2022

The Association among Parental Perceptions and the Childhood Obesity Epidemic

Ian C. Washington
Illinois State University, ianwashington1997@gmail.com

THE ASSOCIATION AMONG PARENTAL PERCEPTIONS AND THE CHILDHOOD OBESITY EPIDEMIC

IAN WASHINGTON

39 Pages

Purpose: The current study seeks to evaluate factors that are related to parental perception from parents who have children between the ages of 2-12 years old. Data was collected on parental perception of their child's weight status, activity level, and sedentary level based on screen time to assess if these factors are associated with increased child BMI.

Methods: Parents with children were invited to participate in a Qualtrics survey that was distributed via email, parental Facebook groups, and social media platforms. Inclusion criteria included being a parent of a child between the ages of 2 and 12 years old. One-way ANOVA was utilized to answer whether child's true BMI, screen time, and physical activity varied by parents' perceptions of child weight status. Furthermore, multiple linear regressions were used to determine if a linear relationship exists between parental perception on their child's weight status, activity level, and screen time to the child's true weight status.

Results: There was a significant effect of parental weight perceptions on child BMI, screen time, and physical activity at the $p \leq 0.05$ level. A Tukey post-hoc revealed that parents who perceived their children as overweight has children that had more screen time than those whose parents perceived their children as about the right weight ($p < .001$). Additionally, there was a significant effect of physical activity on parental perception of child weight at the $p \leq 0.05$ level. A Tukey post-hoc test revealed the mean amount of physical activity in hours per week of

the Overweight group (mean = 4.72)) was significantly lower than those of the About the Right Weight group (mean = 5.87).

Conclusion: This current study shows how lifestyle factors and parental perceptions of their child's weight may be inaccurate based on calculated BMI. These results suggest that parents must accurately recognize overweight and obesity among their children for the implementation of obesity prevention interventions.

KEYWORDS: BMI, Childhood, Lifestyle, Obesity, Overweight, Perception

THE ASSOCIATION AMONG PARENTAL PERCEPTIONS AND THE CHILDHOOD OBESITY EPIDEMIC

IAN WASHINGTON

A Thesis Submitted in Partial
Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE

Department of Family and Consumer Sciences

ILLINOIS STATE UNIVERSITY

2022

THE ASSOCIATION AMONG PARENTAL PERCEPTIONS AND THE CHILDHOOD OBESITY EPIDEMIC

IAN WASHINGTON

COMMITTEE MEMBERS:

Jennifer Barnes, Chair

Julie Schumacher

Chang Su-Russell

ACKNOWLEDGMENTS

I would like to express my deepest thanks to my committee for their continued support and encouragement: Dr. Jennifer Barnes, my committee chair; Dr. Julie Schumacher; and Dr. Chang Su-Russell. I offer a tremendous amount of appreciation for the learning opportunities provided by my committee.

The completion of this project could not have been accomplished without the overwhelming support of my classmates, family, and friends. To all of the dietetic interns – Keep up the extremely hard work; it definitely is not going unnoticed. Thank you to my loving parents, supportive brothers Evan and Eric, and devoted girlfriend Jenna for always being there for me during my time away from home.

I.W.

CONTENTS

TABLES

FIGURES

CHAPTER I: THE ASSOCIATION AMONG PARENTAL PERCEPTIONS AND THE CHILDHOOD OBESITY EPIDEMIC

Introduction

Childhood obesity is an epidemic that has been linked to many chronic diseases with obesity rates continuing to rise. According to the Center for Disease Control and Prevention 18.5% of children ages 2 to 19 years old were obese in 2017-2018. In 2016, it was reported that one-third of children in the United States were obese (Wright et al, 2016). Obesity developed in early life is associated with many chronic diseases in adulthood that contribute to a shorter lifespan, which is haunting due to the fact obesity can be prevented. Current research acknowledges that parental perception is important for successful obesity treatment interventions, however, there is a lack of how accurately parents recognize obesity in their own children (Etelson, et al., 2012). A study focused on eight European countries and 16,220 participants ages 2-9 found that 63% of parents identified their child to be of "proper weight" when they actually had a BMI of 25 or greater, which is categorized as overweight (Regber, et al., 2013). Obesity prevention can be properly executed with the correct perception of a child's body weight and dietary intake to plan for health interventions to reduce the prevalence of overweight and obese children (Almoosawi, et al., 2016).

In addition to accurate parental perception of their child's body weight, other factors that impact child obesity include physical activity level and screen time. Patterns of physical activity are likely to be shaped in early childhood by parental practices and the family environment (Etelson, etl al., 2012). Physical activity and screen time are both modifiable factors that impact weight status and overall health. Screen-based sedentary behavior in excess and low levels of physical activity have emerged as two factors that support the evidence for increased risk for

obesity, therefore should be considered when assessing parental perception of their child (Bai, et al., 2016).

The current study sought to evaluate factors that are related to parental perception of parents who have children of the overweight or obese category. Data was collected on parental perception of their child's weight status, activity level, and sedentary level based on screen time. Measuring these variables helped determine linkages on whether or not misperceptions exist among their own children. This study addressed the following outcomes and hypotheses:

Specific Outcome 1: **Evaluate parental perception of their child/children's weight status, activity level, and screen time.**

H1: Parental perception of their child being overweight/obese will be associated with lower physical activity and greater screen time based off the survey responses.

Specific Outcome 2: Evaluate how parental perceptions of weight status, physical activity level, and screen time mediate the associated risk for obesity.

H2: Misperception of their children's weight status will be positively correlated with higher rates of overweight children in the study.

