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High School Physical Education Teachers' Perceptions of their Role in Impacting Childhood Obesity

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HIGH SCHOOL PHYSICAL EDUCATION TEACHERS' PERCEPTIONS OF THEIR ROLE IN IMPACTING CHILDHOOD OBESITY

BY

John F. Wescott, Jr.

Dissertation Committee:

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Genevieve Pinto-Zipp, P.T., Ed.D.

Annette Kirchgessner, Ph.D.

Submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Health Sciences

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Dedication

This dissertation study is dedicated to my mom and in the memory of my dad. Their knowledge, wisdom, and guidance taught me that I would have to strive and be the best to reach my dreams. Without their love, none of this would matter. Throughout my life, they actively supported me in my determination and realize my potential, and to make this contribution to the world. Thanks, Mom, for putting up with my attitude at times. I know I can be unbearable. Dad, even though you left a bit soon, I know you were with me every step of the way. I wish you could be here to share in the celebration. I love the both of you!

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Abstract

High School Physical Education Teachers' Perceptions of Their Role in Impacting Childhood Obesity

John F. Wescott, Jr.

Seton Hall University, 2017

Dissertation Chair: Terrence F. Cahill, Ed.D., FACHE

Background and Purpose of Study: Childhood and adolescent obesity is becoming an increasingly large problem in the United States (Bruss et al., 2010). The epidemic of obesity and associated diseases poses a serious public health challenge. A major concern is the dramatic and continuing increase in the prevalence of overweight and obesity in children. The prevalence of overweight school-aged children in the United States is estimated to have tripled since 1980 (National Center for Chronic Disease Prevention and Health Promotion, 2012). Obese youth are more likely to have risk factors for cardiovascular disease, such as high cholesterol or high blood pressure (Ogden, Carroll, Curtin, Lamb & Flegal, 2010). Children and adolescents who are obese are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem (Ogden et al., 2010). Obese children are more likely than children of normal weight to become overweight or obese adults, and therefore are more at risk for associated adult health problems, including heart disease, Type 2 diabetes, stroke, several types of cancer, and osteoarthritis (Wyatt, Winters & Dubbert, 2006). Across the United States, childhood obesity and

the absence of physical activity continues to impact the current and future health of children (Borrud et al., 2014). This study assessed the public high physical education (PE) teachers' perceptions of their role in impacting childhood obesity and the school's role in addressing childhood obesity.

Methods: The design of this study was a descriptive, exploratory, cross-sectional survey research. A convenience sample from New Jersey public high school district websites that included a snowball technique was sent a questionnaire and 259 PE teachers qualified. Internal reliability of the questionnaire was 0.930. Descriptive statistics, Independent sample *t*-tests, Analysis of variance (ANOVA) and Post hoc Analysis were used to analyze and interpret the data.

Results: High school PE teachers overwhelmingly agree that childhood obesity is a serious health risk. They believe that too little physical activity, consuming too many calories, and eating the wrong foods contributes to the cause of obesity. Male PE teachers perceived more than female PE teachers that schools were serving a role in addressing childhood obesity. PE teachers' perceptions about the roles the school nurse and the school counselor play in addressing childhood obesity were slightly affected by years-of-teaching experience. High school PE teachers do feel that their background in PE is sufficient to assist children in developing appropriate exercise and eating behaviors and believe that they have the skills to structure weight loss programs for children, but almost 1/3 of high school PE teachers felt that their college program did not prepare them when it comes to designing exercise programs for obese children.

Conclusion: Childhood obesity is becoming one of the greatest public health, social, and economic challenges. Without the support from schools, it is unlikely that the epidemic will change. Within the mission of schools, promoting physical activity and healthy eating is fundamental. PE teachers and schools can help students adopt and maintain healthy eating and physical behaviors. Students must be educated to become active, healthy, productive contributors to society.

Keywords: body mass index, childhood obesity, overweight, epidemic, prevention, treatment

Chapter I

Introduction

The rising number of children who are obese is not only an issue for those children, but also, it is a community, institutional, and societal problem. The responsibility for effectively meeting the needs of this population, therefore, lies within these sectors. Amongst American children in particular, obesity has reached nearly epidemic proportions within the last twenty years. In one study by the Centers for Disease Control and Prevention (CDC), it was reported that 19.8% of children aged six to eleven in the United States are obese (Centers for Disease Control and Prevention, 2009). This is a severe increase from the 7% prevalence rate reported in 1980.

Childhood obesity has become one of the most serious public health challenges within the 21st century. The World Health Organization (WHO) reports that globally, the number of overweight children under the age of five is estimated to be over 42 million (World Health Organization, 2010). Studies of international populations report comparable rates of increase, so that if current trends remain unchecked, childhood obesity is likely to challenge worldwide public health (Must & Strauss, 1999; WHO, 2010). Recently the issue of childhood obesity has received widespread media publicity, and has captured the attention of congressional leaders. Former First Lady Michelle Obama called childhood obesity a “public crisis” and implemented a national campaign that promoted physical fitness within children and families, as well as having school districts develop comprehensive wellness plans (Cappellano, 2011).

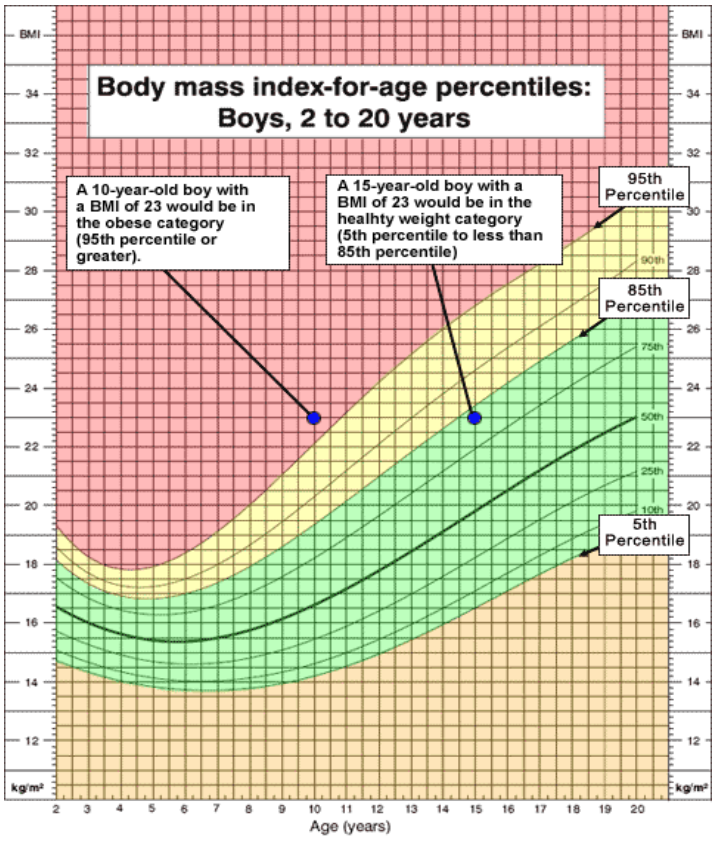
Childhood obesity poses increased risks for future health conditions. Obese children are more likely to have high blood pressure and high cholesterol, which are risk factors associated with cardiovascular disease. In one population-based sample of 5 to 17-year-olds, 70% of obese youth had at least one of the aforementioned risk factors (CDC, 2009). Mediated by such factors as genetics, behavior, and environment, obesity has both immediate as well as long-term health risks. Health life-style patterns are developed in early childhood and often continue throughout the lifespan. Therefore, obese children are at increased risk for becoming obese adults. Obese adults are at an increased risk for health conditions including hypertension, Type 2 diabetes, stroke, and cardiovascular disease, all which may contribute to a shortened lifespan (CDC, 2009). Obesity has been linked to psychological concerns such as social isolation, low self-esteem, and depression. (CDC, 2009). The current increase in childhood obesity likely denotes the potential for an increase in adult obesity in later years if lifestyle changes are not adjusted.

Background of Problem

Obesity refers to a state of having extra or too much body fat. According to Wang and Beydoun (2009), overweight and obesity are different conditions, even though obesity may be caused by the same factors as being overweight. Being overweight may be a result of having extra muscle, fat, or water in the body. The weight is higher than what is considered healthy for people with a given height and the body mass index is higher than what is recommended (Wang & Beydoun, 2009). Obesity is defined as a Body Mass Index (BMI) of more than 30 (Flegal, Carroll, Ogden, & Curtin, 2010), and is considered to be a major risk factor of

cancer, diabetes, cardiovascular disease and premature death (Wyatt, Winters, & Dubbert, 2006). The screening tool used to identify possible weight problems in children, recommended by both the CDC and American Academy of Pediatrics (AAP), is Body Mass Index (BMI) (Centers for Disease Control and Prevention, 2010). BMI is a number calculated from the child's weight and height and is a reliable indicator of body mass for most children. Once BMI is calculated for the individual child, it is plotted on the CDC's BMI-for-age growth chart for children aged two to twenty (Kuczmarski et al., 2002). As shown in Figure 1, this chart is a helpful indicator to show the child's relative BMI according to age, sex, and height compared to the rest of the nation.

BMI Chart (Boys Age 2-20)



BMI Chart (Girls Age 2-20)

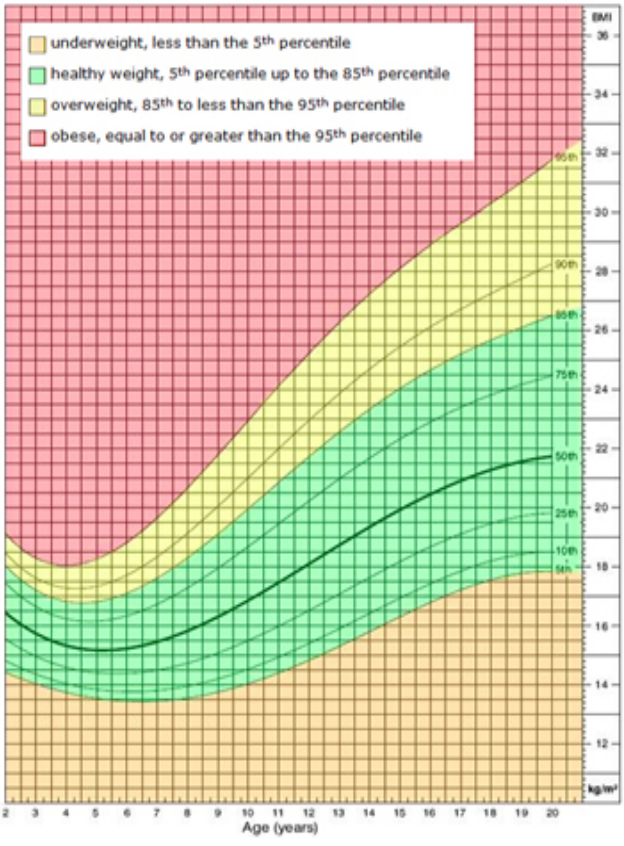


Figure 1. CDC's BMI Growth Charts for the United States (Centers for Disease Control and Prevention, 2000).

BMI results are interpreted differently for children than for adults (BMI-for-age growth charts) because the calculation needs to consider normal growth patterns for different age groups according to height and sex rather than using the normal universal BMI range for adults. The BMI corresponds to weight status categories. Underweight is classified as a BMI in the range of less than 18, healthy weight is in the range of 18 to 24.9, overweight is in the range 25 to 29.9, and obese refers to scores of 30 and over. BMI is not a diagnostic test for weight problems, but is a useful calculation tool for health care providers to identify possible health problems and then to perform other assessments to determine possible diagnoses and treatments (CDC, 2010).

Ludwig (2007) found that in the 1970s, children began to weigh more across socio-economic status (SES), racial and ethnic groups, and various regions. According to Ludwig, this increase in overweight children was unnoticed by health professionals, because overweight children can remain healthy for many years. Serious weight problems are now prevalent throughout the country. Current research indicates that approximately 17% of youth in the United States are obese. (Ogden, Carroll, Fryar, & Flegal, 2015).

Over the past three decades the prevalence of obesity in children between 6 and 19 years has almost tripled in the United States (Dehghan, Akhtar-Danesh, & Merchant, 2005). The Journal of the American Medical Association (JAMA) estimates that 32% of school aged children in the United States are overweight, with 8% of that number falling into the obese range (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). According to Kimbro, Brooks-Gunn, and McLanahan (2007), the number of overweight children in America has increased by 100% since 1971.

There is no one cause of childhood obesity. Diet, physical activity, and genetics play a role in determining a child's weight. Family influences with cultural norms regarding food and eating practices can affect a child's weight and nutrition. Parenting style and environmental factors contribute to foods that are readily available and to the way in which meals are prepared and eaten. These factors can influence the weight gain of children (Savage, Fisher, & Birch, 2007).

Strauss and Pollack (2003) examined social isolation in overweight adolescents. Overweight adolescents were found to be more socially isolated than their normal–weight peers. Although they listed a similar number of friends as the normal weight group, the overweight adolescents did not receive as many friend nominations. Normal weight adolescents received more friendship nominations and were more likely to receive a best-friend nomination.

Having few peer relationships or poor peer relationships and peer rejection can affect self-esteem and depression. Obese children have been found to have an increased rate of depression when compared with normal weight peers (Pearce, Boergers, & Prinstein, 2002). In a sample of 215 girls from ninth- through twelfth-grade, obese girls scored significantly higher on indicators of low self-esteem and depression when compared with their normal weight peers. (Pearce et al, 2002).

Eating disorders also impact weight. Children that are obese are more likely than their average weight peers to develop bulimia nervosa or a binge eating disorder as adults (Epstein, Paluch, Saelens, Ernst, & Wilfley, 2001). Many children turn to diets to address their weight gain. However excessive dieting in children may also be related to eating disorders as adults.

Pediatric healthcare in the United States historically has been low in cost for consumers and for insurance companies. Because of the healthcare factors associated with childhood obesity, the cost of pediatric healthcare is predicted to rise dramatically during the next decade (Ludwig, 2007). According to Ludwig, obesity rates are predicted to accelerate through trans-generational mechanisms if an effective intervention is not developed and implemented. The increase in the number of obese children that remain obese into adulthood in America will increase from 5% currently to 16% by 2035 (Ludwig, 2007).

It is predicted by 2030, 86.3% of adults will be overweight or obese, and 51.1% will be obese. Total health-care costs attributable to obesity and overweight will be more than doubled every decade (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). According to Wang et al., by 2030, health-care costs attributable to overweight and obesity could range from $860 to $956 billion, which would account for 15.8 -17.6% of total health-care costs, or for 1 in every 6 dollars spent on health care.

Watkins, Clark, Foster, Welch, & Kasa-Vubu (2007) found that elevated BMI in childhood is a predictor of hypertension in early adulthood. Hypertension increases the risk of heart disease and stroke. Those who remain overweight for a long period of time are more likely to develop Type 2 diabetes, which can lead to liver and/or kidney failure, amputations, gastro-esophageal reflux, orthopedic problems, insulin resistance, dyslipidemia, sleep apnea, and early death. Watkins et al. claim that by mid-century the effects of childhood obesity could result in a shortened life span of 2 to 5 years. This is an effect equal to all cancers combined. The risk of dying by middle age is 2 to 3 times as high among obese adolescent

girls as it is in their non-obese peers (Watkins et al., 2007). Today's children are the first generation in United States history to have a life span that is predicted to be shorter than their parent's life span (Olshansky et al., 2005).

Statement of Problem and its Significance

Childhood and adolescent obesity is becoming an increasing problem in the United States. The epidemic of obesity and associated diseases poses a serious public health challenge worldwide. A major concern is the dramatic and continuing increase in the prevalence of overweight and obesity in children. The prevalence of overweight school-aged children in the United States is estimated to be at 25% (Bruss et al., 2010).

Childhood obesity has more than tripled in the past 30 years. A study by the National Center for Chronic Disease Prevention and Health Promotion reports that prevalence of obesity among children aged 6 to 11 years increased from 6.5% in 1980 to 18.0% in 2010. The prevalence of obesity among adolescents aged 12 to 19 years increased from 5.0% to 18.1% (National Center for Chronic Disease Prevention and Health Promotion, 2012).

According to Ogden et al. (2010), overweight and obesity in childhood have significant effects on both physical and psychosocial health with short and long term adverse results. Obese youth are more likely to have risk factors for cardiovascular disease, such as high cholesterol or high blood pressure (Ogden et al., 2010). Ogden et al. claims that children and adolescents who are obese are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem. Obese children are more likely than children of normal weight to become overweight or

obese adults, and therefore more at risk for associated adult health problems, including heart disease, Type 2 diabetes, stroke, several types of cancer, and osteoarthritis (Ogden et al., 2010). Across the United States, childhood obesity and the absence of physical activity continue to impact the current and future health of children.

Purpose of Study

Fahlman, Dake, McCaughtry, and Martin (2008) state that unhealthy behaviors developed in early to late childhood often carry over into adulthood and some of these behaviors may have a positive correlation with increased mortality and morbidity in adults (Fahlman et al., 2008). The decline in nutritional diets and the reduction in physical activity are closely related to the increase in childhood obesity (Lobstein, Baur, & Uauy, 2004). Because most children attend schools on a daily basis, it is important to integrate health interventions into schools to end the growth of the obesity epidemic (Fahlman et al., 2008).

Researchers have used different techniques in studying the obesity problem in the school setting. Both quantitative and qualitative methods have been used to study educational techniques related to the risk factors of obesity such as in poor nutrition and inadequate physical activity levels. Certain quantitative methods examined used pre-test and post-test analysis to determine the effectiveness of an educational intervention on different obesity risk factors (Khambalia, Dickinson, Hardy, Gill, & Baur, 2012). Harrell, Davy, Stewart, and King (2005) used a quantitative correlational design and found that small-scale interventions may provide improvements in health awareness and health behaviors for the students participating in the intervention. Other research, such

as the Lee, Lai, Chou, Chang and Chang (2009) study, use qualitative methodologies by using focus groups and interviews to explore children's existing knowledge on obesity risk factors, such as nutrition and exercise, have been effective in targeting certain themes for future interventions.

The current epidemic of inactivity and the associated epidemic of obesity are being driven by multiple factors (societal, technological, industrial, commercial, financial) and must be addressed likewise on several fronts. Foremost among these are the expansion of school physical education, dissuading children from pursuing sedentary activities, providing suitable role models for physical activity, and making activity-promoting changes in their environment. There are certain risk times for the development of obesity in childhood, which provide a basis for targeted intervention. In addition, tracking data supports the persistence of obesity, at least in later childhood, as well as cardiovascular risk factors.

Physical activity is the discretionary component of energy expenditure and there is evidence that falling levels of physical activity are contributing to the obesity epidemic. Physical activity in children is related to developmental stages, is reduced with increasing age, and is influenced by parental physical activity. While there is debate about the immediate health benefits of physical activity to children, there are data to support that lower physical activity levels and sedentary behaviors are associated with a higher prevalence of obesity in children. Physical activity is an accepted strategy in the treatment of established obesity (tertiary prevention). The role of physical education in the prevention of obesity at the high school level is less clear. On balance, increasing physical activity in children is an

attractive and non-restrictive approach to obesity prevention. To adopt this approach requires the support and involvement of the school.

The purpose of this study was to assess public high school physical education teachers' perceptions of childhood obesity and the schools' role in addressing the problem. The research questions call for real-life contextual understandings, multi-level perspectives, and cultural influences. The nature of the research and its evidence was its focus on the context and meaning of human lives and experiences for the purpose of inductive or theory-development research.

Research Questions

The following questions were examined:

1) Do high school physical education teachers perceive childhood obesity as a serious health risk?

2) What are high school physical education teachers' perceptions regarding their role in childhood obesity?

3) Do male and female high school physical education teachers differ in their perceptions of childhood obesity?

4) Does length of time one has been a high school physical education teacher affect perceptions of childhood obesity?

5) What is the school's role in addressing childhood obesity as perceived by high school physical education teachers?

6) Where do high school physical educators receive most of their information on childhood obesity?

7) Open-ended question: Explain what you believe your role is in addressing childhood obesity at your school.

Summary

Childhood obesity is a growing problem in today's society. Identified factors such as poor nutrition and inadequate physical activity are important in understanding the etiology of obesity (Morrill & Chinn, 2004). Educating children

about healthy eating, the importance of physical activity, and obesity facts is critical in addressing the obesity epidemic. If physical education interventions in schools can be shown to be effective in increasing children's knowledge about obesity risk factors, then perhaps this may prevent the increasing obesity problem. In addition to preventing obesity, children will be more knowledgeable about healthy lifestyles and will potentially choose to engage in healthy behaviors that will not only benefit their own health, but will benefit that of their families, society, and economy.

