program to establish safe and secure places for the children who are food insecure to receive their extra nutritious meals. Not only do these children need a safe place, such as a local church or community center, to receive their food, but they also need people to be at these secure locations to distribute the meals. Therefore, community members can also donate their time to ensure the children receive their extra nutritious meals. Another place that can be established in the community where food insecure individuals can receive a few meals is a soup kitchen. Soup kitchens are created by communities and normally run by

individuals and organizations who volunteer their time to prepare and distribute meals to those individuals who cannot afford to buy food. These kitchens feed people of all ages and backgrounds. Some are from families who are struggling and need occasional help with a few meals. Others are homeless and have no secure way of acquiring the food they need to survive.

To help communities battle the growing epidemic of childhood obesity, the Institute of Medicine has constructed a plan called the *Local Government Action to Prevent Childhood Obesity*. This plan serves as a guide that local governments can follow in order to get ahead of this prevailing epidemic. Recommended by this report are fifty-eight steps that each U.S. community should take to help prevent children from becoming overweight and obese, through healthy eating and physical activity strategies. One of the healthy eating strategies calls for chain restaurants to start clearly labeling the amount of calories in each of their food options on their menus. This would help their customers become aware of the amount of calories they are eating during their meals, and better monitor the caloric intake for themselves and their children. Another healthy eating step communities can take against childhood obesity is to "mandate and implement strong nutrition standards for foods and beverages available in government-run or regulated after-school programs, recreation centers, parks, and child-care facilities, including limiting access to unhealthy foods and beverages" (Institute of Medicine committee on Childhood Obesity Prevention Actions for Local Governments, 2009). This strategy of the action plan would help reduce the amount of unhealthy food and drinks available to

children in many places in their community. The healthy eating step also recommends that communities organize a huge media outlet to promote healthy eating among its public. This outlet would not only promote the benefits of healthy eating, but it would also educate the community members on why childhood obesity and unhealthy foods are bad for their children. For this public health media campaign to work, the community must unite its media sources including local radio and television stations and other organizations that produce media materials. To discourage parents from purchasing unhealthy foods and beverages for their children, this action plan calls for the development and application of a new tax on these food groups. This strategy would help reduce the consumptions of food and beverages that have very little nutritional value by local children, and increase their consumption of nutritious food and beverages which would now be the less expensive choice.

For physical activity, the *Local Government Action to Prevent Childhood Obesity* report recommends that communities "plan, build and maintain a network of sidewalks and street crossings that connects to schools, parks and other destinations and create a safe and comfortable walking environment (Institute of Medicine committee on Childhood Obesity Prevention Actions for Local Governments, 2009). This safe walking environment can be used by children to walk or ride their bikes to and from school, the local park, or other local areas. This will give them some much needed physical activity and will offer an alternative to always riding in a car or bus to get to the places they want to go. In correlation with this strategy, the IOM report also calls for communities to build or

reconstruct their local parks, playing fields, playgrounds, and centers for recreation and maintain these areas so that children have a safe place to go and play (Institute of Medicine committee on Childhood Obesity Prevention Actions for Local Governments, 2009). Outdoor play is one of the best ways for children to obtain daily physical activity which burns calories and help their bodies produce muscle instead of fat.

Another way individuals can take strides in preventing and defeating childhood obesity in their community is by setting up a program, called the Farm to School Initiative, in their community. The Farm to School Initiative is a program designed to increase the nutritional intake of school children by connecting local farmers and local schools. Through this program the farmers supply schools (K-12) with their produce, which not only benefits the children, but also helps support the farmers. The school then serves the fresh fruits and vegetables to the children, which allows all children to have access to nutritional food. The school also uses the produce to educate its students on the value of nutrition. With the help of this program, some schools have set up gardens, where they teach the students how to grow their own vegetables. Teachers have also created lesson plans for subjects like arithmetic, which allow them to use the garden as their classroom. By providing the children with healthy and nutritious fruits and vegetables, this initiative is helping to increase the amount of healthy foods children eat daily and decrease their intake of food that has little to no nutritional value, thereby helping to prevent these children from becoming overweight or obese. Also, because this program allows the students to take the

hands on approach to growing food in the garden, the students become very excited about the food they have grown in the garden. This happenstance not only ensures that children are more likely to continue eating and making healthy food choices in the future, but it also helps educate them on how to grow their own fruits and vegetables at home (w16).