Chapter II

A Review of the Literature

Obesity

Obesity, defined as a Body Mass Index (BMI) of more than 30 (Flegal et al., 2010), is considered to be a major risk factor of cancer, diabetes, cardiovascular disease and premature death (Wyatt et al., 2006). According to Barnes (2011), two-thirds of Americans are affected by excess weight. Vioque, Ramos, Navarrete-Muñoz, and Garcia-de-la-Hera (2010) found that the prevalence of obesity and being overweight have been increasing at a rapid rate, particularly in less developed countries. In 2005 about 23.2 percent of adults worldwide were overweight with 9.8 percent of them being obese (Vioque et al., 2010). According to a report from the World Health Organization, 1.7 billion people worldwide are overweight or obese. The indications are that most governments of the world have ignored one of the key risks to health (Deitel, 2003).

Obesity refers to a state of having extra or too much body fat. Overweight and obesity are different conditions, even though obesity may be caused by the same factors as being overweight. Being overweight may be a result of having extra muscle, fat, or water in the body. The weight is higher than what is considered healthy for people with a given height and the body mass index is higher than what is recommended. Various research studies have been conducted to determine the cause of obesity (Wang & Beydoun, 2009).

In general, obesity is a result of consuming more calories than the body needs or failing to burn excess calories that the body has received (Cutler,

Glaeser, & Shapiro, 2003). Obesity can be caused by consuming too much food, over indulging in high calorie beverages, and/or failure to regularly exercise (Cutler et al., 2003). However, there are cases where obesity is a result of medical conditions. Medical conditions such as thyroid function (Knudsen et al., 2005), and prescribed antipsychotic medication (Schwartz, Nihalani, Jindal, Virk, & Jones, 2004) may also cause obesity. Smoking cessation (Filozof, Fernandez Pinilla, & Fernandez-Cruz, 2004), sleep apnea (Goodfriend & Calhoun, 2004), menopause (Lovejoy, 2003), and failure to lose weight that women gain during pregnancy may also precipitate obesity (Rooney & Schauberger, 2002).

Some of the blame for the growing incidence of obesity in the United States has been directed at increases in the levels of work and occupational requirements that leave minimum time for exercise along with the increase in the number of people with desk jobs. Over the last 50 years there has been a shift away from occupations that require moderate physical activity to occupations that are largely composed of sitting and sedentary behavior (Church et al., 2011). According to Church et al., within that same time period in the U.S., there has been a progressive decrease in the percent of individuals employed in goods production and agricultural occupations whereas there has been an increase in the percent of individuals employed in service occupations. Obesity has been linked to cardiovascular disease, hypertension, diabetes, dyslipidemia, metabolic syndrome, gall stones, osteoarthritis, sleep apnea, and certain forms of cancer (Wyatt et al., 2006). According to Stein and Colditz (2004), the increase in the epidemiology of diabetes, hypertension, and cardiovascular diseases in the U.S. and worldwide can be attributed, in large part, to the increase in obesity. In the

U.S., obesity is a public health crisis (Wang et al., 2008), but at the global level, it is an epidemic (James, 2008). In the U.S., 65 percent of the adult population is either overweight or obese. The prevalence of overweight has increased by 40 percent from 1976 to 2000 with the prevalence of obesity increasing by 110 percent during the same period (Stein & Colditz, 2004).

In the U.S., the prevalence of obesity is very high. Except for men between the ages of 20 and 39, it exceeds 30 percent in most age and sex groups, (Flegal et al., 2010). When age adjusted, obesity prevalence for men is approximately 32.2 percent and ranges across different racial and ethnic groups. Age adjusted obesity prevalence for women in the U.S. is approximately 35.5 percent with the worst affected group being non-Hispanic black women and the least affected group being non-Hispanic white women (Flegal et al., 2010). Obesity is second to smoking as the leading cause of preventable diseases and deaths in the U.S. (Flegal et al., 2010).

Childhood Obesity

For a child to be diagnosed with obesity, he or she must be between ages 2 and 19 years with a BMI equal to or greater than the 95th percentile for the child's age and sex (Ogden et al., 2010). There is an increasing concern about childhood obesity. Most of the research has been conducted in relation to diabetes and children that are overweight or obese. According to Liu et al. (2010), the prevalence of obesity in children between 2 to 5 years has doubled over the past 3 decades, while children between 6 and 19 years have almost tripled in the U. S. Research indicates that rates remain high with 25 percent of children in the U.S. overweight and 11 percent obese (Dehghan et al., 2005).

Raman (2002) stated that overweight children are at risk for a variety of chronic conditions later in life and the risk may even exist independently of obesity later in adult life. Raman attests that obesity in children is associated with increased risk of developing several serious health conditions such as adverse serum levels, insulin resistance, elevated blood pressure, and calcifications in the aorta and coronary arteries. Raman further indicates that obesity is associated with an increased risk of non-insulin dependent diabetes mellitus with visceral fat appearing to influence insulin secretion and insulin resistance. Childhood obesity can predict the future of adult blood pressure. Hypertension may be associated with hyperinsulinemia. There are long-term morbidities such as cerebral hemorrhage and heart disease associated with hypertension (Raman, 2002).

Several factors have been identified as contributing to childhood obesity. Some of the factors include family income, race or ethnicity, and gender. It has been found that obesity-related health risks are high among Asians with a lower body mass index threshold. As a result, they are more vulnerable to obesity related diseases with the rates rising from the body mass index of 23 (Deitel, 2003). Hence, body fat percentage, as well as risk factors for diabetes, hypertension, and cardiovascular disease at a given body mass index, are higher among Asians (Deitel, 2003).

With regard to family income, the greatest increases in obesity were seen among adolescents whose family incomes were below the poverty level (Babey, Hastert, Wolstein, & Diamant, 2010). Findings revealed that consumption of sweetened beverages is higher among low-income adolescents. Also, trends of obesity are higher among low-income male adolescents as compared to low-

income female adolescents. Environmental and genetic factors have also been found to contribute to childhood obesity significantly (Babey et al., 2010).

Childhood and puberty are critical stages in the development of humans. The development of obesity in adults has shown to be critically affected by childhood and puberty (Sandhu, Ben-Shlomo, Cole, Holly, & Smith, 2006). Obesity in childhood is of grave concern due to its associated health complications and the influences that it has on the psychosocial development of children (Zametkin, Zoon, Klein, & Munson, 2004). Other concerns are the challenges and costs associated with managing and dealing with childhood obesity. Once children have become obese, it is challenging to maintain a healthy body weight. Research has revealed that overweight children are at higher risks of being overweight as adults compared to lean children (Wang & Lobstein, 2006). Empirical research indicates that one-third of 6-year-olds that are overweight remain so as adults. Due to the multiple risks associated with obesity, childhood obesity has effects on morbidity and mortality. Thus, the fight against obesity should focus on children as well as adults since they are also adversely affected and are likely to suffer more from the condition (Zametkin et al., 2004).

Widespread concern that the prevalence of overweight and obesity are reaching epidemic levels in many developed and developing countries (Tremblay & Willms, 2003). In countries such as Japan (Yoshinaga et al., 2010), China (Cheng, Chen, & Sun, 2013), and Canada (Tremblay & Willms, 2003), the prevalence of childhood overweight is rising rapidly. Many children are overweight or obese and childhood obesity has developed into an issue of major concern in public health globally (World Health Organization, 2012). The number of children

in the 95th percentile of body mass index has doubled and even tripled in some cases (Austin, 2011). As a result of the observable and recorded changes in the prevalence of childhood obesity and being overweight, there has been an increase in societal and public health attention to obesity. However, this focus has not translated into significant gains in the reduction of childhood obesity. According to Austin, the initiatives aimed at preventing childhood obesity have failed to consider some issues, such as eating disorders and weight control behaviors, which may be propagating the problem. Such blind spots in the move toward childhood obesity prevention hinder the ability to understand all the dimensions to generate sufficient crosscutting solutions and the needed preventive effects (Austin, 2011).

Childhood obesity has rapidly increased to epidemic proportions in spite of a genetically stable population (Ebbeling, Pawlak, & Ludwig, 2002). This has led to the view that environment or diet interaction play significant roles in the development of obesity. Some ethnic groups within the U.S. have been involved in eating higher proteins and fats than vegetables. African Americans demonstrate a higher prevalence rate of obesity (Wang & Beydoun, 2007). Even though current research has turned the focus on carbohydrate consumption, the nature of risk posed by carbohydrate diets is unclear (Wang & Beydoun, 2009; Zhou, Da, Zhou, Sun, & Liu, 2010). The lifestyles of modern children and families are largely to blame for the challenges that children face in managing their weight. This is evidenced by research indicating that in most developed and developing nations, with some notable exceptions such as China and Brazil, childhood obesity is more prevalent in urban than rural areas (Wang & Lobstein, 2006). This is because

children in urban settings generally stay indoors, are less active, and eat more junk food than children in rural settings (Wang & Lobstein, 2006).

A balanced diet and regular exercise can help reduce the risk of obesity (Caudwell, Hopkins, King, Stubbs, & Blundell, 2009). Eating disorders and disordered weight control practices and behaviors are affecting more families and children. Eating disorders, which encompass binge eating, bulimia nervosa, anorexia nervosa, and different variants of the conditions, are prevalent and rarely addressed (Austin, 2011). Parent's own improper eating behaviors may contribute to the development of overweight in their children. Obese parents are more likely to have obese children due to eating practices they expose to their children. Thus, family practices and norms relating to eating food and exercising have a significant bearing on children (Lindsay, Sussner, Kim, & Gortmaker, 2006).

Depression and low self-esteem have been highlighted as one of the major causes of obesity in modern society (Goodman & Whitaker, 2002). The contemporary child is exposed to many different forms of stressors, most notably school work and the absence of parents. Additionally, children are known to have a general preference for junk and sweet food. Nutritionists assert that it is the responsibility of parents to ensure that their children are fed well and have balanced diets. However, in a society where parents are pre-occupied with their work, fast food restaurants that are operational every hour of the day, and those who are not enthusiastic about the food they eat with their children, these same children consume more calories than they require. Thus, modern family lifestyles contribute to the prevalence of childhood obesity (Clark, Goyder, Bissell, Blank, & Peters, 2007). Dealing with childhood obesity requires re-examination of nutrition

and family health by parents and any other individuals responsible for nutrition education (Lindsay et al., 2006). Due to the unique challenges presented by modern children's lifestyles, other entities such as schools and community environments need to be brought into the fight against childhood obesity (Barlow, 2007). This is an assertion based on the fact that American children spend more time at schools and with their peers than with their parents (Barlow, 2007).

Causes of Childhood Obesity

As previously stated, the increased prevalence of childhood obesity worldwide poses greater risks of chronic diseases later in life (Vitale, 2010). The search for causes of childhood obesity has always centered on theories of diet, physical activity, and lifestyle behavior factors. Vitale emphasizes that obesity occurs as a multi-factorial etiology involving genetics, metabolism, environment, lifestyle, and behavioral components. He asserts that future policies surrounding childhood obesity must consider continued focus on preventive and treatment interventions. According to Olstad and McCargar (2009), body weight and lifestyle behaviors are known to originate from childhood to adulthood and, therefore, if a child is obese, there is an increased risk of obesity as an adult. However, they maintain that parents can serve as role models to healthy lifestyle behaviors for their younger children. This is based on the observation that parental obesity is a predictor of childhood obesity. In addition to the parental role model, health professionals can help control the increase of obesity among children (Olstad & McCargar, 2009).

Levin (2009) asserts that there is a synergy of nature and nurture in the occurrence of childhood obesity. Levin gathers evidence from epidemiological

studies, which suggest that maternal under-nutrition, diabetes during gestation and lactation periods can produce obesity in the human offspring. This has also been established through animal models, which have been used to assess the independent effects of altering the pre-versus post-natal environments on different metabolic, neuroendocrine, and physiological functions that lead to the development of offspring obesity and cardiovascular conditions (Levin, 2009).

Heitmann, Koplan, and Lissner (2009) assert that the causes of childhood obesity, if addressed in the early stages of manifestation, may have a better result in reducing and controlling weight, thus preventing the prevalence of obesity. Progress toward assuring the health of today's young population calls for addressing the problem through a primary intervention. Childhood obesity increases the risk of psychosocial problems and hence the need to control the condition (Heitmann et al., 2009).

Measuring Childhood Obesity

A child's body weight is regulated by numerous physiological mechanisms that maintain a balance between energy intake and expenditure (Ebbeling et al., 2002). Body mass index (BMI) is used to asses 3 measurements. These include underweight measurements, overweight measurements, and risk for becoming overweight. Children's percent of body fat changes over the years as they grow. Boys and girls differ in their body fat as they mature and that is why BMI for children (also referred to as BMI-for-age) is gender and age specific. Each BMI-for-age and gender specificity contains percentiles. Healthcare professionals use the CDC's established percentiles as cutoff points to identify underweight (< 5^{th} percentile), overweight (85^{th} to < 95^{th} percentile), and obese (> 95^{th} percentile). This is a useful

tool because it provides a reference for growing children and adolescents that can be used beyond puberty (Centers for Disease Control and Prevention, 2000). In addition, BMI for age and gender compares well to laboratory measures of body fat and it can be used to track body size throughout life.

Childhood Obesity Prevention

Prevention research concerning childhood obesity focuses on the entire population of children with the aim of decreasing the number of obese and overweight children. The prevention models also focus on reducing the additional weight gain in those who have already gained weight. Furthermore, research in prevention focuses on the intervention sustainability and the maintenance of the intervention effects (Pratt, 2008). For instance, Brown and Summerbell (2009) conducted a systematic review of obesity prevention in school-based interventions that focus on the changing dietary intake and level of physical activity. The purpose of the research was to determine the effectiveness of such interventions. Thirty-eight controlled trials of school-based lifestyle interventions were searched in MEDLINE and EMBASE. These had a minimum duration of 12 weeks in reporting the weight outcome. The findings show that 1 out of 3 studies on diet intervention, 5 out of 15 physical activity intervention, and 9 out of 20 combined diet and physical activity interventions, demonstrated significant and positive differences between the intervention and control of the body mass index (Brown & Summerbell, 2009).

Brown and Summerbell (2009) attest that there is insufficient evidence to assess the effectiveness of one intervention against the other or among the various dietary interventions. They claim that school-based physical activity interventions may help maintain healthy weight but the results are inconsistent and short-term.

Also, physical activity interventions may be more successful in younger children and in girls (Brown & Summerbell, 2009). The fact that the research studies were heterogeneous made it difficult to generalize about what interventions are effective. Although the research displayed a variety of results, Brown and Summerball determined that overall combined diet and physical activity school-based interventions may help prevent children from being overweight and obese.

Additional research concerning obesity prevention in certain subpopulations of children such as minorities, immigrants, and preschoolers is needed. Flynn et al. (2006) recommended best practices for childhood obesity and prevention among such subpopulations, based on the addressed factors. For instance, they propose that obesity among immigrant children can be addressed from the view of a different food supply in a country. For preschoolers between the ages of 0 to 6 years, obesity can be addressed from the position that preschool is a critical period in which obesity can be successfully prevented (Flynn et al., 2006). This is because of the adiposity rebound (AR) and future obesity associations (Flynn et al., 2006). As Rolland-Cachera, Deheeger, Maillot, and Bellisle (2006) explain, the AR corresponds to the second rise in the BMI curve that occurs between 5 and 7 years. Although not a direct measure as BMI at any age, it involves the examination of several points during growth, and because it is identified at a time when adiposity level change directions, the method provides information that can help understand individual changes and the development of health risks (Rolland-Cachera et al., 2006).

It is also important to focus on the subpopulation of male children. Although both males and females are equally affected by obesity, males are more vulnerable

to obesity-associated health risks such as cardiovascular conditions (Flynn et al., 2006). After researching the medical/academic library database to appraise programs addressing prevention and treatment of childhood obesity and related risk of chronic diseases, Flynn et al. found that community and home settings are in shortage of obesity intervention and obesity prevention programs that enable understanding of the effectiveness of interventions in these environments. Flynn et al. observed that there are many methodological issues related to the assessment of obesity intervention and prevention programs.

It is important for researchers to explore trans-disciplinary studies that will separately test the efficacy, effectiveness, and dissemination of the interventions and preventions of childhood obesity. Nevertheless, most researchers agree that an urgency to find solutions to the childhood obesity problem exists. It is therefore reasonable that different types of research proceed simultaneously instead of following a strict trajectory and sequential steps (Pratt, 2008).

Childhood Obesity Treatment

The treatment of obesity in children and young adolescents has many similarities to the treatment recommended for adults. Treatment occurs in the available modes such as behavioral and pharmacological. However, children are different from adults in terms of biological, behavioral and social factors, and also in the stage of growth and development. For obese children with no other health complications such as hypertension or dyslipidemia, or a BMI between 85 percent and 95 percent, behavioral treatment is highly recommended (Luzier, Berlin, & Weeks, 2010). But for those with complications, weight loss is highly recommended (Barlow, 2007).

Variances in treatment of obesity in children as compared to adults pertain to the special circumstances in children's physiological factors, psychosocial factors, and environmental influences. According to Elamin (2010), the catalyst in childhood obesity treatment is to change behaviors related to energy balance. Change of behavior in the children's group is assumed to be generally safe, and when effective, is mostly sustained longer than in adults. Luzier et al. (2010) studied the behavioral treatment of pediatric obesity on the basis of associated physical and psychosocial problems. The research indicates that empirically supported treatments (EST) for childhood obesity promote nutritional education, physical activity, and involvement of both child and parent in therapy. However, it is behavior therapy, which is established as a meeting criterion for an EST of childhood obesity. Behavior-based therapies make use of techniques that include stimulus control, reinforcement of behavior change, self-monitoring, and modeling of healthy eating habits. The stimulus control techniques include introducing elements that will evoke desirable behaviors such as using verbal, environmental, and physical prompts to encourage children to exercise and eat healthier (Luzier et al., 2010).

Miller et al. (2008) evaluated the effect of a multidisciplinary behavioral childhood obesity treatment program on body mass index. The height and weight of 74 participants were measured and the BMI calculated at the start and completion of a 12-session program. The results indicated that lower attrition for a childhood obesity treatment program was associated with younger age and lower baseline BMI z score. This is because over half of the participants that completed the educational multidisciplinary obesity treatment program experienced a

decrease in the BMI z score despite their gender. Stewart, Chapple, Hughes, Poustie, and Reilly (2008) conducted a qualitative evaluation of parental perspectives on the use of behavioral change techniques in the pediatric obesity treatment. This is because of the belief that the qualitative method would improve the understanding of patient perceptions and therefore enhance the treatment. The use of behavioral change methods is proposed for engaging families in changing lifestyles.

Stewart et al. (2008) used purposive sampling in which 17 parents and children attending a 6-month treatment for obesity were interviewed. The findings revealed that parents who had taken part in the behavioral change techniques applauded the process as they found it child friendly and even talked of forming a partnership. Therefore, developing a rapport with the dietitian is significant for the parents in their perception of a positive experience. The research alludes to future treatments for childhood obesity by providing insight into treatment aspects and approaches that are approved by parents (Stewart et al., 2008). The study highlights a possible value of using behavioral change skills by dietitians to engage with families of obese children.

Vignolo et al. (2008) conducted a longitudinal observational clinical study to determine the efficacy of a cognitive-behavioral lifestyle multidisciplinary program for treatment of childhood obesity in an outpatient hospital setting. The subjects were 31 simple obese children of whom 13 were boys and 18 were girls between the age of 6 and 12 years. The program also actively involved parents. The results during the follow up revealed that waist circumferences decreased, family habits, such as limit setting, communicating, parental role modeling, and rewarding

displayed positive changes. Total energy intake was reduced significantly. Vignolo et al., expressed that emotional and social aspects of obesity-related behaviors showed positive changes along with the overall improvement of motor skills. The research provides further evidence that positive persistent results may be obtained in obese children with treatment programs that combine a lifestyle centered approach, nutritional education, parental involvement, and cognitive behavioral strategies (Vignolo et al., 2008).

A four-stage approach to treatment of weight loss or weight maintenance and pediatric diabetes is highly recommended by the American Medical Association Expert Committee on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity (Rao, 2008). Stage 1 is a prevention-plus protocol that involves specific dietary and physical activity recommendations. Stage 2 involves structured weight-management for children and families with structured meals and snacks, and sixty minutes of supervised activity. Stage 3 (Comprehensive, Multidisciplinary Intervention) and Stage 4 (Tertiary-Care Intervention) are more intensive interventions. These interventions are delivered by highly trained teams of experts trained in obesity. These interventions are more suitable for children who have been unsuccessful in achieving a healthier weight through Stages 1 and 2 (Rao, 2008). Rao indicates that in a primary care setting, the goals for childhood obesity treatment should be to screen the BMI and carry out early identification and timely treatment of overweight children. Interventions and follow-ups should also emphasize small and specific changes. In school and community settings, the goals should be to carry out early screening in order to identify children who are mild to moderately

obese. This should be followed by structured weight management interventions. The interventions should be comprehensive of longer duration and associated with a health care practitioner and team (Rao, 2008). Third stage intervention, as mentioned, can occur in circumstances of referral and involve a comprehensive, multidisciplinary team of interventionists. The fourth stage is the tertiary care intervention that should be the goal for moderate to severely obese, especially when comorbid conditions are present (Rao, 2008).

Rogovik, Chanoine, and Goldman (2010) discuss weight loss medication that can be used in the treatment of childhood obesity. The study describes orlistat, a pharmaceutical drug approved by the FDA, for treatment of overweight and obese children from 12 years of age and over. The study calls for establishment of the role of metformin in larger studies. While sibutramine has remained an experimental product because of its adverse effects, it has been approved for adolescents over sixteen years of age for treatment. However, weight loss supplements lack sufficient data that supports their safety and efficacy. According to Rogovik et al., preliminary data shows that the use of fiber supplements such as glucomannan provides additional weight loss results in individuals receiving a lifestyle intervention. Orlistat inhibits fat absorption and is also associated with gastrointestinal side effects such as bloating, cramping, steatorrhea, and fecal incontinence. Sibutramine is able to suppress appetite through its pharmacokinetics but side effects include increases in heart rate and blood pressure. Lifestyle modification, although, remains the main intervention at decreasing body weight (Rogovik et al., 2010).

Responding to the Problem of Childhood Obesity

Various research studies have been conducted to review the role played by different disciplines in addressing the problem of childhood obesity. For example, van Gerwen, Franc, Rosman, Le Vaillant, and Pelletier-Fluery (2008) examined the knowledge, beliefs, practices, and attitudes of primary care physicians with regards to childhood obesity. They concluded that physicians perform a major role in addressing this problem by initiating, coordinating and participating in preventative measures.

According to van Gerwen et al. (2008), most primary care physicians lack sufficient knowledge on childhood obesity. But most physicians believe that obesity management is important and that they play a major role in counseling and treating obese children. Another role performed by these physicians is in the diagnosis of the condition by measuring the child's BMI. Physicians also participate in the treatment of childhood obesity particularly by using behavioral management strategies, addressing family conflicts and providing parental guidance (van Gerwen et al., 2008). They provide nutritional as well as dietary advice and give recommendations for more physical exercise. Physicians also refer obese children to dieticians, nutritionists or behavior therapists for treatment (van Gerwen et al., 2008).

Pediatricians are more directly responsible for children's health and interact with them more often than primary care physicians and most health practitioners. They perform their role by continuously measuring children's BMI to identify signs of overweight and assessing them for risks of obesity thereby improving early signs of increased BMI, unhealthy eating, medical risks, and unhealthy physical habits.

They provide guidance on obesity prevention and suggest interventions for weight control of those found with excess weight (Barlow, Trowbridge, Klish, & Dietz, 2002).

Research by Melin and Lenner (2009) indicated that involvement of school nurses in weight management activities is an effective way of addressing childhood obesity. According to the findings, providing school nurses with appropriate instruction and knowledge required in addressing the problem of childhood obesity and working in collaboration with nutritionists, dieticians, and other members of the health care team, is an effective way to prevent further weight gain among overweight school children.

School nurses can help in diagnosing obesity by conducting BMI measurements and when empowered with the proper knowledge and skills, they can contribute to the treatment of childhood obesity by counseling these children and their parents on how to manage their weight through proper diet and sufficient exercise (Melin & Lenner, 2009). School nurses perform an important role in childhood obesity prevention by conducting routine assessment and identifying children who may be at risk, explaining known risk factors, discussing and proactively encouraging healthy lifestyle behaviors, providing behavioral modification counseling, and providing recommendations on diet as well as activities that can help prevent the development of this condition (Melin & Lerner, 2009). School nurses can identify children at risk of childhood obesity early enough and encourage preventive interventions, which could reduce prevalence of obesity among children and related health problems (Melin & Lerner, 2009; Vitale, 2010).

A major role of dieticians and nutritionists is to provide advice on healthy eating. Most dieticians and nutritionists focus on the reduction of sugar and fat consumption and advise affected children and their parents to adhere to diets that have less of these elements. Dieticians recommend such children to drink three portions of milk per day and avoid eating in between meals. They provide alternatives to foods that must be avoided and give advice on how this can be achieved. Dieticians and nutritionists provide guidance and counseling on eating healthier and obtaining all the necessary nutrients without having to indulge in foods that contribute to overweight and obesity (Barlow et al., 2002).

Occupational and physical therapists focus on active participation in daily activities as a means to prevent the development of obesity in both children and adults. One of the causes of obesity in children is the reduction of physical activity (Beavers, 2009). Both occupational and physical therapists point out personal, social, environmental, and occupational factors that can motivate obese children and to take part in active, fun, and healthy lifestyles (Beavers, 2009). Some of the ways in which occupational therapists continue to address the problem of childhood obesity is by advising these children to participate in sports such as soccer, running, or dance. Gardening is encouraged to improve nutritional knowledge and vegetable preferences (Beavers, 2009).

Brown and Summerbell (2009) assert that schools have contributed toward helping students maintain healthy eating and physical activity behaviors. They point out that physical activities and eating habits that affect weight are influenced by several sectors of society such as family, healthcare providers, community organizations, businesses, media, faith-based organizations, and schools. In

schools, administrators understand that physical education is important and provide student's schedules with time each week at elementary and secondary school levels (Brown & Summerbell, 2009). Additionally, they point out that physical education programs not only involve physical activities, but also address nutrition issues. Physical education programs emphasize knowledge for a lifetime of physical activity, keep them active for most of the physical education class periods, and teach movement along with self-management skills. These classes are compulsory for all students and are assigned in school timetables (Brown & Summerbell, 2009).

Physical Education's Response to Childhood Obesity

Schools in the U. S. face intense pressure to concentrate on standardized tests, and accordingly, place less emphasis on the aspects of healthy mind and healthy body (Cawley, Meyerhoefer, & Newhouse, 2005). An increasing number of school board members and educators are, however, realizing that health is related to success in school. That is, schools cannot attain their primary mission with regard to education if their staff and students are not healthy and fit mentally, socially, and physically. Efforts by the National Association of State Boards Education have contributed significantly to require schools to actively participate in the nation's fight against childhood obesity (Cawley et al., 2005).

Datar and Sturm (2004) point out that physical education can play a substantial role in containing obesity in children. Based on the research, expanding existing physical education times nationwide, so that every child in kindergarten receives 5 hours of physical education instruction per week, could reduce the prevalence of children who are at risk of being overweight by 60 percent. Physical

activity and its promotion are key components in American schools. Well-designed physical education programs can effectively improve youth fitness and may reduce obesity. These components contribute to reduction of fat in the body thereby reducing the chances of individuals who actively get involved in such instruction from becoming overweight or obese (Datar & Sturm, 2009). Research on the role of physical education in reducing childhood obesity is scarce, but existing literature shows that physical education promotes physical activity and healthy eating behaviors among active participants.

According to Cawley et al. (2005), many state legislators introduced measures to increase or reform school physical education. Research studies confirm that specific modifications of physical education curricula can increase student physical activity (Cawley et al., 2005). The physical education program should highlight knowledge for bodily action, support the needs of all students, keep them involved for most of the class time, and expound on movement as well as self-management. It requires appropriate and sufficient time each week with adequate facilities, and classes that are of reasonable size (Taras, 2005).

What We Know About Childhood Obesity

The number of overweight and obese children has been increasing dramatically in recent decades, and there is no sign that this trend is ending (Ogden, Flegal, Carroll, & Johnson, 2002). The prevention of childhood obesity is one of the most difficult challenges that pediatric health care providers face (Golan & Crow, 2004). Prevention may be one of the hall marks of pediatric practice, but office-based counseling offers limited leverage to counter broader changes that affect the daily lives of children. Even though prevention and treatment in clinical

settings have been the focus for interventions in the past, researchers now agree that the trends of being overweight arise from changes in social and environmental factors that need to be understood and modified for effective prevention (Hill & Peters, 1998; Hill, Wyatt, Reed, & Peters, 2003). Many factors have been suggested as causes of childhood obesity. Reduction of physical education at school, increased homework loads, campus vending machines, television, larger meal portion sizes, fast-food restaurants, video games, socio-economic backgrounds, among others (Sturm, 2005; Birch & Ventura, 2009).

Childhood obesity is associated with several adverse consequences. Obese children are at high risk for adult obesity, which can lead to diabetes, hypertension, or cardiovascular diseases, as well as, increased morbidity. Between 1999 and 2005 the number of hospitalizations with a diagnosis of obesity for children and youth ages 2 to 19 nearly doubled from 21,743 to 42,429. Total costs for hospitalizations with any diagnosis of obesity increased from $125.9 million in 2001 to $237.6 million in 2005 (Trasande, Liu, Fryer, & Weitzman, 2009). However, treatment for childhood obesity remains largely ineffective.

Gaps in the Literature

Research literature on the prevention of the problem of childhood obesity is limited. Numerous methodological limitations of research exist including small sample sizes that are often convenience rather than representative samples. Wide ranges of age groups have also been utilized with no stratification by age or risk, as well as short intervention and follow-up periods that are often less than 12 months. Studies of childhood obesity mainly focus on the causes of the condition and treatment. However, there seems to be several gaps in literature that are yet

to fully address prevention of the problem. These studies are based on aspects that define research such as methodology, research design, and sampling. To accurately identify the prevention of childhood obesity, there needs to be an understanding of the influences on children's diet, physical activity, and other considerations of obesity. Most research has taken on observational and experimental designs to test ideas and develop new models. But research that integrates the impact of public schools on childhood obesity is scarce and there is a need to establish them.

Future research should fill the gap by focusing on public school populations and should seek to evaluate how physical activity and school support link with addressing childhood obesity. Generally, various research studies indicate that childhood obesity is a problem of the Western industrialized countries (Brown & Summerbell, 2009; Heitmann et al., 2009; Levin, 2009). Therefore, when suggesting interventions, the focus is always on such populations. However, some research indicates that childhood obesity is quickly becoming a global epidemiology (Nowicka, 2007). For successful prevention of childhood obesity there needs to be increased research on physical education activity and the support of the school in addressing childhood obesity.

Physical Education Research Study

The focus in this study is how high school physical education teachers are in a unique position to identify and assist children in maintaining or reducing to normal weight. Physical education teachers are skilled in assessing body composition and administering physical fitness tests (Ward & Bar-Or, 1986). However, there is no research to explore how physical education teachers see

themselves in relation to the increasing childhood obesity problem. This study explores high school physical education teachers' perceptions of childhood obesity and their role in addressing the problem along with their perception of the school's role in addressing childhood obesity.

Chapter III

METHODOLOGY

Design

The design of this study was exploratory, cross-sectional and descriptive. The researcher did not attempt to control or manipulate the variables under study, but rather to describe them.

Participants

Participants were recruited from a target population of New Jersey public high school physical education teachers. The participants were men and women with 1 to 43 years of physical education teaching experience recruited from each New Jersey public high school's district website. The database had approximately 2400 New Jersey public high school physical education teachers. It was speculated that the physical education teachers would fall into any of the following educational categories: Bachelor of Arts (BA), Bachelor of Science (BS), Master of Arts (MA), Master of Science (MS), or higher. In addition, the physical education teachers in the data base were asked to forward the survey to other New Jersey public high school physical education teachers using the snowball sampling technique in order to increase the diversity of the sample and its size. A solicitation letter was emailed to the public high school physical education teachers to volunteer their participation in the study.

Inclusion/Exclusion Criteria

Only New Jersey State certified full-time tenure, tenure-track employed New Jersey public high school physical education teachers were included in this study.

The sample included newly tenure-track employed physical education teachers as well as experienced tenured physical education teachers. The participants were required to read and write English. Non-full-time tenured or non-full-time tenure-track, unemployed, non-certified New Jersey public high school physical education teachers, private high school physical education teachers, and those unable to read and write English were excluded from the study.

Sample Size

There are two different aspects of power analysis. One is to calculate the necessary sample size for a specified power, called '*a priori analysis*', the other is to calculate the power when given a specific sample size, called '*post-hoc analysis*'. Both of these calculations depend on the Type I error rate. The smaller the Type I error rate, the larger the sample size required for the same power. Likewise, the smaller the Type I error rate, the smaller the power for the same sample size (Faul, Erdfelder, Buchner, & Lang, 2009). This is a trade-off between the reliability and sensitivity of the test.

G*Power Analysis for Study Sample Size

An *a priori* G*Power analysis was calculated to determine the sample size appropriate to achieve adequate power applying G*Power 3.1 (Faul, et al., 2009). An alpha (α) set at 0.05, a power of 0.95, and effect size of 0.5 was used to calculate sample size. The minimum sample size required for this study was 176 participants, 88 male PE teachers and 88 female PE teachers (Figure 2).

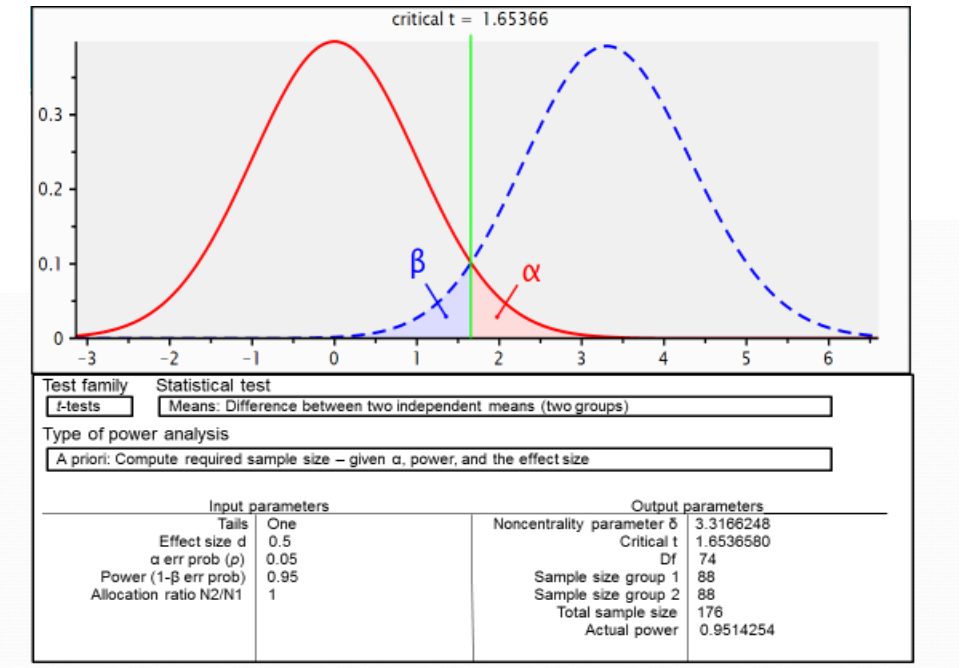


Figure 2. A priori G*Power analysis for sample size. An α level of 0.05, power of 0.95, and effect size of 0.5.

Survey Instrument

A validated survey questionnaire was developed by the principal investigator (PI) specifically for this study utilizing a Delphi panel. The survey questionnaire was constructed by focusing on a compelling theme in the literature review (Price, Desmond, & Stelzer, 1987; Price, Desmond, Ruppert, & Stelzer, 1989; Price, Desmond, & Ruppert, 1990). Instructions for completing the survey questionnaire are at the beginning of the survey. Statements relating to two domains; Physical Education Teachers' Role and School Support are in sections 1 and 2. Demographic information is included in section 3 with an open-ended question at the end completing the survey. A Likert scale was used to score the items in the two domains. Likert scale is a psychometric scale used in self-reports

(survey) to assess attitudes or values. In this instrument, 2 ordinal scales were used. A scale with numerical values from 1 to 5 with options from *Strongly agree, Agree, Undecided, Disagree, and Strongly disagree*, and a scale with numerical values from 1 to 4 with options from *Major role, Moderate role, Minor role, and No role.* The survey has 50 items. After determining the content validity of the survey questionnaire was satisfactory, the final survey questionnaire was ready for administration to the public high school physical education teachers.

Delphi Design

As per Clayton (1997), The PI assembled a group panel facilitation process, with respect to this Delphi technique, that was able to achieve anonymous expert consensus after consisting a multiple round process. The PI gathered a Delphi panel of experts consisting of six individuals chosen on the basis of their individual knowledge, expertise, and experiences in the areas of physical education, education administration, and research. The group of six experts is considered a reasonable size for the Delphi process (Clayton, 1997). Keeney, Hasson & McKenna (2001) suggest choosing a group for the purpose of administering individual knowledge to a specific problem is considered a reasonable form of sampling. The PI achieved this form of grouping for the Delphi process.

Delphi Methodology

The panel was comprised of three New Jersey State certified physical education teachers working in separate private high schools in Newark, New Jersey, one New Jersey public high school principal with an education doctorate that is a survey research expert, one university department chairperson with an education doctorate with research and survey development expertise at Seton Hall

University, and one Professor Emeritus with a doctor of philosophy and author of several articles pertaining to childhood obesity from the University of Toledo. Upon receiving IRB approval from Seton Hall University, the PI emailed the completed survey developed by the PI along with a survey worksheet to each panel member that contained detailed instructions for review of the survey instrument, which included the specific research questions and domains for the research study.

Establishing a consensus standard is crucial as to the level chosen to determine what items are retained or discarded as the rounds of review unfold. It is a good practice for the research team to establish a definition of consensus before data collection begins (Green, Jones, Hughes & Williams, 1999).

Green et al. (1999), suggests an 80% consensus level in acceptance for each of the research questions in the survey instrument is preferred upon review for the Delphi technique. The panel accepted and agreed upon the 80% consensus level. For the first round (Round 1) the panel members were instructed to review each research question from the survey instrument and use the worksheet to analyze and provide responses. Each member of the panel was to complete the review process within two weeks and send the worksheet via email to the PI. The members of the panel reviewed the survey tool independently and had no interaction with any other member of the panel during the review process, which is in accord with the recommendation of Green et al. Once the PI received the recommendations from all the members of the panel and implemented the suggested changes to the survey instrument and revised from Round 1, the updated survey instrument was emailed back to each panel member for a second round of review (Round 2). The same instructions for review were applied in Round

2 as they were in Round 1. The survey instrument received an 80% consensus level upon completion of Round 2. Since consensus was achieved at 80% upon completion of Round 2, no additional rounds were necessary and the Delphi process was completed. Analysis of the results were secured and the creation of the survey instrument was finalized in its current form (Appendix C).

The Delphi technique provided face and content validity. The reliability of the survey instrument was calculated in the analysis of the survey study by applying a Cronbach's alpha.

Procedure

After IRB approval was obtained from Seton Hall University (Appendix A), the principal investigator sent an e-mail letter of invitation to New Jersey public high school physical education teachers calling for participation by eligible physical education teachers as per set criteria. The e-mail letter also contained a link to the survey, which was housed on Seton Hall University's website entitled *"Academic Survey System Tool (ASSET)"* for the participants that chose to be involved (APPENDIX B). In addition, a snowball recruitment process was utilized. The e-mail letter also contained the following clause *"…If you know of another public high school physical education teacher that may be interested in participating in the study please forward this email to him/her."* To avoid duplication of surveys by participants, the status of the survey was set to "enable" in the *ASSET* program. This indicator tool assured that once the participant completed and submitted the survey, it could not be duplicated by the same participant utilizing an email address that was already accessed in the data collection.

Additionally, all participants were informed that they had the option to accept or decline to participate in the online survey questionnaire. Participant's voluntary submission of the completed survey questionnaire was considered as their informed consent. There was no use of monetary or other incentives provided to improve participation. Data was compiled and response items coded for analysis. Figure 3 provides a schematic flow of the procedure followed in the administration of the survey questionnaire and Figure 4 provides an illustration of the flow of the procedure followed for data collection.