Discussion: School Level

The major public health concerns of poverty, food insecurity, and childhood obesity can also be dealt with at the school level in a child's environment. At this level, one response to these issues is the implementation and following of government policies and community programs that are already established to aid in the prevention and cessation of these concerns. As for dealing with poverty, the school's main concern should be to provide the best education possible to their students. With a good education, children are more likely to graduate from high school and receive scholarships so that they may also go to college. A college degree can help an individual finally move out of the poverty level. Therefore, schools should strive to follow the regulations set forth by the No Child Left Behind Act so that every child can have the opportunity to earn a high school and college degree. Schools should also take advantage of the funding provided by this act to advance their reading programs and hire more effective teachers to make their school the best possible learning environment for children.

Schools should make sure they implement and follow federal polices such as the National School Lunch and Breakfast programs, to help make sure their

children have adequate access to nutritious food. Not only can hungry children not focus and therefore not learn the material they are being taught, but the cognitive development of children that do not receive an adequate amount of nutritional meals daily is also impaired which cause these children to have a lower IQ. Therefore, all schools in the United States should offer these programs to their students who belong to food insecure households so that they too can receive at least two healthy and nutritious meals every day and have a better chance at learning.

U. S. schools should also follow the Institute of Medicine's *Local Government Action to Prevent Childhood Obesity* report and remove all junk food and sugary beverages that have little to no nutritional value from their grounds and instead offer their students a variety of healthy snack and drink options. Because children spend the majority of their day at school for most of the year, the majority of their daily food intake also occurs at their school. Schools therefore, need to better regulate and monitor the nutrition content of the food they give to their students to help keep them on track to a healthier lifestyle. Schools can also implement the Farm to School program to give their students access to fresh fruits and vegetables. This program can also aid the teachers in teaching students and their parents the importance of healthy eating. As another part of this healthier lifestyle, students should also have many opportunities for physical education during their time at school. These opportunities can be presented to students in the form of a daily physical education class in which children can be taught different physical activities in the form of games they can

play with their friends. Students can also get their daily dose of physical activity at school from recess in which they can are allowed outside to run around and play with their classmates.

Discussion: Home Level

The most important level of a child's environment is their home, thus meaning that the child's caregivers have the largest responsibility when it comes to making sure their child has access to adequate amounts of healthy food and taking on a healthy lifestyle. The main functions parent's in poverty can do for their children is to actively seek out and take advantage of government supplements. With the No Child Left Behind Act they can enroll their child in the best local school to ensure that they will get an excellent education and thus a chance to earn a college degree and get out of poverty. Parents can also use the Child Support Enforcement Program to force and ensure that their child's noncustodial parent is also helping to support the child, which provides more available funds to the rearing of the child.

Parents who cannot afford food should also actively seek out their local SNAP program so that they can receive supplemental funding to ensure that their child is getting multiple well balanced meals a day. These food insecure children should also be enrolled by their parents into other supplemental food programs such as the National School Lunch and Breakfast programs during the school year, and the Summer Food Service Program and Afterschool Meal Programs during the times they are not in school. If they still need assistance or do not

qualify for these programs, parents can and should take advantage of their local food banks and soup kitchens.

To help prevent their children from becoming overweight or obese, parent's can help their child's school implement the farm to school program and they, along with their child, can also use this program to make sure they are well educated on ways they and their children can live a healthy lifestyle. What parent's feed their children not only directly affects the child's diet and health, but it also affects the eating habits the child creates and will live by for the rest of their life. How and what the parent themselves eat is also very important in prevent childhood obesity because they are the ones the child looks to for guidance and mimics. Parents should therefore not only make sure that their child is active and exercises daily but they should also make sure they stay active with their child.

Discussion: Limitations

The limitations of this literature review were mainly focused on finding sources for this review. Most of the sources relevant to the study of the poverty, food insecurity, and childhood obesity cycle were not evaluated in scientific literature and were therefore hard to find. Another limitation came from the issue that many of the key terms used to find these sources, such as poverty, were defined multiple ways by different people. This paper was also completed on a limited time frame.

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