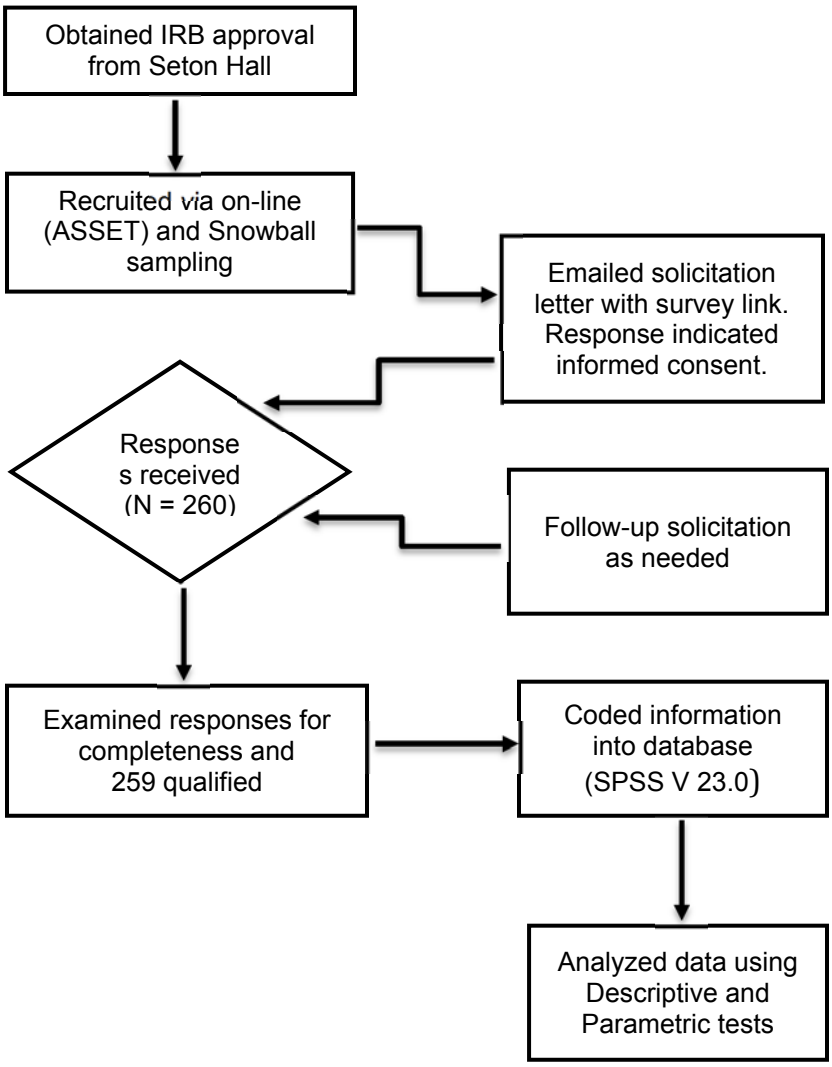


Figure 3. Schematic flow of the procedure followed in the administration of the survey questionnaire.

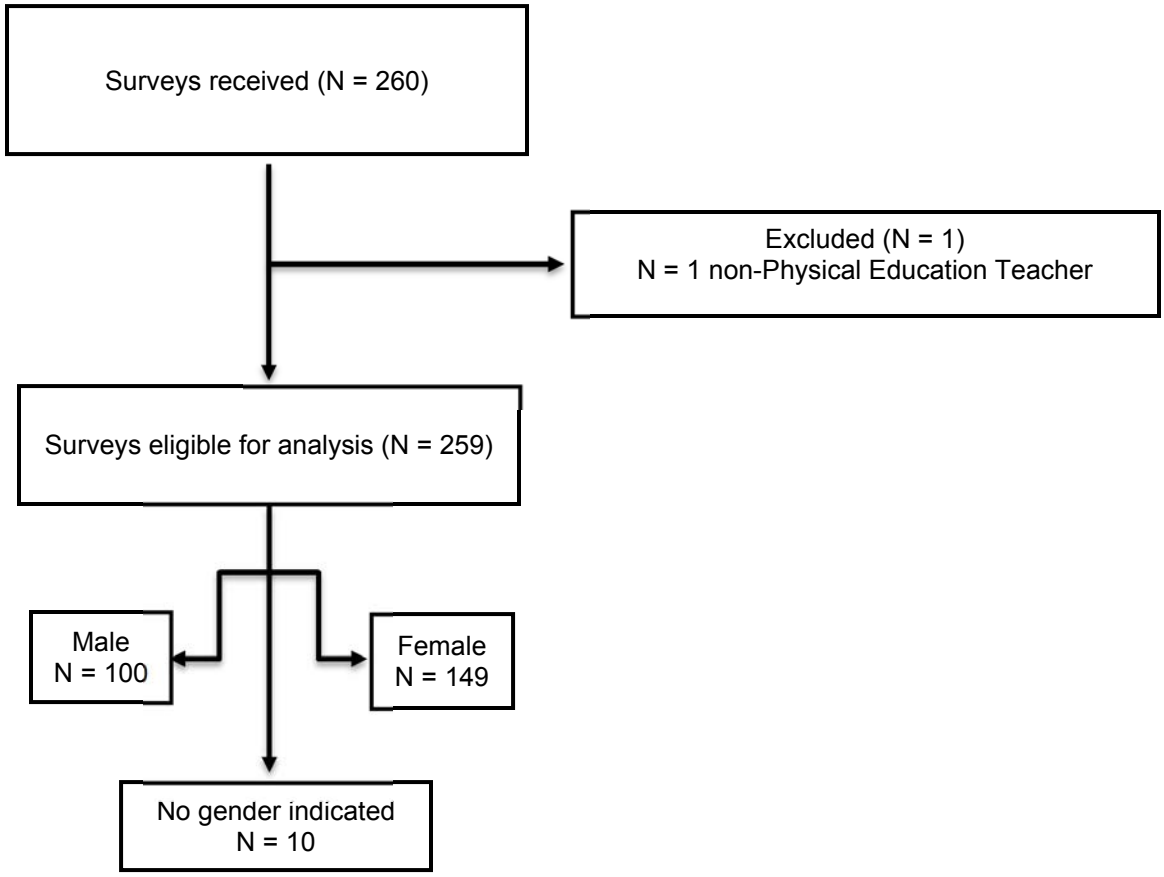


Figure 4. Schematic flow of the procedure followed for the data collection.

Data Analysis

The data analysis consisted of examining the surveys for correctness and completeness, then coding and keying data into IBM SPSS Version 23.0 for Windows, and performing an analysis of descriptive responses according to frequency distributions and descriptive statistics. The reliability of the survey questionnaire, assessed by Cronbach's alpha was 0.930, which is considered excellent (George & Mallery, 2011).

Levene's tests were conducted to assess the assumption of equality of variance. Frequency tables and descriptive statistics were constructed to display results with respect to each of the six research questions. The Levene's test is a test to see whether the variances for 2 or more groups are equal. The Levene's test comes up in the independent samples *t*-test and in the one-way ANOVA as an assumption of both of those procedures. It is testing whether the population variances for the 2 groups in an independent *t*-test, or for 3 or more groups in an ANOVA, are equal in the population. The reason why the Levene's test is used in the *t*-test and the ANOVA, is because it is an assumption of both those tests. So, when those procedures are run, we want to make sure that the assumption appears to be satisfied, or if it is not satisfied, then we want to do what is necessary to make sure that the test performs well.

In the Levene's test, 0.05 is used for alpha (*p* value), which is the most common value to use. You want to compare the *p* value (reported as *Sig.* in SPSS) to 0.05. If the *p* value is < 0.05, then we want to reject the null hypothesis. It means the test is significant and this provides some evidence that the variances may be unequal in the population. If the *p* value is $\geq$ 0.05, that gives us some evidence that the variances are equal in the population.

For interpretation of the tables in Chapter IV, where the Levene's tests were run, if the *p* value is < 0.05, the variances are significantly different, interpret the *bottom row* of results for *t*. If the *p* value is $\geq$ 0.05, the variances are *not* significantly different, interpret the *top row* of results for *t*.

Pairwise comparisons were run to determine which of the years-of-teaching groups were significantly different from each other. As well, either a Games-Howell

post hoc test was run to check homogeneity of variance if there was doubt of it being met, or Tukey's HSD post hoc test was run when sample sizes were equal and homogeneity was met. One survey was discarded from the analysis for not meeting inclusion criteria.

Chapter IV

RESULTS

Participant Demographics

A total of 260 responses were received. Of these, 1 survey respondent did not meet the inclusion criteria thus leaving 259 valid surveys for analysis with descriptive and inferential statistics using SPSS Version 23.0 (IBM Corporation, 2015). There were some answers to questions or statements that not all 259 participants responded. 90% of the survey questions had to be completed to maintain participation in the study for those who did omit some answers to questions or statements.

G*Power Post-hoc Analysis

As seen in Figure 5, a G*Power post-hoc analysis was calculated applying G*Power 3.1 and resulted in a power of 0.989 using an alpha (α) set at 0.05, a sample size of 259, and an effect size of 0.5 (Faul et al., 2009).

As declared, the power is the chance that a study will detect an effect when there is an effect to be detected. Therefore, if the power ends up being high, the probability of making a Type I error goes down (Cohen, 1988). With the power of 0.989, this study is of high power.

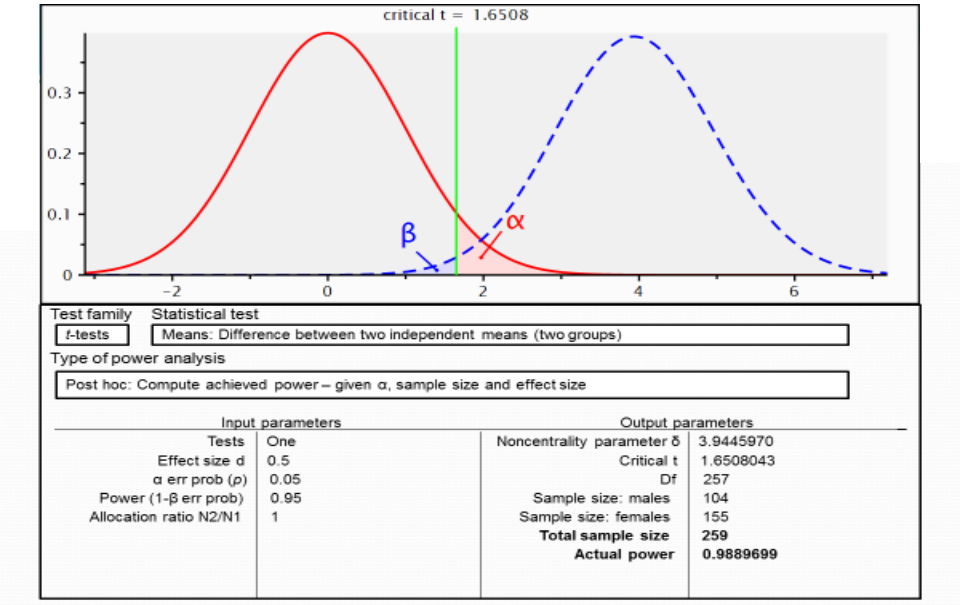


Figure 5. G*Power Post-hoc analysis for power. An α level of 0.05, sample size of 259, and an effect size of 0.5.

More than half of the participants were above the age of 41 years. 13.1% (n = 34) were less than 30, 33.5% (n = 87) were between 31 and 40, 23.8% (n = 62) were between 41 and 50, 24.6% (n = 64) were between 51 and 60, and 3.5% (n = 9) were older than 61. Four respondents did not indicate an age. In terms of gender, 40.2% (n = 100) were males and 59.8% (n = 149) were females. Ten respondents did not indicate a gender.

As far as years of teaching high school PE, 27% have 1 to 9 years of teaching (n = 69), 27.3% have 10 to 15 years of teaching (n = 70), 22.7% have 16-23 years of teaching (n = 58), and 23% have 24 to 43 years of teaching (n = 59). Three respondents did not indicate the number of years of teaching high physical education.

When it comes to the high school PE teacher's educational background, all respondents possessed a bachelor's (BA or BS) degree (n = 259, 100%). 133 respondents possessed a master's (MA or MS) degree (51%) and 2 respondents possessed a doctoral (Ph.D. or Ed.D.) degree (<1%).

This chapter presents the results of the analyses of all valid responses. These findings are organized in response to each of the six research questions and the open-ended question.

Research Findings

Research Question 1. Do high school physical education teachers perceive childhood obesity as a serious health risk?

Perceptions of childhood obesity being a "serious health risk" were assessed with responses to the questions listed in Table 1. High school PE teachers more frequently than not perceive childhood obesity to be a serious health risk (indicated by "Strongly agree" and "Agree" responses) In addition, high school PE teachers more frequently perceive that obese children will not outgrow their obesity (indicated by "Strongly disagree" and "Disagree" responses). These findings are supported by the percentages of level of agreement to the questions about perceptions of obesity as a serious health risk, as represented by the descriptive statistics shown in Table 2 that lend further support to this finding; e.g., the modal response to questions indicating the perception of childhood obesity as a serious health risk were "Strongly agree" (5s) and "Agree" (4s). Research question 1 not only surveyed high school physical education teachers about their perceptions of the severity of childhood obesity, but also their perceptions about the causes of childhood obesity.

Table 1

Perceptions of Childhood Obesity as a Serious Health Risk

	N	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1a. Having a BMI-for-age within normal limits is important to the health of children.	258	34.1	47.7	10.9	6.2	1.2
1e. Being overweight affects students' ability to engage in moderate to vigorous physical activities.	257	66.5	27.2	2.7	3.5	
1f. Being overweight affects students' ability to be as active as the other students in their class.	258	59.3	32.6	1.9	6.2	
1g. Physical education is involved in effecting the health of overweight students.	257	48.6	40.1	5.8	4.3	1.2
1n. Most obese children will outgrow their obesity.	257	2.7	1.2	14.4	51.8	30.0
1o. With proper guidance, most obese children are able to lose significant amounts of weight.	256	16.8	48.8	23.0	9.0	2.3
1p. with proper guidance, most obese children are able to maintain their weight loss.	253	12.6	50.2	26.1	9.5	1.6

Table 2

Responses Indicating Perceptions of Childhood Obesity as a Serious Health Risk

	N					Standard		
	Valid	Missing	Mean	Median	Mode	Deviation	Min	Max
1a. Having a BMI-for-age within normal limits is important to the health of children.	258	1	4.07	4	4	.894	1	5
1e. Being overweight affects students' ability to engage in moderate to vigorous physical activities.	257	2	4.57	5	5	.716	2	5
1f. Being overweight affects students' ability to be as active as the other students in their class.	258	1	4.45	5	5	.813	2	5
1g. Physical Education is involved in effecting the health of overweight students.	257	2	4.31	4	5	.854	1	5
1n. Most obese children will outgrow their obesity.	257	2	1.95	2	2	.858	1	5
1o. With proper guidance, most obese children are able to lose significant amounts of weight.	256	3	3.69	4	4	.935	1	5
1p. With proper guidance, most obese children are able to maintain their weight loss.	253	6	3.63	4	4	.880	1	5

The list of questions assessing perceptions about the causes of obesity are shown in Table 3. High school PE teachers perceive three causes of childhood obesity (i.e., too little physical activity, the consumption of too many calories, and eating the wrong types of foods) to play a major role in childhood obesity. Hormone imbalances and heredity are perceived to play a more moderate role. The descriptive statistics in Table 4 lend additional support to this finding regarding perceptions of the causes of childhood obesity.

Table 3

Perceptions of the Causes of Obesity

	N	Major role	Moderate role	Minor role	No role
14a. What role does too little physical activity play in causing obesity?	253	68.4	28.1	3.2	0.4
14b. What role does consuming too many calories play in causing obesity?	253	91.7	8.3		
14c. What role does eating the wrong types of food play in obesity?	254	86.6	13.0	0.4	
14d. What role does hormone imbalance play in causing obesity?	254	16.9	47.2	34.6	1.2
14e. What role does heredity play in causing obesity?	255	23.1	54.9	20.4	1.6

Table 4

Responses Indicating Perceptions of the Causes of Obesity

	N					Standard		
	Valid	Missing	Mean	Median	Mode	Deviation	Min	Max
14a. What role does too little physical activity play in causing?	253	6	3.64	4	4	.563	1	4
14b. What role does consuming too many calories play in causing obesity?	253	6	3.92	4	4	.276	3	4
14c. What role does eating the wrong types of food play in obesity?	254	5	3.86	4	4	.357	2	4
14d. What role does hormone imbalance play in causing obesity?	254	5	2.80	3	3	.724	1	4
14e. What role does heredity play in causing obesity?	255	4	3.00	3	3	.707	1	4

Research Question 2. What are high school physical education teachers' perceptions regarding their role in childhood obesity?

Table 5 consists of the questions that were surveyed to assess high school physical education teachers' perceptions of the role of physical education in addressing childhood obesity. High school PE teachers strongly to moderately agree that physical education plays a role in addressing childhood obesity. Regarding the question of the degree to which high school physical education teachers perceive that physical education is the appropriate venue to prevent weight problems in children, there were more "Undecided" and "Disagree" responses than in any other questions about the role of PE in obesity and weight control.

Table 5

Perceptions of PE Teacher's Role in Childhood Obesity

	N	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1b. Childhood obesity is a major issue facing young people today.	256	69.92	28.91	1.17		
1c. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily.	259	68.34	29.34	1.16	1.16	
1d. Student's level of physical activity affects their ability to lead a healthy lifestyle.	259	75.68	23.17	0.77	0.39	
1h. Physical education should inform students of the health risks of child and adolescent obesity.	258	70.54	27.52	1.94		
1i. Physical education should inform parents of the health risks of child and adolescent obesity.	255	47.45	35.69	12.16	4.31	0.39
1j. Physical education is the place to prevent weight problems in children as most children can be reached before a serious problem develops.	256	26.17	37.50	16.41	16.41	3.52
1k. Physical education classes should be designed to offer life-long habits of exercise that will assist in weight control.	255	64.71	34.12	1.18		
1l. Physical education classes should be designed to offer life-long nutritional habits that would assist in weight control.	259	53.28	37.84	6.18	2.32	0.39
1m. Physical education is an appropriate venue to address childhood obesity.	256	50.36	42.19	5.08	1.56	0.78

The descriptive statistics in Table 6 further support these findings and show that the modal response to questions concerning physical education is “Strongly agree”, except for the question concerning physical education as the appropriate venue to prevent weight problems in children. In this question, the modal response is “Agree” suggesting that while physical education teachers strongly agree that physical education plays a role in addressing childhood obesity, they are in less agreement that physical education is the appropriate venue for preventing weight problems in children.

Table 6

Responses Indicating Perceptions of PE Teacher’s Role in Childhood Obesity

	N							
	Valid	Missing	Mean	Median	Mode	Standard Deviation	Min	Max
1b. Childhood obesity is a major issue facing young people today.	256	3	4.69	5	5	0.49	3	5
1c. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity.	259	0	4.65	5	5	0.57	2	5
1d. Student’s level of physical activity affects their ability to lead a healthy lifestyle.	259	0	4.74	5	5	0.48	2	5
1h. Physical education should inform students of the health risks of child and adolescent obesity.	258	1	4.69	5	5	0.51	3	5
1i. Physical education should inform parents of the health risks of child and adolescent obesity.	255	4	4.25	4	5	.086	1	5
1j. Physical education is the place to prevent weight problems in children as most children can be reached before a serious problem develops.	256	3	3.66	4	4	1.14	1	5
1k. Physical education classes should be designed to offer life-long habits of exercise that will assist in weight control.	255	4	4.64	5	5	.051	3	5
1l. Physical education classes should be designed to offer life-long nutritional habits that would assist in weight control.	259	0	4.41	5	5	0.74	1	5
1m. Physical education is an appropriate venue to address childhood obesity.	256	3	4.40	5	5	0.73	1	5

Research Question 3. Do male and female high school physical education teachers differ in their perceptions of childhood obesity?

Table 7 shows that of the 259 survey responses, 149 indicated they were female, 100 indicated they were male, and 10 respondents did not indicate a gender. For those who did not indicate gender, their surveys were not included for this portion of the study.

Table 7

Survey Responses from PE Teachers Identifying Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	100	38.6	40.2	40.2
Female	149	57.5	59.8	100.0
Valid Total	249	96.1	100.0	
Missing	10	3.9		
Total	259	100.0		

Independent sample *t*-tests were performed to determine differences between male and female PE teachers regarding their perceptions of childhood obesity. The independent *t-tests* reveals the data for the questions regarding perceptions of childhood obesity according to gender difference. One question that was statistically significant showed that more male PE teachers perceive that physical education is involved in effecting the health of overweight students (M = 4.46, SE = .075) than from female PE teachers (M = 4.19, SE = .076). This difference, 0.275, BCa 95% CI [0.057, 0.494], was significant t (245) = 2.48, p = .014; and indicated by the effect size, r = .156. As can be seen in Table 8, no other

significant differences between male and females were found with regards to perceptions of childhood obesity.

Table 8

PE Gender Difference in the Rating of Statements About Perceptions of Childhood Obesity

		Levene's Test		t-test for Equality of Means						
		F	Sig	t	df	Sig (2-tailled)	Mean Diff	Std Err Diff	95% Confidence Interval of the Difference Lower	Upper
1a. Having a BMI-for-age within normal limits is important to the health of children.	Equal Variances Assumed	.141	.708	-1.012	246	.313	-.177	.116	-.346	.111
1e. Being overweight affects students' ability to engage in moderate to vigorous physical activities.	Equal Variances Assumed	1.176	.279	-.751	246	.453	-.069	.091	-.249	.111
1f. Being overweight affects students' ability to be as active as the other students in their class.	Equal Variances Assumed	.426	.514	-.539	246	.590	-.056	.103	-.259	.147
1g. Physical education is involved in effecting the health of overweight students.	Equal Variances Assumed	.546	.461	2.480	245	.014	.275	.111	.057	.494
1n. Most obese children will outgrow their obesity.	Equal Variances Assumed	1.642	.201	.925	245	.356	.098	.106	-.111	.307
1o. With proper guidance, most obese children are able to lose significant amounts of weight.	Equal Variances Assumed	.114	.736	.735	244	.463	.090	.122	-.151	.331
1p. With proper guidance, most obese children are able to maintain their weight loss.	Equal Variances Assumed	1.910	.168	1.408	241	.160	.163	.115	-.065	.390

Independent sample *t*-tests were performed to determine differences between male and female PE teachers regarding their perceptions of the causes of childhood obesity. Table 9 reveals the data for the questions regarding causes of childhood obesity according to gender differences. Only one question approached statistical significance, showing that more male PE teachers (*M* =

3.94, *SE*= .024) perceive that consuming too many calories plays a role in causing obesity than female PE teachers (*M* = 3.90, *SE* = .024). This difference, 0.035, BCa 95% CI [-0.032, 0.103], was significant *t* (235.17) = 1.028, *p* = .046; and indicated by the effect size, *r* = 0.067.

Table 9

PE Gender Difference Indicating Perceptions of Causes of Childhood Obesity

		Levene's Test		t-test for Equality of Means						
		F	Sig	t	df	Sig (2-tailled)	Mean Diff	Std Err Diff	95% Confidence Interval of the Difference Lower	Upper
14a. What role does too little physical activity play in causing obesity?	Equal Variances Assumed	.325	.569	-.094	243	.925	-.007	.073	-.150	.136
14b. What role does consuming too many calories play in causing obesity?	Equal Variances Assumed	4.025	.046	.988	243	.324	.035	.036	-.035	.106
	Equal Variances Not Assumed			1.028	235	.305	.035	.034	-.032	.103
14c. What role does eating the wrong types of food play in obesity?	Equal Variances Assumed	1.983	.160	.749	244	.454	.035	.047	-.057	.128
14d. What role does hormone imbalance play in causing obesity?	Equal Variances Assumed	.578	.448	.415	244	.678	.039	.094	-.147	.225
14e. What role does heredity play in causing obesity?	Equal Variances Assumed	1.484	.224	1.560	245	.120	.142	.091	-.037	.320

Independent sample *t*-tests were performed to determine differences between male and female PE teachers regarding their perceptions of their role in impacting childhood obesity. Table 10 reveals the data for the questions regarding perception of childhood obesity according to gender difference. Five of the nine separate tests were found to be statistically significant.

Table 10

PE Gender Difference Indicating Perceptions of Their Role in Impacting Childhood Obesity

		Levene's Test		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig	t	df	Sig (2-tailled)	Mean Diff	Std Err Diff	Lower	Upper
1b. Childhood obesity is a major issue facing young people today.	Equal Variances Assumed	10.936	.001	1.798	243	.073	.115	.064	-.011	.241
	Equal Variances Not Assumed			1.836	224	.068	.115	.063	-.008	.238
1c. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily.	Equal Variances Assumed	18.772	.000	3.071	247	.002	.223	.073	.080	.366
	Equal Variances Not Assumed			3.174	234	.002	.223	.070	.0385	.361
1h. Physical education should inform students of the health risks child and adolescent obesity.	Equal Variances Assumed	30.224	.000	2.703	246	.007	.175	.065	.048	.303
	Equal Variances Not Assumed			2.861	243	.005	.175	.061	.055	.296
1i. Physical education should inform parents of the health risks of child and adolescent obesity.	Equal Variances Assumed	4.112	.044	2.615	244	.009	.295	.111	.076	.514
	Equal Variances Not Assumed			2.792	240	.006	.295	.106	.087	.503
1j. Physical education is the place to prevent weight problems in children as most children a be reached before a serious problem develops.	Equal Variances Assumed	12.104	.001	3.787	244	.000	.548	.145	.263	.834
	Equal Variances Not Assumed			3.895	231	.000	.548	.141	.271	.826

The results of these tests are as follows:

Question 1b: More male PE teachers (*M* = 4.75, *SE* =.046) perceive that childhood obesity is a major issue facing young people today than female PE teachers (*M* = 4.63, *SE* = .042). This difference, 0.115, BCa 95% CI [-0.008, 0.238],

was significant *t* (224.71) = 1.836, *p* = .001; and indicated by the effect size, *r* = 0.122.

Question 1c: More male PE teachers (*M* = 4.78, *SE* =.050) perceived that children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily than female PE teachers (*M* = 4.56, *SE* = .049). This difference, 0.223, BCa 95% CI [0.085, 0.361] was significant *t* (234.27) = 3.174, *p* = .000; and indicated by the effect size, *r* = 0.203.

Question 1h: More male PE teachers (*M* = 4.79, *SE* = .041) perceive that physical education should inform students of the health risks of child and adolescent obesity than female PE teachers (*M* = 4.61, *SE* = .046). This mean difference, 0.175, BCa 95% CI [0.055, 0.296] was significant *t* (243.96) = 2.861, *p* = .000; and indicated by the effect size, *r* = 0.180.

Question 1i: More male PE teachers (*M* = 4.42, *SE* = .072) perceive that physical education should inform parents of the health risks of child and adolescent obesity than female PE teachers (*M* = 4.13, *SE* = .077). This mean difference, 0.295, BCa 95% CI [0.087, 0.503] was significant *t* (240.19) = 2.792, *p* = .044.

Question 1j: More male PE teachers (*M* = 4.75, *SE* = .046) perceive that PE is the place to prevent weight problem in children as most children can be reached before a serious problem develops than female PE teachers (*M* = 4.63, *SE* =.042). This difference, 0.548, BCa 95% CI [0.271, 0.826], was significant *t* (231.61) = 3.895. *p* = .001, and indicated by the effect size, *r* = 0.248.

As can be seen in Table 11, no other significant differences between males and females were found with regard to their perceptions of their role in impacting childhood obesity.

Table 11

PE Gender Difference Indicating Perceptions of Their Role in Impacting Childhood Obesity

		Levene's Test		t-test for Equality of Means						
		F	Sig	t	df	Sig (2-tailled)	Mean Diff	Std Err Diff	95% Confidence Interval of the Difference Lower	Upper
1d. Student's level of physical activity affects their ability to lead a healthy life.	Equal Variances Assumed	.053	.819	-.080	247	.937	-.005	.062	-.128	.118
1k. Physical education classes should be designed to offer life-long habits of exercise that will assist in weight control.	Equal Variances Assumed	.003	.960	-.106	244	.916	-.007	.066	-.137	.123
1l. Physical educations classes should be designed to offer life-long nutritional habits that would assist in weight control.	Equal Variances Assumed	.598	.440	.968	247	.334	.094	.097	-.097	.286
1m. Physical education is an appropriate venue to address childhood obesity.	Equal Variances Assumed	1.025	.312	2.182	244	.030	.201	.092	.020	.383

Research Question 4. Does the length of time one has been a physical education teacher affect perceptions of childhood obesity?

An inspection of Table 12 shows that 27.0 % of respondents indicated they have 1-9 years of teaching experience (for the purposes of this study, these respondents will be referred to as "early career"); 27.3% of respondents indicated they have 10-15 years of teaching experience ("middle career"); 22.7% of respondents indicated they have 16-23 years of teaching experience ("late career"); and 23.0% of respondents indicated they have 24 or more years of teaching experience ("near retirement"). Figure 6 indicates that the PE teachers were almost evenly distributed across the 4 years-of-teaching categories.

Table 12

Survey Responses for Years Teaching Physical Education

Years Teaching	Frequency	Percent	Valid Percent	Cumulative Percent
1-9	69	26.6	27.0	27.0
10-15	70	27.0	27.3	54.3
16-23	58	22.4	22.7	77.0
24 plus	59	22.8	23.0	
Valid Total	256	98.8		
Missing	3	1.2		
Total	29	100.0		

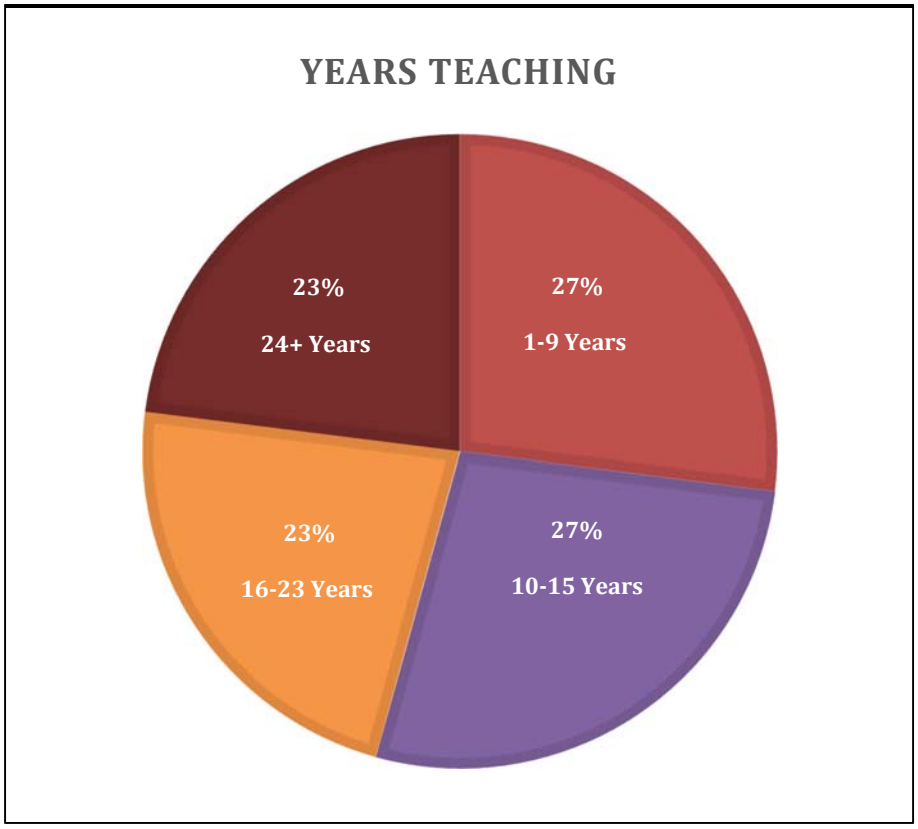


Figure 6. Years of teaching physical education. This figure illustrates the years of teaching by category and percentages per category.

An analysis of variance (ANOVA) was performed on the data to determine if there are differences in high school PE teachers' perceptions of childhood obesity amongst the four years-of-teaching categories. Results of this test showed there were no significant differences in their perceptions of childhood obesity given how many years they had taught (Table 13).

Table 13

PE Teachers' Perceptions of Childhood Obesity Amongst the 4 Years-of-Teaching Categories

		Sum of Squares	df	Mean Square	F	Sig
1a. Having a BMI-for-age within normal limits is important to the health of children.	Between Groups	1.239	3	.413	.514	.673
	Within Groups	201.491	251	.803		
	Total	202.730	254			
1e. Being overweight affects students' ability to engage in moderate to vigorous physical activities.	Between Groups	1.977	3	.659	1.353	.258
	Within Groups	122.281	251	.487		
	Total	124.258	254			
1f. Being overweight affects students' ability to be as active as the other students in their class.	Between Groups	1.224	3	.408	.632	.595
	Within Groups	162.008	251	.645		
	Total	163.232	254			
1g. Physical education is involved in effecting the health of overweight students.	Between Groups	.510	3	.170	.236	.871
	Within Groups	179.919	250	.720		
	Total	180.429	253			
1n. Most obese children will outgrow their obesity.	Between Groups	2.006	3	.669	.997	.395
	Within Groups	167.573	250	.670		
	Total	169.579	253			
1o. With proper guidance, most obese children are able to lose significant amounts of weight.	Between Groups	1.877	3	.626	.716	.543
	Within Groups	217.546	249	.874		
	Total	219.423	252			
1p. With proper guidance, most obese children are able to maintain their weight loss.	Between Groups	3.175	3	1.058	1.385	.248
	Within Groups	187.961	246	.764		
	Total	191.136	249			

An analysis of variance (ANOVA) was performed to determine if there are differences in high school physical education teachers' perceptions of the causes of obesity amongst the four years-of-teaching categories. No significant differences were found in their perceptions of the causes of childhood obesity given how many years they had taught (Table 14).

Table 14

PE Teachers' Perceptions of the Causes of Childhood Obesity Amongst the 4 Years-of-Teaching Categories

		Sum of Squares	df	Mean Square	F	Sig
14a. What role does too little physical activity play in causing obesity?	Between Groups	.984	3	.328	1.036	.377
	Within Groups	78.583	248	.317		
	Total	79.567	251			
14b. What role does consuming too many calories play in causing obesity?	Between Groups	.061	3	.005	.069	.997
	Within Groups	19.234	248	.078		
	Total	19.295	251			
14c. What role does eating the wrong types of food play in obesity?	Between Groups	.525	3	.175	1.376	.250
	Within Groups	31.634	249	.127		
	Total	32.159	252			
14d. What role does hormone imbalance play in causing obesity?	Between Groups	.675	3	.225	.4324	.736
	Within Groups	132.044	249	.530		
	Total	132.719	252			
14e. What role does heredity play in causing obesity?	Between Groups	1.539	3	.513	1.030	.380
	Within Groups	124.445	250	.498		
	Total	125.984	253			

The following ANOVA was performed to determine if there are differences in high school physical education teachers' perceptions of their role in impacting childhood obesity. As shown in Table 15, the respondents' perceptions about

childhood obesity being a major issue facing young people $F(3, 249) = 3.642$, $p = .014$ and the amount of physical activity (60 minutes or more of moderate to vigorous physical activity daily) $F(3, 252) = 4.098$, $p = .007$ were significantly affected by years of teaching experience.

Table 15

PE Teachers' Perceptions of Their Role in Impacting Childhood Obesity

		Sum of Squares	df	Mean Square	F	Sig
1b. Childhood obesity is a major issue facing young people today.	Between Groups	2.524	3	.841	3.624	.014
	Within Groups	57.808	249	.232		
	Total	60.332	252			
1c. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily.	Between Groups	3.831	3	1.277	4.098	.007
	Within Groups	78.529	252	.312		
	Total	82.360	255			
1d. Student's level of physical activity affects their ability to lead a healthy lifestyle.	Between Groups	.922	3	.307	1.323	.267
	Within Groups	58.543	252	.232		
	Total	59.465	255			
1h. Physical education should inform students of the health risks of child and adolescent obesity.	Between Groups	1.092	3	.364	1.431	.234
	Within Groups	63.810	251	.254		
	Total	64.902	254			
1i. Physical education should inform parents of the health risks of child and adolescent obesity.	Between Groups	3.262	3	1.087	1.466	.224
	Within Groups	183.988	248	.742		
	Total	187.250	251			
1j. Physical education is the place to prevent weight problems in children as most children can be reached before a serious problem develops.	Between Groups	.263	3	.088	.068	.977
	Within Groups	319.848	249	1.285		
	Total	320.111	252			
1k. Physical education classes should be designed to offer life-long habits of exercise that will assist in weight control.	Between Groups	.295	3	.098	.380	.768
	Within Groups	64.118	252	.259		
	Total	64.413	255			
1l. Physical education classes should be designed to offer life-long nutritional habits that would assist in weight control.	Between Groups	.620	3	.207	.369	.776
	Within Groups	141.313	252	.561		
	Total	141.933	255			
1m. Physical education is an appropriate venue to address childhood obesity.	Between Groups	.759	3	.253	.471	.703
	Within Groups	133.715	249	.573		
	Total	134.474	252			

A Games-Howell post hoc test was used to compare all years-of-teaching category pairs to determine the difference between the category pair's responses

to “childhood obesity is a major issue facing young people today.” The Mean Difference (I - J) was calculated for all years-of-teaching category pairs (Table 16).

Table 16

Childhood Obesity is a Major Issue Facing Young People Today

Years Teaching (Categories) (I-J)	(I)	Mean Diff (I-J)	Standard Error	*p*	95% LL	95% UL
1-9	10-15	.198*	.076	.048	.00	.39
	16-23	.296*	.084	.010	.05	.49
	24 plus	.168	.080	.162	-.04	.38
10-15	1-9	-1.9	.076	.048	-.39	.00
	16-23	.071	.094	.872	-.17	.32
	24 plus	-.030	.091	.988	-.27	.21
16-23	1-9	269*	.084	.010	-.49	-.05
	10-15	-.071	.094	.872	-.32	.17
	24 plus	-.101	.098	.731	-.36	.15
24 plus	1-9	-.168	.080	.162	.38	.04
	10-15	.030	.091	.988	.21	.27
	16-23	.101	.098	.731	-.15	.36

*The mean difference is significant at the 0.05 level.

Table 16 reveals that PE teachers that have taught 1-9 years rated “childhood obesity is a major issue facing young people today” on average 0.198 higher than PE teachers that have taught 10-15 years and 0.269 higher than PE teachers that have taught 16-23 years (Table 16). A Pairwise Comparison confirms that the 1-9 years-of-teaching category rate that “childhood obesity is a major issue facing young people today higher than those from the 10-15 and the 16-23 years-of-teaching groups (Figure 7).

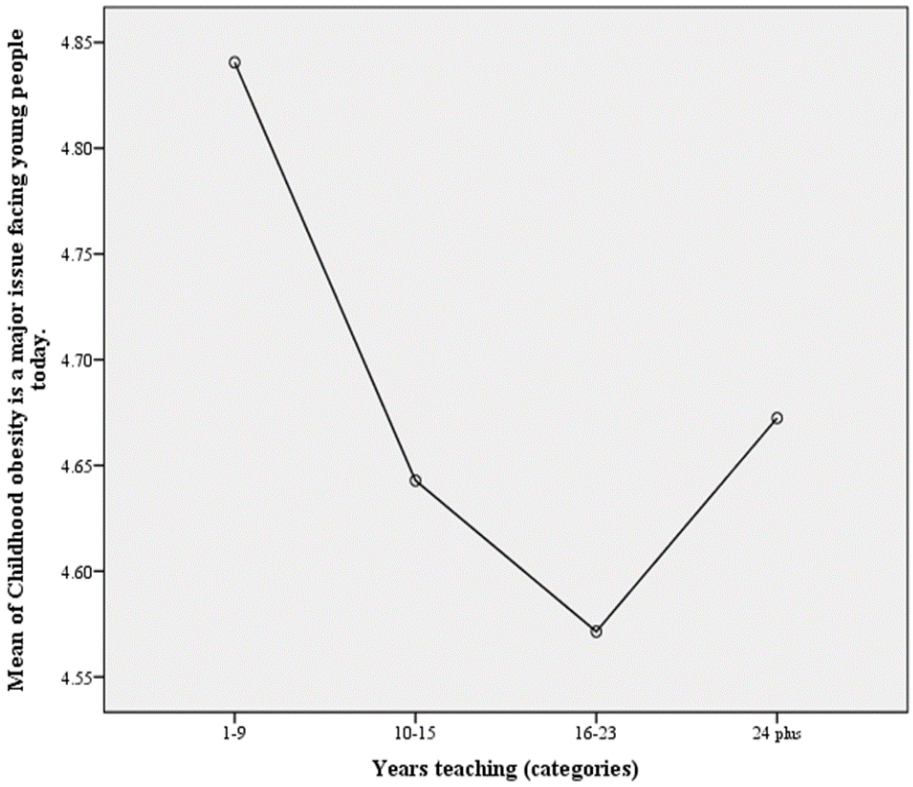


Figure 7. Childhood obesity is a major issue facing young people today. Average rating per years-of-teaching category.

Another Games-Howell post hoc test was used to compare all years-of-teaching category pairs to determine the difference between the category pair's responses to "children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily." Again, the Mean Difference (I - J) was calculated for all years-of-teaching category pairs (Table 17).

Table 17

Children and Adolescents Should Have 60 Minutes or More of Moderate to Vigorous Physical Activity Daily

Years Teaching (Categories) (I-J)	(I)	Mean Diff (I-J)	Standard Error	*p*	95% LL	95% UL
1-9	10-15	.154	.087	.291	-.07	.38
	16-23	.334*	.099	.006	.07	.59
	24 plus	.071	.088	.854	-.16	.30
10-15	1-9	-.154	.087	.291	-.38	.07
	16-23	.180	.111	.372	.11	.47
	24 plus	-.083	.102	.845	-.35	.18
16-23	1-9	.334*	.099	.006	-.59	-.07
	10-15	-.180	.111	.372	-.47	.11
	24 plus	-.264	.112	.095	-.56	.03
24 plus	1-9	-.071	.854	.854	-.30	.16
	10-15	.083	.845	.845	-.18	.35
	16-23	.264	.095	.095	-.03	.56

*The mean difference is significant at the 0.05 level.

Table 17 displays that PE teachers that have taught 1-9 years rated “children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily” on average 0.334 higher than teachers that have taught 16-23 years.

A Pairwise Comparison confirms that the 1-9 years-of-teaching category rate that children and adolescents should have 60 minutes of more of moderate to vigorous physical activity daily higher than from the 16-23 years-of-teaching category (Figure 8).

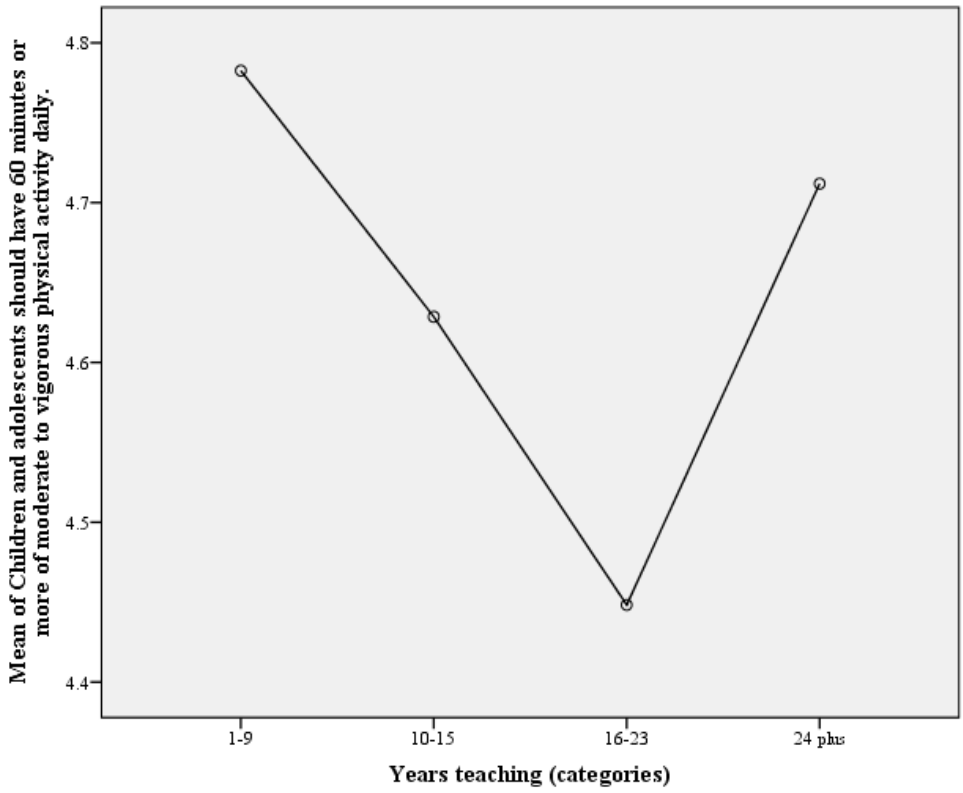


Figure 8. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily. Average rating per years-of-teaching category.

Research Question 5. What is the school's role in addressing childhood obesity as perceived by high school physical education teachers?

Independent sample *t*-tests were performed to determine differences between male and female PE teachers regarding their perceptions of the school's role in addressing childhood obesity. Table 18 reveals the data for the questions regarding perception of the school's role in addressing childhood obesity. Four of the seven tests were found to be significant.

Table 18

PE Teacher Gender Difference Indicating Perceptions of the School's Role in Addressing Childhood Obesity

		Levene's Test		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig	t	df	Sig (2-tailled)	Mean Diff	Std Err Diff	Lower	Upper
2a. Physical education is an important program in my school's education curriculum.	Equal Variances Assumed	.871	.351	1.345	243	.180	.224	.167	-.104	.111
2b. My school is involved in addressing the health of overweight students.	Equal Variances Assumed	.112	.738	3.868	243	.000	.531	.137	.260	.111
2c. My school should do more to alleviate childhood obesity	Equal Variances Assumed	1.399	.238	1.642	242	.102	.177	.108	-.035	.147
2d. My school should address weight problems in children to help avoid the health risks of obesity.	Equal Variances Assumed	.000	.984	1.335	243	.183	.135	.101	-.064	494
2e. My school's meal program meets basic nutritional requirements.	Equal Variances Assumed	.025	.875	2.276	243	.024	.331	.145	.044	.307
2f. Teachers are supportive of the school as a place to help children reduce obesity.	Equal Variances Assumed	.792	.374	2.716	243	.007	.327	.120	.090	.331
2g. Parents are supportive of the school as a place to help children reduce obesity.	Equal Variances Assumed	1.215	.272	2.281	241	.023	.251	.110	.034	.468

The results of these tests are as follows:

Questions 2b: More male PE teachers (*M* = 3.73, *SE* = 0.129) perceived that the school is involved in addressing the health of overweight students than female PE teachers (*M* = 3.51, *SE* = 0.105). The difference, 0.531, BCa 95% CI [0.260, 0.801], was significant *t* (243) = 3.868, *p* = .000; and indicated by the effect size, *r* = 0.241

Question 2e: More male PE teachers (*M* = 3.37, *SE* = 0.112) perceived that the school meal program meets basic nutritional needs than female PE teachers (*M* = 3.04, *SE* = 0.092). The difference, 0.331, BCa 95% CI [0.044, 0.617], was significant *t* (243) = 2.276, *p* = .024; and indicated by the effect size, *r* = 0.144.

Question 2f: More male PE teachers (*M* = 3.22, *SE* = 0.093) perceived that the school's teachers are supportive of the school as a place to help children reduce obesity than female PE teachers (*M* = 2.90, *SE* = 0.076). The difference, 0.327, BCa 95% CI [0.090, 0.563], was significant *t* (243) = 2.716, *p* = .007; and indicated by the effect size, *r* = 0.172.

Question 2g: More male PE teachers (*M* = 2.80, *SE* = 0.083) perceived that parents are supportive of the school as a place to help children reduce obesity than female PE teachers (*M* = 2.55, *SE* = 0.070). The difference, 0.251, BCa 95% CI [0.034, 0.468], was significant *t* (241) = 2.281, *p* = .023; and indicated by the effect size, *r* = 0.145.

An analysis of variance (ANOVA) was performed to determine if there are differences in high school physical education teachers' perceptions about the school's role in addressing childhood obesity amongst the four years-of-teaching categories. A review of Table 19 indicates that the results of this test showed there were no significant differences in their perceptions of the school's role in addressing childhood obesity given how many years they had taught. No significant differences were found.

Table 19

PE Teachers' Perceptions of the School's Role in Addressing Childhood Obesity

		Sum of Squares	df	Mean Square	F	Sig
2a. Physical education is an important program in my school's education curriculum.	Between Groups	6.938	3	2.313	.514	.246
	Within Groups	411.014	247	1.664		
	Total	417.952	250			
2b. My school is involved in addressing the health of overweight students.	Between Groups	3.927	3	1.309	1.353	.343
	Within Groups	289.834	247	1.173		
	Total	293.761	250			
2c. My school should do more to alleviate childhood obesity.	Between Groups	.107	3	.036	.632	.985
	Within Groups	169.449	246	.689		
	Total	169.556	249			
2d. My school should address weight problems in children to help avoid the health risks of obesity.	Between Groups	3.213	3	1.071	.236	.148
	Within Groups	147.201	247	.596		
	Total	150.414	250			
2e. My school's meal program meets basic nutritional requirements.	Between Groups	6.202	3	2.067	.997	.189
	Within Groups	318.738	247	1.290		
	Total	324.940	250			
2f. Teachers are supportive of the school as a place to help children reduce obesity.	Between Groups	4.597	3	1.532	.716	.151
	Within Groups	212.303	247	.860		
	Total	216.900	250			
2g. Parents are supportive of the school as a place to help children reduce obesity.	Between Groups	3.752	3	1.251	1.385	.155
	Within Groups	173.910	245	.710		
	Total	177.662	248			

An analysis of variance (ANOVA) was performed to determine if there are differences in high school physical education teachers' perceptions about the role of specific school personnel, including school nurse, health teacher, physical education teacher, guidance counselor, and the principal, in addressing childhood obesity amongst the four years-of-teaching categories.

As shown in Table 20, the respondents' perceptions about the role the school nurse plays in addressing childhood obesity $F(3, 248) = 2.850$, $p = .038$ and the role the counselor plays in addressing childhood obesity $F(3, 2247) = 3.455$, $p = .017$ were significantly affected by years of teaching experience.

Table 20

PE Teachers' Perceptions of the Role School Personnel Plays in Addressing Childhood Obesity

		Sum of Squares	df	Mean Square	F	Sig
15a. What role does the school nurse play in addressing childhood obesity?	Between Groups	6.250	3	2.083	1.036	.038
	Within Groups	181.317	248	.731		
	Total	187.567	251			
15b. What role does the health teacher play I addressing childhood obesity?	Between Groups	3.755	3	1.258	.069	.063
	Within Groups	126.281	247	.511		
	Total	130.036	249			
15c. What role does the physical education teacher play in addressing childhood obesity?	Between Groups	2.569	3	.856	1.376	.213
	Within Groups	139.707	246	.568		
	Total	142.276	249			
15d. What role does the counselor play in addressing childhood obesity?	Between Groups	7.153	3	2.384	.4324	.017
	Within Groups	170.480	247	.690		
	Total	177.633	248			
15e. What role does the principal play in addressing childhood obesity?	Between Groups	4.090	3	1.363	1.030	.088
	Within Groups	151.380	245	.618		
	Total	155.470	248			

A Tukey HSD post hoc test was used to compare all years-of-teaching category pairs to determine the difference between the category pair's responses to "the nurse's role in addressing childhood obesity". The Mean Difference (I – J) was calculated for all years-of-teaching category pairs (Table 21).

Table 21

Role School Nurse Plays in Addressing Childhood Obesity

Years Teaching (Categories) (I-J)	(I)	Mean Diff (I-J)	Standard Error	*p*	95% LL	95% UL
1-9	10-15	-.019	.146	.999	-.40	.36
	16-23	.047	.153	.990	-.35	.44
	24 plus	-.363	.152	.084	-.76	.03
10-15	1-9	.019	.146	.999	-.36	.40
	16-23	.066	.154	.973	-.33	.46
	24 plus	-.344	.153	.113	-.74	.06
16-23	1-9	-.047	.990	.990	-.44	.35
	10-15	-.066	.973	.973	-.46	.33
	24 plus	-.410	.052	.052	-.82	.00
24 plus	1-9	.363	.084	.084	-.03	.76
	10-15	.344	.113	.113	-.05	.74
	16-23	.410	.052	.052	.00	.82

*The mean difference is significant at the 0.05 level.

Table 21 displays that PE teachers that have taught 24 plus years rated the "role the school nurse plays in addressing childhood obesity" on average 0.410 higher than teachers that have taught 16-23 years with the mean difference being 0.052, which although not significant by definition, still demonstrated a higher rating.

A Pairwise Comparison confirms that the 24 plus years-of-teaching category rate that the school nurse plays a role in addressing childhood obesity than those from the 16-23 years-of-teaching category (Figure 9).

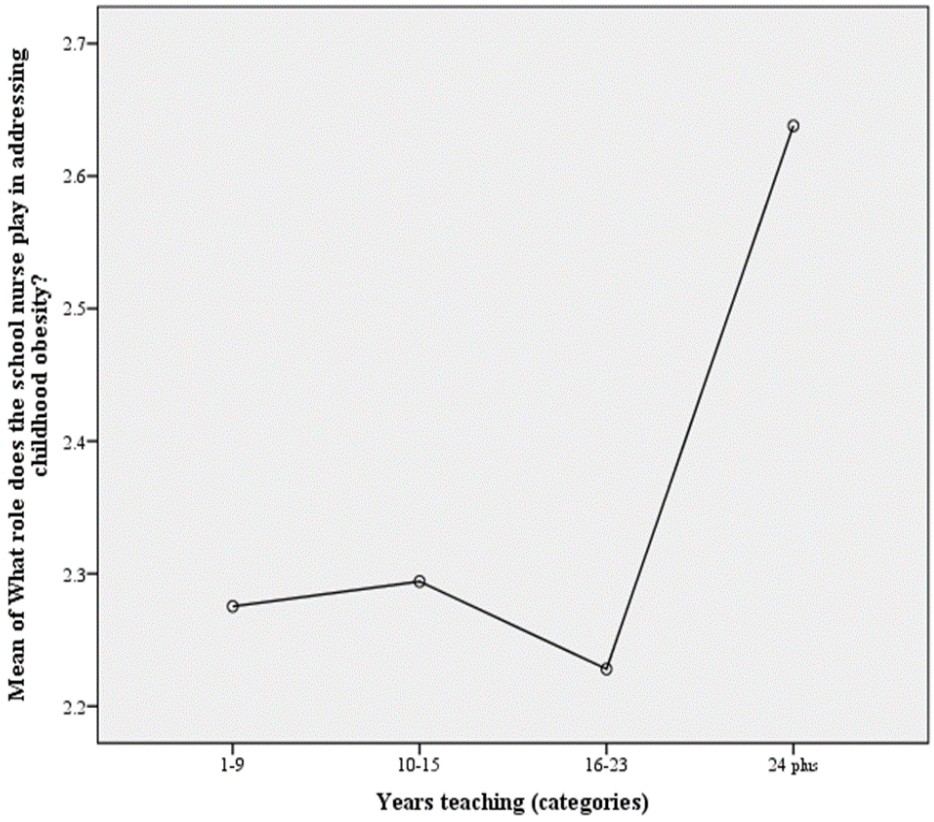


Figure 9. Role school nurse plays in addressing childhood obesity. Average rating per years-of-teaching category.

A Tukey HSD post hoc test was used to compare all years-of-teaching category pairs to determine the difference between the category pair's responses to "the role the counselor plays in addressing childhood obesity". The Mean Difference (I - J) was calculated for all years-of-teaching category pairs (Table 22).

Table 22 shows that PE teachers who have taught 24 plus years rated the "role the counselor plays in addressing childhood obesity" on average 0.456 higher than PE teachers who have taught 16-23 years. In addition, teachers who have

taught 1-9 years rated the “role the counselor plays in addressing childhood obesity” on average 0.387 higher than PE teachers who have taught for 16-23 years.

Table 22

Role Counselor Plays in Addressing Childhood Obesity

Years Teaching (Categories) (I-J)	(I)	Mean Diff (I-J)	Standard Error	*p*	95% LL	95% UL
1-9	10-15	.045	.142	.989	-.32	.41
	16-23	. 387*	.149	.048	.00	.77
	24 plus	-.069	.149	.966	-.45	.32
10-15	1-9	-.045	.142	.989	-.41	.32
	16-23	.341	.149	.104	-.04	.73
	24 plus	-.115	.149	.868	-.50	.27
16-23	1-9	-.387*	.149	.048	-.77	.00
	10-15	-.341	.149	.104	-.73	.04
	24 plus	-.456*	.156	.019	-.86	-.05
24 plus	1-9	.069	.149	.966	-.32	.45
	10-15	.115	.149	.868	-.27	.50
	16-23	.456*	.156	.019	.05	.86

*The mean difference is significant at the 0.05 level.

A Pairwise Comparison confirms that the 24 plus years-of-teaching category rate that the counselor plays a role in addressing childhood obesity higher than those from the 16-23 years-of-teaching category and teachers that have taught 1-9 years rated that the counselor plays a role in addressing childhood obesity higher than those from the 16-23 years-of-teaching category (Figure 10).

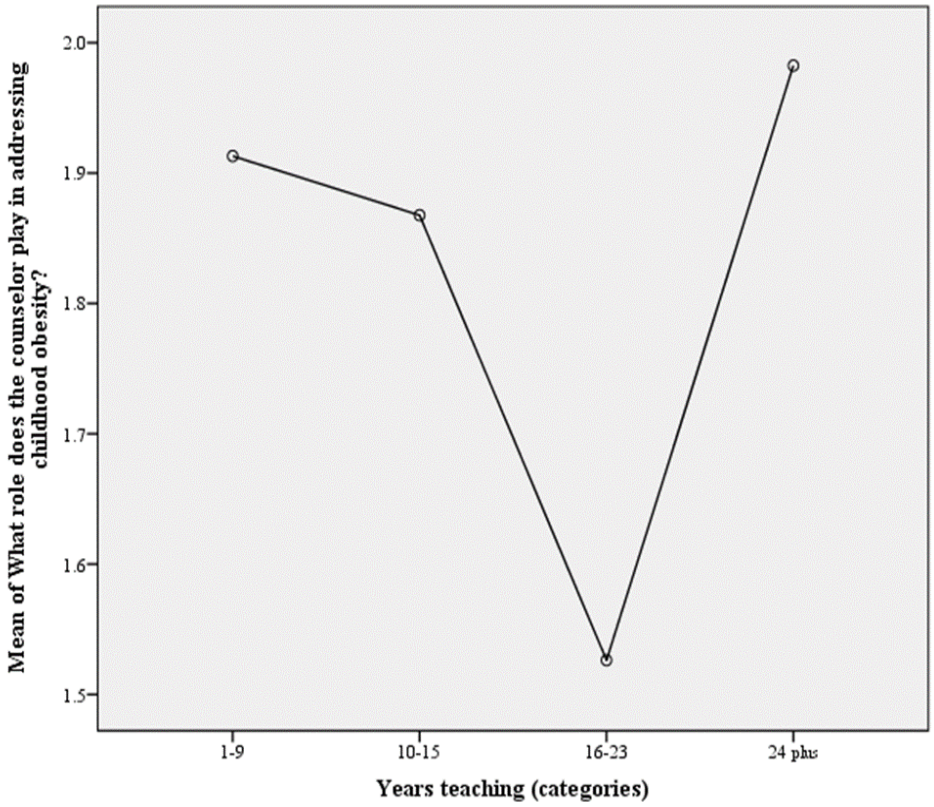


Figure 10. Role counselor plays in addressing childhood obesity. Average rating per years-of-teaching category.

Research Question 6. Where have high school physical educators received most of their information on childhood obesity?

Table 23 consists of the questions that were surveyed to assess the sources of high school physical education teachers' information on childhood obesity.

Table 23

PE Teacher's Sources of Information on Childhood Obesity

	N	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1q. My background in physical education is sufficient to assist children in developing appropriate exercise behaviors.	256	50.4	44.1	3.9	1.6	
1r. My background in physical education is sufficient to assist children in developing appropriate eating behaviors.	257	44.8	43.6	6.6	3.9	1.2
1s. I was adequately prepared by my college education to design exercise programs for obese children.	259	29.3	36.3	13.1	18.5	2.7
1t. I have the skills to structure weight loss programs for children.	257	35.4	47.5	7.8	7.4	2.0

High school physical education teachers "Agree" and "Strongly agree" that their background in physical education is sufficient in assisting children in developing appropriate exercise and eating behaviors. Furthermore, they "agree" and "strongly agree" they have the skills to structure weight loss programs for children. However, there are more "Undecided" and "Disagree" responses about being adequately prepared in their college education to design exercise programs for obese children. The descriptive statistics in Table 24 further support these findings.

Table 24

Responses Indicating PE Teacher's Sources of Information on Childhood Obesity

	N							
	Valid	Missing	Mean	Median	Mode	Standard Deviation	Min	Max
1q. My background in physical education is sufficient to assist children in developing appropriate exercise behaviors.	256	3	4.43	5	5	.650	2	5
1r. My background in physical education is sufficient to assist children in developing appropriate eating behaviors.	257	2	4.27	4	5	.840	1	5
1s. I was adequately prepared by my college education to design exercise for obese children	259	0	3.71	4	4	1.150	1	5
1t. I have the skills to structure weight loss programs for children.	257	2	4.07	4	4	.950	1	5

Open-ended Question.

In this study, the open-ended question, "Explain what you believe your role is in addressing childhood obesity at your school", was answered by 173 of the 259 surveys returned, or 67% of respondents.

In analyzing these responses, there were six key themes that emerged: (1) importance of keeping students physically engaged, (2) emphasizing nutrition and proper diet, (3) importance of parent education and involvement, (4) discussion of childhood obesity is a sensitive subject, (5) education and efforts to address childhood obesity should begin in elementary school, and (6) what PE teachers believe limits or interferes with their role in addressing childhood obesity.

PE teachers reported in the importance of keeping students physically engaged, there should be an offering of a variety of physical activities during physical education class and information that emphasizes the importance of

physical activity and/or exercise throughout one's lifespan as well as emphasizing the importance of healthy eating and exercise throughout the lifespan.

PE teachers responding with emphasizing nutrition and proper diet suggest offering a variety of nutritional information and proper eating choices during physical education classes. Emphasis should be on the importance of good nutrition and proper diet with physical activity and/or exercise throughout one's lifespan.

PE teachers express the importance of parent education and involvement. Parents should be provided information about good nutrition, the benefits of physical activity, and the factors that contribute to obesity and potential health consequences.

PE teachers listed factors that limit or interfere in their role of addressing childhood obesity as inadequate professional development education for PE teachers and the school's excessive academic testing with the students. In addition, high school PE teachers believe education and efforts to combat childhood obesity should begin at a much earlier age. The fact that childhood obesity is a "delicate" and/or "sensitive" issue was mentioned by numerous respondents, indicating high school PE teachers feel apprehensive about addressing weight issues as parents, students, and school administrators could perceive these efforts as intrusive and/or inappropriate.

In the analysis of the responses for the six emerging themes one was the *importance of keeping students physically engaged*. For example, one respondent stated that "We're on block scheduling. Our classes are 80 minutes long, which is great for PE class. We have plenty of time devoted for lots of movement and

activity. Unfortunately, with block scheduling, you are essentially completing one year's worth of work in one semester. So, PE class is only one semester not all year." Another respondent said "We have an outstanding PE program. The equipment we have is top quality and put to use every day. We do more physical fitness in our classes and less in team sports. Students are required to design their own fitness program, that is approved by the PE teacher, and they must adhere to it. Every 4 weeks the students are required to change their program to include conditioning other parts of the body".

For the second theme of *emphasizing nutrition and proper diet, a* respondent professed that "we're a small high school, and it seems to work out well. We really get to know the students over the years and we seem to have a fairly good impact on most. The school administration has done well as far as getting good food choices for students to eat." Another claimed "I include discussions in my PE class about good choices of foods to eat and the value of good nutrition."

An example of the third prominent theme of the *importance of parent education and involvement* was by a respondent that said "parents should be educated in the causes of childhood obesity and the possible health problems resulting from of it." Someone else mentioned that "it seems parents are unaware of the dangers of childhood obesity and they need to be included in the conversation."

With the fourth theme about the *discussion of childhood obesity is a sensitive subject* a respondent declared "I don't bring up overweight or obesity in class because it's a sensitive issue. One teacher had a parent complain to the

Superintendent and, eventually was reprimanded and had the results written-up and placed in their file." One more specified that "you have to be careful of what you say in class as an individual student may think that you are talking specifically about them."

When it came to the fifth theme about *education and efforts to address childhood obesity should begin in elementary school,* a respondent made it clear by saying "childhood obesity should be addressed early in elementary school. We receive a lot of students that graduate middle school and come to high school already overweight. Parents need to be included in the education of childhood obesity as well and made aware of the health problems that can result from being overweight. We shouldn't wait until high school to address the problem. If we can teach sex ed. as part of health early on, we can certainly discuss health concerns when it comes to excess weight." In addition, another individual alleged that "the school district should get together as a whole and start addressing the problem of childhood obesity as early as elementary school."

In respect to the last theme about *what PE teachers believe limits or interferes with their role in addressing childhood obesity* a respondent proclaimed "there should be more professional development that discusses the problem of obesity and ways to help address it." Another admitted that "when I was in college majoring in PE, there were no classes or lectures on the subject of obesity, child, adult or otherwise. Not to say I haven't learned it on my own as our students are becoming more overweight. I asked, and not one of the PE teachers ever had a college course or discussion in a college PE class about excess weight or obesity." And finally, one contributor exclaimed "unfortunately, I am more involved with

testing. My time is spent either proctoring exams or preparing students for the next exam. We have very little time in the gym because it seems like testing takes priority here.”

Chapter V

DISCUSSION and CONCLUSIONS

This study was designed to investigate public high school physical education (PE) teachers' perceptions of (a) childhood obesity as a serious health risk, (b) their role in impacting childhood obesity, and (c) the school's role in addressing childhood obesity. In addition, both gender and length of time teaching (in years) were examined as possible variables influencing PE teachers' perceptions of childhood obesity. Finally, the manner in which PE teachers obtain information about childhood obesity was surveyed. This chapter will discuss the data presented in Chapter IV as it relates to these questions, discuss the limitations of this study, and suggest recommendations for future research in this area.

Perceptions of Childhood Obesity as a Serious Health Risk

One of the major findings of this study is that high school PE teachers overwhelmingly believe that childhood obesity is a serious health risk, indicated by their endorsement of a BMI-for-age within normal limits for optimal health, and the perception of overweight students as limited in their capacity for moderate to vigorous exercise as well as how being overweight affects their ability to be as active as other students. This finding is consistent with previous studies (Price et al., 1990; Greenleaf & Weiller, 2005) in which respondents overwhelmingly agreed that youth obesity is a concern and were almost unanimous in their beliefs that normal weight is very important to the health of children.

In addition, high school PE teachers endorsed the importance of PE in positively affecting the health of overweight students. However, despite their

endorsement of physical education as a positive influence on the health of overweight students, PE teachers believe strongly that obese children will not outgrow their obesity nor do they believe that obese children can lose significant amounts of weight and/or maintain weight loss. These findings are consistent with those of Price et al. (1990) in his study of elementary school PE teachers in which he found that fewer than half the respondents believed that with proper guidance most obese children are able to lose significant amounts of weight. Further, fewer than half believed obese children would be able to maintain their weight loss if they actually lost weight.

Perceptions About the Causes of Childhood Obesity

The results of this study indicate that high school PE teachers perceive three factors to play a major role in the etiology of childhood obesity: too little physical activity, the consumption of too many calories, and eating the wrong types of foods. Hormone imbalances and heredity are perceived to play a less important role.

These findings are consistent with previous investigations of childhood obesity that found PE teachers were more likely to believe that poor eating habits, excess calorie consumption, sedentary lifestyle, lack of parental concern, and biological factors were the leading causes of childhood obesity and that cultural factors, low socioeconomic status, peer pressure, and hormone problems played a minor role (Price et al., 1990; Greenleaf & Weiller, 2005). Other factors rated as important contributors to childhood obesity include lack of self-control, prevalence of junk food machines, and psychological problems (Greenleaf & Weiller, 2005).

Perceptions Regarding PE Teachers' Role in Childhood Obesity

PE teachers in this study tend to agree that physical education plays a helpful role in addressing childhood obesity even though they do not tend to believe that physical education is the appropriate venue to prevent and/or control weight problems in children. These findings suggest that while PE teachers believe physical education to be helpful in addressing overweight students, they do not believe that physical education is preventative and/or curative in combating childhood obesity. These findings are consistent with those of Greenleaf and Weiller (2005) where the physical educators in their study saw themselves as being in important positions for promoting physical activity for youth as well as having the desire to positively influence the physical activity levels of youth of all shapes and sizes. However, while the PE teachers in the current study do not believe that physical education is preventative, Price et al. (1987), studied elementary school principals who believed schools would be an ideal place to prevent weight problems in children, even though they had less confidence that schools are competent in prescribing weight loss programs.

Gender Differences in High School PE Teachers' Perceptions of Childhood Obesity

In this study, there were significant differences between male and female PE teachers regarding their perceptions about childhood obesity, its causes, and the PE teacher's role in having an impact on childhood obesity. Male PE teachers were found to endorse more than female PE teachers that childhood obesity is a major issue, that physical education is involved in affecting the health of overweight students, that consuming too many calories plays a role in causing obesity, and

that children should have 60 minutes or more of moderate to vigorous daily physical activity. Males also believe more than females that in their role as a PE teacher they can have an impact on childhood obesity. Furthermore, male PE teachers believe more than female PE teachers that PE should inform both students and parents about the health risks of childhood obesity. Finally, while the general findings suggest PE teachers do not believe physical education to be the place to prevent weight problems in children, further analyses indicate that male PE teachers do in fact believe that physical education is the place to prevent weight problems as most children can be reached before a serious problem develops.

Only one study in the literature was found to investigate gender differences in PE teachers' perceptions and beliefs about childhood obesity. In Price et al., (1990), their findings are slightly inconsistent with the results of this study. In their survey of elementary school PE teachers' perceptions of childhood obesity, they found no significant differences between the sexes in perceptions of obesity. Regarding the causes of obesity, they found female teachers were more likely than male teachers to believe that poor eating behaviors and psychological problems play a major role in the etiology of childhood obesity. Only one significant difference emerged with regard to high school PE teacher's role; females were more likely to report that exercise programs are difficult to design.

Although there is some evidence in the present findings to suggest that there is a relationship between the gender of high school PE teachers and their perceptions and beliefs about childhood obesity, it is unclear about the specifics of this relationship and what these findings mean. In only one other study were gender differences of PE teachers investigated (Price, 1990), however, those

findings were equivocal. Further research needs to be conducted in order to clarify the relationship between gender and PE teachers' perceptions and beliefs about childhood obesity.

Teaching requires skill, insight, intelligence, and diligence. PE teachers struggle to succeed in various ways to meet the challenges presented by students. While both male and female PE teachers demonstrate these attributes, they may meet the challenges differently.

Female PE Teachers may be more sensitive and considerate of student's feelings and appearance than their male counterparts. Bigger and fuller sizes have become more acceptable, especially in women, as a result in modelling and advertisements for fuller figures and sizes. Since PE classes are co-educational, male PE students may struggle with personal female issues ("I'm on my menstrual cycle", "I don't want to break a nail", "I don't want to mess up my hair", "I don't like sweating"), where female PE teachers will have a better understanding of those issues.

Male and Female PE teachers may have a preferred way of teaching based on their perception of the student(s). Some may feel a certain pressure to change their style of teaching based on the classroom or school environment. It could be large class sizes, lack of class time, or other academic priorities.

Years-of-Teaching Differences in High School PE Teachers' Perceptions of Childhood Obesity

The length of time one has been a PE teacher was divided into four categories: those with 1-9 years-of-teaching experience, referred to as "early career"; those with 10-15 years-of-teaching experience, referred to as "middle

career"; those with 16-23 years-of-teaching experience, referred to as "late career"; and those with 24 or more years-of-teaching experience, referred to as "near retirement". Survey responses were almost evenly distributed across the four years-of-teaching categories.

In this study, there were no significant differences in the years-of-teaching categories with respect to either perceptions of childhood obesity and/or perceptions about the etiology of childhood obesity. These findings are consistent with those of Price et al. (1990), except for their finding that "early career" PE teachers are more likely to believe that cultural factors play a major role in the etiology of obesity.

Years-of-teaching experience did significantly affect perceptions about one's role in impacting childhood obesity in this study. "Early career" PE teachers believed more than either "middle career" or "late career" PE teachers that childhood obesity is a major issue. Furthermore, "early career" PE teachers believed more than "late career" PE teachers that children and adolescents should have 60 minutes or more of moderate to vigorous daily physical activity.

"Early career" PE teachers are possibly more aware of the serious health risks of childhood obesity, given the contemporary relevance of childhood obesity in teacher education as well as the increased publicity in the media and general public. "Early career" PE teachers may also be more proactive in addressing issues of overweight students, given they are beginning their careers and eager to make a difference. This idea is supported by Price et al., (1990), who found that teachers with fewer years of teaching were more likely to report they found counseling children and their parents on exercise programs for weight loss

professionally gratifying. Conversely, both “middle career” and “late career” PE teachers may have become desensitized to the insidious effects of progressive weight gain and increasingly sedentary lifestyles of their students over the years and therefore may be less likely to consider childhood obesity a major issue.

Perceptions of the School’s Role in Addressing Childhood Obesity

In this study, there were significant differences between male and female PE teachers regarding their perceptions of the school’s role in addressing childhood obesity. Male PE teachers believe more than female PE teachers that the school is involved in addressing the health overweight students. Also, male PE teachers believe more than female PE teachers that the school’s meal program meets basic nutritional requirements. Additionally, male PE teachers believe more than female PE teachers that the school’s remaining teachers and the student’s parents are supportive of the school as a place to help children reduce obesity. These findings are inconsistent with those of Price et al., (1990), where there were no significant differences in perceptions of the school’s role based on gender difference amongst elementary school PE teachers. The results of this study revealed that there were no significant years-of-teaching experience differences in high school PE teachers’ perceptions of the school’s role in addressing childhood obesity.

However, there were significant differences in perceptions about the role of specific school personnel, namely, the school nurse and the school counselor. This finding is consistent with a study conducted by Price et al. (1987) who found that elementary school principals in their study rated the school nurse and the

school counselor as playing the most important roles in dealing with childhood obesity at school.

Respondents' perceptions about the roles the school nurse and the school counselor play in addressing childhood obesity were significantly affected by years-of-teaching experience. "Near retirement" PE teachers perceived the school nurse as having a major role in addressing childhood obesity more than "late career" PE teachers. In addition, "near retirement" PE teachers also perceived the school counselor as having a major role in addressing childhood obesity more than either "early career" or "late career" PE teachers.

Years in the classroom give the PE teacher a perspective that may be manifested in their appreciation of and respect for the interdisciplinary nature of the school system. "Near retirement" teachers may have also learned the limits and boundaries of their job role and recognize the expertise of other school personnel. For example, a "near retirement" PE teacher might collaborate with the school nurse to emphasize the health aspects of weight control, while s/he emphasizes diet and exercise. Similarly, the PE teacher can refer to the school counselor to help the obese child with personal and emotional issues that have behavioral correlates.

PE Teachers' Sources of Information on Childhood Obesity

In this study, high school PE teachers tend to agree that they possess the requisite background to assist children in developing appropriate exercise and eating behaviors, and to structure weight loss programs. This finding is consistent with Greenleaf and Weiller (2005) whose participants felt competent in prescribing exercise programs for weight loss and found working with youth and parents on

exercise programs for weight loss gratifying. However, the PE teachers in the current study do not believe they have been adequately prepared by their college educations to design exercise programs for obese children, a finding consistent with Price et al. (1990). Rather they have had to rely on physical education journals, the mass media, and past experience, as sources of additional information (Price et al., 1990).

In his 2007 article on “The Preparation of Physical Educators: A Public Health Perspective”, McKenzie maintains that while PE teachers are positioned to be the strongest advocates of a healthy, active lifestyle, they need to develop skills that are not typically stressed in undergraduate physical education teacher education. He declares that physical educators would be better prepared for their role in physical activity promotion (an important component of weight reduction programs for obese children) if undergraduate physical education programs infused health-related physical activity and fitness into their curriculums.

Responses to Open-ended Question

O’Cathain and Thomas (2004) believe that a general open question at the end of structured questionnaires has the potential to increase response rates, elaborate responses to closed questions, and allow respondents to identify new issues not captured in the closed questions. Many of the responses to the open-ended question confirmed their answers from the questionnaire but, many took advantage of expressing additional thoughts not covered in the survey.

Various PE teachers that responded to the open-ended questions felt strongly that childhood obesity is a problem that must be addressed and physical education can be a part of the solution. This makes sense as, according to

Deckelbaum and Williams (2001) and Ebbeling et al. (2002), regular physical activity combined with healthy eating is among the best strategies for preventing and combating childhood obesity, diabetes, and other obesity-related conditions and/or illnesses. More importantly, several PE teachers believe there is a direct correlation with a decline of physical activity contributing to the unprecedented epidemic of childhood obesity.

Many PE teachers found it difficult to compete for time given importance placed upon standardized testing results by their administration. There was a belief among many of the PE teachers that there should be more performance measures on physical fitness and the results will be better performance on literacy and math as opposed to “teaching to the test” or just insurmountable testing. Increasing physical activity would result in cognitive benefits that may improve children’s academic performance. The irony of the testing era is that devotion to improve children’s academic performance has led to a decline in children’s health, and childhood obesity rates have risen to dangerously high rates.

What was essential to numerous PE teachers, was that more support from administration is the first step in getting, teachers, counselors, and staff members involved. Some school based interventions may be effective if there was sufficient administrative support. Professional development programs and seminars would greatly benefit not just the PE teacher that is craving for them, but all school personnel to better understand the problem of childhood obesity and have a more proactive approach in combining fitness, counseling, dieting, and proper nutrition to assist children suffering from obesity.

This particular open-ended question presented to the high school PE teachers along with the analysis of their responses appears to be unique. Literature to show support or consistency appears to be deficient.

Theoretical Rationale

The primary focus of obesity research today is on environmental and behavioral factors such as dietary patterns and physical activity that affect children's weight. With proper diets and adequate exercise, childhood obesity is a preventable condition (Sallis & Glanz, 2006).

School can play a critical role in addressing childhood obesity both for students and parents (Story, Kaphingst, & French, 2006). Despite recommendations by the American Academy of Pediatrics (AAP), the majority of healthcare professionals do not routinely use BMI to track children's growth and screen for potential weight-related problems (Spear et al., 2007). Parents are also unaware of the severe health risks associated with childhood obesity (Barlow & Dietz, 1998). Interventions often occur at the treatment stage after the child has been diagnosed of obesity in the form of dietary and exercise counseling to prevent the development of chronic diseases. Children spend a significant amount of time in school and have their social circle there. Policies to maintain children's healthy weight status, therefore, can be effectively implemented in a school setting. Previous research also pointed out the success of school-based intervention programs (Lindsay et al., 2006).

While this study was not guided by theory, the Social-cognitive Theory, which explains how behaviors are acquired and maintained based on learned observation, are goal directed, self-reflective, and self-regulated (Bandura, 1986,

1997) may help to explain the findings of this study. Accordingly, PE teachers' perceptions of childhood obesity are learned from individual experiences, the actions of others, and their interaction with their environment (Bandura, 1997; Davison & Birch, 2001; Glanz, Rimer, & Viswanath, 2008). At the center of the Social-cognitive Theory is Bandura's conceptual triadic reciprocal determinism. This involves a bidirectional interaction between three factors: behavior, environment, and person (Figure 11). All three factors are essential and influence each other in what is known as reciprocal causation (Bandura, 1989). The interdependence among the three factors means that behavior depends on personal (e.g., cognitive and affective events) and environmental (e.g., school support and personnel interaction) factors, personal factors depend on environmental and behavioral factors, and environmental factors depend on behavior and personal factors.

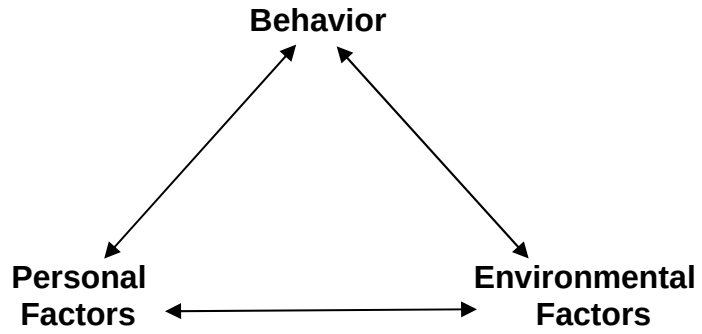


Figure 11. Social-cognitive Theory's interrelationship between behavior, personal factors, and environmental factors (Bandura, 1986).

Here, the Social-cognitive Theory relates to childhood obesity in that the behavior (perception) of the PE teacher depends on personal and environmental

factors. Personal factors include cognitive and affective events. Specifically, what people think, feel, and believe (e.g., knowledge, expectations, beliefs, and self-perceptions) will influence how they behave. Environmental factors include the physical (e.g., school building and gymnasium space) and social (e.g., school staff and other school teachers) environment and can also influence how people behave. According to Bandura's (1986) triadic model, the behavior (perception) of the PE teacher depends on personal and environmental factors. Specifically, the personal factors involve the cognitive and affective domains that relate to an individual's knowledge and value of the physical education components; the environmental factor involves the school support. The interrelationship between the perceptions of childhood obesity, the personal factors of knowledge and value of physical activity, and the environmental factor of school support are consistent with the Social-cognitive Theory's central theme of triadic reciprocal determinism (Figure 12).

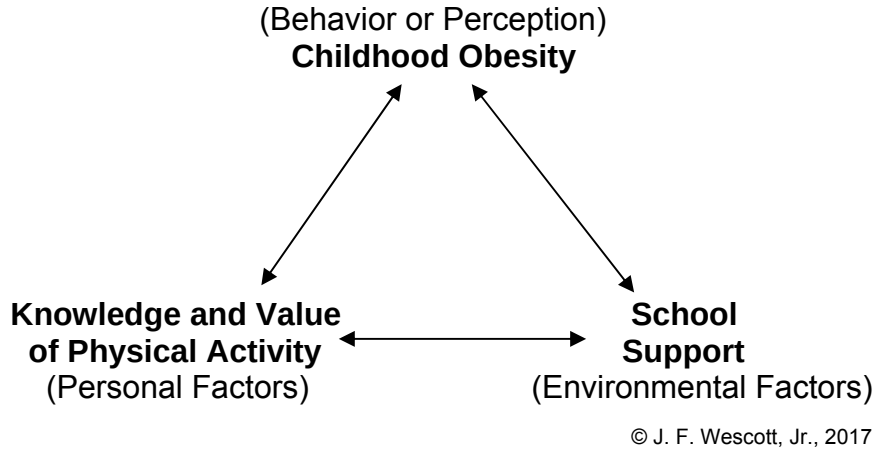


Figure 12. Social-cognitive Theory's interrelationship between behavior, personal factors, and environmental factors as it applies to childhood obesity.

Additionally, in conjunction with the Social-cognitive Theory, the Social Ecological Model (Caprio et al., 2008) explains the interrelation among various personnel (physical education teachers and other school personnel) and environmental factors (school support). The Socio Ecological Model is a theory-based framework for understanding the multifaceted and interactive effects of personal and environmental factors that determine behavior (Caprio et al., 2008). There are hierarchical levels of the Social Ecological Model (Figure 13). Relatively little research has explored how the social environment (community), the physical environment of the school (physical plant and school personnel), and school policy (school and administrative support) contribute to the behaviors (perceptions) of PE teachers addressing childhood obesity. Policy is a high-level process that has strong influences on lower levels of the Socio Ecological Model (Langille & Rodgers, 2010). Community values help determine priorities of different levels of school legislation. Community values influence the overall culture that either support or do not support physical activity in school. According to Langille and Rodgers, a supportive culture is essential for effectively changing an environment.

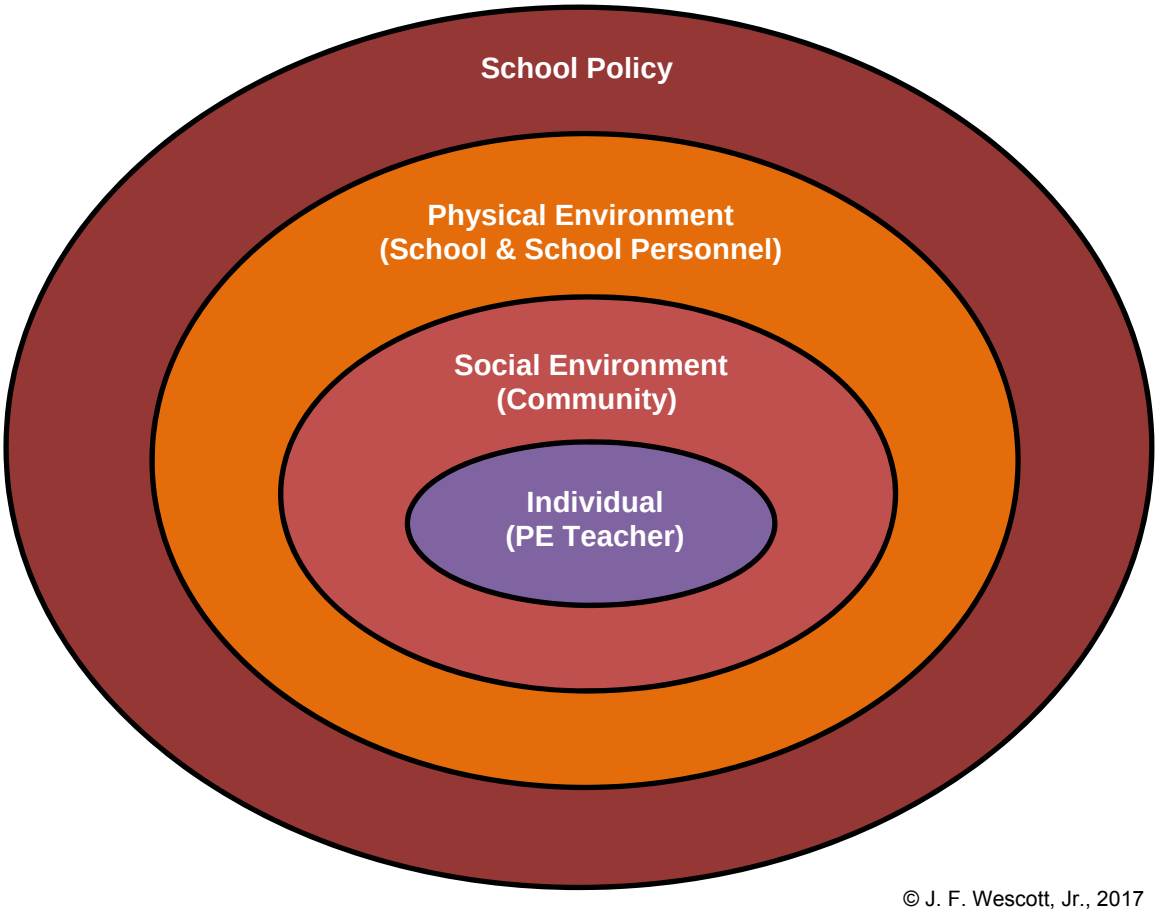


Figure 13. Hierarchical levels of Social-Ecological Model that contribute to PE teacher's behavior.

There are overall standards for schools and school boards that provide direction for schools to meet specific outcomes (Langille & Rodgers, 2010). School culture, or priorities and values inherent within a specific school, have an influence on the school's support in addressing childhood obesity. Accordingly, interactions between higher level policies, community, and school influence the behaviors (perceptions) of the high school PE teacher when addressing childhood obesity.

Study Implications

In respect to the implications of the study findings, most important is that high school PE teachers and their schools can help students adopt and maintain healthy eating and physical behaviors by addressing physical activity and nutrition through an organized school health program. Efforts of the school community can strongly influence student's health though physical education, health education, nurse and health services, nutrition services, counseling, psychological, and social services, a healthy school environment, and health services for staff and family.

Additionally, these findings suggest possible benefit to instituting a school health committee containing different segments of the school and community that include parents, teachers, students, school administrators, health care providers, and social service professionals. The committee would help with the guidance of school health policies, programs, activities, and resources. They can also help in the promotion of health as part of the fundamental mission of the school or school district.

And, an assessment of the school's health policies along with physical activity and nutrition programs should be explored and an improvement plan should be developed. Strengthening the school's physical activity and nutrition policies that best meet the physical education and health needs of all students.

Teacher and staff health promotion programs are a sound strategy for improving morale, attendance, and overall performance (Allegrante, 1998). They also can make important contributions to student health by giving teachers and staff the skills and motivation they need to become powerful role models for good

health. Health services for teachers and staff can include health screenings and free or low-cost physical activity and healthy-eating programs.

It should be understood physical education is as much an academic discipline as anything else taught in school. It's a discipline that gives students some of the critical skills they need to be productive citizens of the 21st century. Like other academic courses of study, physical education should be based upon rigorous national standards that define what students should know and be able to do as a result of participation (National Association for Sport and Physical Education, 2004). Quality physical education requires adequate time, adequately prepared teachers with opportunities for professional development, adequate facilities, and reasonable class sizes.

The school setting offers multiple opportunities for students to enjoy physical activity outside of physical education class, after-school programs, intramural sports programs, and physical activity clubs. These opportunities are particularly important because they are accessible to all students, including those who are not athletically gifted and those with special health or physical needs.

Given this study's topic, a quality school meal program is essential. Managing a school food service program requires a diverse skill set, and thus it is important that food service personnel receive proper training. Most schools offer foods and beverages to students through a variety of channels outside of the school meal program; vending machines, school stores, concession stands, after-school programs, fundraising campaigns, class parties, and à la carte items in the cafeteria. It must be ensured that students have appealing, healthy choices in foods and beverages offered outside of the school meal program.

Limitations of this Study

1. PE teachers' holiday schedules and various New Jersey State exam schedules may have limited respondents' availability to participate in the study.
2. The respondents in this study were tenured and/or tenure track New Jersey State certified PE teachers in physical education, and thus may not be representative of private school PE teachers who do not need to be tenured or New Jersey State certified. This was a convenience sample and therefore the results cannot be generalized beyond those who participated in the study.
3. There is a self-selection bias in survey research. Respondents who complete the survey may be more motivated and/or otherwise "different" and represent a special subset of the sample, thus limiting the generalizability of the results to the larger population.
4. Self-report data relies on participants completing survey instruments honestly; however, there is always the possibility that participants may respond in a manner to present themselves in the best possible light.

Recommendations for Future Research

Based on the findings of this study, the following recommendations for future research and investigation are made:

1. It is recommended that future study investigate separate urban, suburban and rural public high school populations in New Jersey.
2. It is recommended that this study be expanded geographically to enhance the generalizability of these results to PE teachers regionally and nationally.

3. It is recommended that this study be expanded to include additional qualitative open-ended questions in order to generate depth data from purposively defined groups of respondents, (e.g., “early career” male high school PE teachers).
4. It is recommended that the investigation of PE teachers’ perceptions about their role in addressing childhood obesity be continued. Specifically, to what extent do PE teachers’ perceptions about their role in addressing childhood obesity influence their actual behavior in the classroom?
5. It is recommended that further research be conducted in order to clarify the relationship between gender and PE teachers’ perceptions and beliefs about childhood obesity. What accounts for the differences in male and female PE teachers’ perceptions about childhood obesity?
6. It is recommended that further research be conducted in order to clarify the relationship between years of teaching and PE teachers’ perceptions and beliefs about childhood obesity. Does having an advanced degree alter perceptions, attitudes, and behavior? Does it influence the sources from which PE teachers receive information?

Closing

In closing, childhood and adolescent obesity is becoming one of the greatest public health, social, and economic challenges of the 21st century. Without a strong contribution from PE programs and school support, it is unlikely to reverse the trend. Improving and intensifying efforts to promote physical activity and healthy eating is consistent with the fundamental mission of schools. By educating

young people to become healthy, productive citizens who can make meaningful contributions to society.

The PE teacher has the potential to be a catalyst for the attainment or maintenance of normal weight in children and adolescents. PE teachers cannot make students lose weight, cannot cure it, and cannot prevent childhood obesity. PE teachers believe physical education is a positive influence on childhood obesity and believe in the important benefits of physical activity and good nutrition. PE teachers in this study tend to agree that physical education plays a helpful role in addressing childhood obesity even though they do not tend to believe that physical education is the venue to prevent and/or control weight problems in children. These findings suggest that while PE teachers believe physical education to be helpful in addressing overweight students, they do not believe that physical education is preventive and/or curative in combating childhood obesity.

Knowledge and resources alone are not enough. Meaningful change requires strategies to be implemented. Enhancing physical education programs and providing a healthy school environment can play a strong role in improving the lives of young people through physical activity and healthy eating.

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APPENDICES

Appendix A

Seton Hall University: Institutional Review Board (IRB) Approval

OFFICE OF INSTITUTIONAL REVIEW BOARD
SETON HALL UNIVERSITY

January 5, 2015

John Wescott

[redacted]

Dear Mr. Wescott,

The Seton Hall University Institutional Review Board has reviewed the information you have submitted addressing the concerns for your proposal entitled "High School Physical Education Teachers' Perceptions of Their Role in Impacting Childhood Obesity." Your research protocol is hereby accepted as revised and is categorized as exempt.

The proposed changes to the survey instrument are also accepted.

Please note that, where applicable, subjects must sign and must be given a copy of the Seton Hall University current stamped Letter of Solicitation or Consent Form before the subjects' participation. All data, as well as the investigator's copies of the signed Consent Forms, must be retained by the principal investigator for a period of at least three years following the termination of the project.

Should you wish to make changes to the IRB approved procedures, the following materials must be submitted for IRB review and be approved by the IRB prior to being instituted:

- Description of proposed revisions;
- *If applicable*, any new or revised materials, such as recruitment fliers, letters to subjects, or consent documents; and
- *If applicable*, updated letters of approval from cooperating institutions and IRBs.

At the present time, there is no need for further action on your part with the IRB.

In harmony with federal regulations, none of the investigators or research staff involved in the study took part in the final decision.

Sincerely,

Mary F. Ruzicka, Ph.D.

Mary F. Ruzicka, Ph.D.
Professor
Director, Institutional Review Board

cc: Dr. Terrence Cahill

Appendix B

Letter of Invitation that Includes Informed Consent

Letter of Invitation - Public High School Physical Education Teachers' Perceptions of Their Role in Impacting Childhood Obesity

Dear NJ High School Physical Education Instructor,

My name is John Wescott and I am a doctoral candidate in the Health Sciences program at Seton Hall University, South Orange, NJ. I am a public high school physical education teacher with 22 years of experience in pediatric health care as a respiratory therapist and 12 years of high school teaching experience.

Studies have shown that childhood obesity has more than doubled since 1970, and that health consequences are reflected in the rising cost of health care. An estimated 30% of U.S. children and adolescents, ages 6 to 19, are overweight or obese and the likelihood of being overweight or obese increases as people get older. Being overweight or obese is especially a problem for children because of the effect it can have on their academic and social venues.

You are being invited to participate in this study by completing an on-line survey. You are eligible to participate because you are a New Jersey certified teacher of physical education who is tenured or pursuing tenure and have full-time or equivalent employment in a New Jersey public high school. The data in this research is being collected in an attempt to better understand physical education teachers' impact on childhood obesity. I will be the principle investigator for the study.

In order to participate in this on-line study simply click on the web-link provided at the bottom of this letter and it will connect you to the survey instrument. You may use any name to log in. The password for the survey is "password" (all lower case). The information that you enter into the ASSET survey will be kept strictly confidential and is not traceable to you. The survey is anonymous and you will not be identified by name or description in any reports or publications about this study. The survey will take approximately 20 minutes to complete. Accessing and completing the survey conveys informed consent to participate in the study.

School of Health and Medical Sciences
Department of Interprofessional Health Sciences & Health Administration
Tel: 973.275.2076 • Fax: 973.275.2171
400 South Orange Avenue • South Orange, New Jersey 07079 • ***gradmeded.shu.edu***

This study has been reviewed and approved by Seton Hall University's Institutional Review Board. Any questions for the Institutional Review Board may be directed to Mary F. Ruzicka, PhD., Office of the IRB, President's Hall, Seton Hall University, 400 South Orange Avenue, South Orange. NJ 07079. The IRB office phone number is 973-313-6314 and the IRB e-mail address is irb@shu.edu.

There will be no monetary compensation or any kind of compensation for participating in this study. There are no foreseeable risks or direct benefits of the study to you. However, the information gathered will add to a body of knowledge regarding physical education and childhood obesity. Your participation in the completion of the questionnaire is entirely voluntary. You may decide not to participate or close the survey (browser) at any time before completion of the survey without penalty. You may obtain further information from John Wescott at or (201)-681-0735 or john.wescott@student.shu.edu or Dr. Cahill at terrence.cahill@shu.edu.

If you know of another public high school physical education teacher that may be interested in participating in the study, please forward this email to him/her. This survey is completely voluntary and anonymous.

Thank you for your time and consideration in participating in the study. It is greatly appreciated.

Sincerely,

John Wescott, Doctoral Candidate
Seton Hall University
School of Health and Medical Sciences
Department of Interprofessional Health Sciences & Health Administration
Seton Hall University
400 South Orange Avenue
South Orange, NJ 07079

Survey URL Link: http://asset.tltc.shu.edu/asset/asset.AssetSurvey?surveyid=6614

Appendix C

Survey Questionnaire

High School Physical Education Teachers' Perceptions of Their Role in Impacting Childhood Obesity

INSTRUCTIONS: PLEASE SELECT THE ANSWER THAT BEST DESCRIBES YOUR BELIEFS IN EACH OF THE FOLLOWING STATEMENTS

Physical Education Teacher's Role

1. Having a BMI-for-age within normal limits is important to the health of children.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

2. Childhood obesity is a major issue facing young people today.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

3. Children and adolescents should have 60 minutes or more of moderate to vigorous physical activity daily.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

4. Students' level of physical activity affects their ability to lead a healthy lifestyle.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

5. Being overweight affects students' ability to engage in moderate to vigorous physical activities.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

6. Being overweight affects students' ability to be as active as the other students in their class.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

7. Physical education is involved in effecting the health of overweight students.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

8. Physical education should inform children of the health risks of child and adolescent obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

9. Physical education should inform parents of the health risks of child and adolescent obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

10. Physical education is the place to prevent weight problems in children as most children can be reached before a serious problem develops.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

11. Physical education classes should be designed to offer life-long habits of exercise that will assist in weight control.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

12. Physical education classes should be designed to offer life-long nutritional habits that would assist in weight control.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

13. Physical education is an appropriate venue to address childhood obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

14. Most obese children will outgrow their obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

15. With proper guidance, most obese children are able to lose significant amounts of weight.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

16. With proper guidance, most obese children are able to maintain their weight loss.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

17. My background in physical education is sufficient to assist children in developing appropriate exercise behaviors.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

18. My background in physical education is sufficient to assist children in developing appropriate eating behaviors.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

19. I was adequately prepared by my college education to design exercise programs for obese children.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

20. I have the skills to structure weight loss programs for children.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

INSTRUCTIONS: PLEASE SELECT THE ANSWER THAT BEST DESCRIBES YOUR BELIEFS IN EACH OF THE FOLLOWING STATEMENTS

School Support

21. Physical education is an important program in my school's general education curriculum.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

22. My school is involved in addressing the health of overweight students.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

23. My school should do more to alleviate childhood obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

24. My school should address weight problems in children to help avoid the health risks of obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

25. My school's meal program meets basic nutritional requirements.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

26. Teachers are supportive of the school as a place to help children reduce obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

27. Parents are supportive of the school as a place to help children reduce obesity.

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

Demographic and Background Questions

28. Does your school allow students to opt out of physical education? Yes No

29. If allowed, what percent of students at your school opt out of physical education?

≤ 5% 6-10% 11-15% 16-20% ≥ 20%

30. What is the approximate student population in your school?

≤ 100 101 – 500 501 – 750 751 – 1000 1001 – 1500 1501 – 2000 > 2000

31. Estimate the percentage of the racial/ethnic background of all students in your school.

White American (non-Hispanic) _____

Black or African American (non-Hispanic) _____

Hispanic or Latino _____

Asian or Asian American _____

Other _____

Total = 100%

32. Estimate the percentage of **OVERWEIGHT** male students in your school.

≤ 20% 21-40% 41-60% 61-80% 81-100%

33. Estimate the percentage of **OVERWEIGHT** female students in your school.

≤ 20% 21-40% 41-60% 61-80% 81-100%

34. Estimate the percentage of **OBESE** male students in your school.

≤ 20% 21-40% 41-60% 61-80% 81-100%

35. Estimate the percentage of **OBESE** female students in your school.

≤ 20% 21-40% 41-60% 61-80% 81-100%

36. Intramural sports are offered at your school. ____ Yes ____ No

37. If Yes to question #36, what percent of obese males participate in intramural sports in your school?

≤ 20% 21-40% 41-60% 61-80% 81-100%

38. If Yes to question #36, what percent of obese females participate in intramural sports in your school?

≤ 20% 21-40% 41-60% 61-80% 81-100%

INSTRUCTIONS: PLEASE SELECT THE ANSWER THAT BEST DESCRIBES YOUR BELIEFS IN EACH OF THE FOLLOWING STATEMENTS

39. What role do the following play in causing obesity?

A. Too little physical activity

____ Major role ____ Moderate role ____ Minor role ____ No role

B. Consuming too many calories

____ Major role ____ Moderate role ____ Minor role ____ No role

C. Eating the wrong types of foods

____ Major role ____ Moderate role ____ Minor role ____ No role

D. Hormone imbalance

____ Major role ____ Moderate role ____ Minor role ____ No role

E. Heredity

____ Major role ____ Moderate role ____ Minor role ____ No role

40. What role does each of the following school personnel play in addressing childhood obesity?

A. School nurse

____ Major role ____ Moderate role ____ Minor role ____ No role

B. Health teacher

____ Major role ____ Moderate role ____ Minor role ____ No role

C. Physical Education teacher

____ Major role ____ Moderate role ____ Minor role ____ No role

D. Counselor

____ Major role ____ Moderate role ____ Minor role ____ No role

E. Principal

____ Major role ____ Moderate role ____ Minor role ____ No role

41. How many full time equivalent physical education teachers are in your school (including you)? _____

42. How many years have you been a physical education teacher? _____ years

43. How is your school identified? _____ urban _____ suburban _____ rural

44. How many hours per week do you participate in physical activity? _____ hours

45. What is your gender _____ Male _____ Female

46. What is your height in inches? _____ Your weight in pounds _____

47. What is your age? _____ ≤ 30 _____ 31-40 _____ 41-50 _____ 51-60 _____ ≥ 61

48. Your racial/ethnic background

_____ White American (non-Hispanic)

_____ Black or African American (non-Hispanic)

_____ Hispanic or Latino

_____ Asian or Asian American

_____ Other (please explain)

49. Your educational background

_____ Associate's degree Major _____ Minor _____

_____ Bachelor's degree Major _____ Minor _____

_____ Master's degree Major _____ Minor _____

_____ Specialist degree Major _____ Minor _____

_____ Doctoral degree Major _____ Minor _____

Open-ended

50. Explain what you believe your role is in addressing childhood obesity in your school.