Methodology

Participants

Parents with children were invited to participate in a Qualtrics survey that was distributed via parental Facebook groups and social media platforms. Inclusion criteria included being a parent of a child between the ages of 2 and 12 years old.

Instruments

Parental perception of their child's weight status, activity level, and screen time was assessed. The survey consisted of 17 total questions. Six questions were asked to gather basic demographic

information regarding child in the household, average household income, urban or rural area residence, highest level of education, and highest level of nutrition education. Questions regarding age and sex of the parent and child were asked to gather basic anthropometric information in four questions. The questions asked included: “In years, how old are you and your child? and “What is the gender of your child?” and the next two questions prompted parents to self-report their child’s height and weight. Participants typed their responses they thought fit best for their child’s height in feet and inches and weight in pounds, which was then converted to body mass index (BMI) by the researchers. For the purpose of this study, three questions were selected from the 2017-2018 National Health and Nutrition Education Survey questionnaire data source. The last three questions asked parents about how they felt about their child’s current weight, cumulative hours of television watched in the past 30 days, and number of days their child receives 60 minutes or more of physically activity per week. Answers for the questions related to child weight, screen time, and physical activity were compared to participant responses of child height and weight.

Statistical Analysis

SPSS statistical software was utilized to calculate the mean and standard deviation through descriptive statistics and frequencies for demographic variables such as age, gender, household income level, highest level of education, area residence (rural or urban), number of children in the household, and ethnicity. Body mass index (BMI) of both parents and children was calculated by dividing the weight in pounds by the height in inches squared and multiplied by 703 and then categorized into four categories: Underweight (<18.5), Normal (18.5-24.9), Overweight (25-29.9), and Obese (30 or >). It should be noted that this equation to calculate for BMI was used for adult and child height and weight and does not account for the BMI- for-age

percentile based on CDC growth charts for children and teens ages 2-19. To examine if an association towards the childhood obesity epidemic exists, a multiple linear regression was conducted to assess if parental perception and answers regarding their child's activity level and screen time provided predict BMI of subjects. A regression analysis was used to determine a linear relationship between parental perception on their child's weight status, activity level, screen time to the child's true weight status. The regression analysis was also used to identify the links between parental misperception and excess BMI of participant's children which ultimately was compared to the responses of the surveys provided. A one-way ANOVA test was utilized to identify if there was a statistically significant difference between variables containing multiple groups. The variables used for the ANOVA testing included the independent variable of parental perception of their child's weight status and dependent variables of child body mass index (BMI), the amount of screen time over 30 days, and the amount of physical activity over seven days.

Results

Participants

The total number of participants that completed the survey and had at least one child between the ages of 2-12 years old was 424. Once the data set was cleaned, 144 surveys were omitted due to incorrect measurements of height and weight provided by participants, and the total number of participants was 280. The most common age range for participants was 35-44 years old (53.2%), then 18-34 years old (34.3%), and lastly 45-64 years old (12.5%). The most common age range for children from the survey was 6-9 years old (38.2%), then 2-5 years old (32.1%), and lastly was 10-12 years old (28.2%). The preferred gender of participants included 215 females (76.8%), 62 (22.1%) males, 3 (.7%) transgender and/or gender non-conforming

unspecified participants. The most common gender among children included 148 males (52.9%), 127 females (45.4%), and lastly 2 genderqueer/different identity (.8%). The ethnicity of participants of the survey included 85.4% Non-Hispanic/White, 6.8% Black/African American, 3.6% Asian, 2.1% Hispanic/Latino, 1.8% Native Hawaiian, and .4% not sure/preferred not to answer.

Calculated BMI Versus Perceptions of Child's Weight, Screen Time, and Physical Activity

To answer the first research question whether a child's true BMI, screen time, and physical activity varied by parent's perceptions of child weight status, a one-way ANOVA analysis was utilized. Of the ANOVA results, there was a significant effect of parental weight perceptions on child BMI at the $p \leq 0.05$ level. (See Table 1.1) Additionally, there was a significant effect between parent reported child screen time varied by parents, $p = <.001$ (See Table 1.2) and perceived child weight statuses at the .05 level, $p = <.001$ on child BMI. (See Table 1.3) A Tukey post-hoc revealed that of parents who perceived their children as overweight, their children had more screen time than those whose parents perceived their children as about the right weight ($p<.001$). Those whose parents reported as not sure ($p<.001$) and revealed the mean of the Overweight group (M = 4.44, SD = 1.47) was significantly higher than those of the About the Right Weight (M = 3.19, SD = 1.48) and the Not Sure group (M = 2.55, SD = .999) at p=.001. Additionally, there was a significant effect of parental perception on child weight and physical activity at the .05 level ($p = <.001$). A Tukey post-hoc test revealed the mean of the Overweight group (M = 4.72, SD = 1.79) was significantly lower than those of the About the Right Weight group (M = 5.87, SD = 2.10) at p=0.049. However, the Underweight and Not Sure group did not differ significantly from each other. Similarly, a Tukey post-hoc test revealed the mean of the About the Right Weight group was significantly higher than those of the Overweight

group (M = 4.72, SD = 1.79) at .049 < .05, Underweight group (M = 4.20, SD = 2.00) at .001 < .05, and Not Sure group (M = 4.45, SD = 2.09) at .021 <.05.

Evaluation of Perceptions and Association of Increased BMI

To determine if a linear relationship between parental perception on their child's weight status, activity level, and screen time to the child's true weight status, a multiple linear regression was used in two blocks. In the first block, age and gender were used as control variables to determine if BMI varied among children of different ages and genders. Furthermore, in the second block, researchers assessed two predictor variables of parental perceptions of child's screen time and physical activity to determine if a linear relationship is associated with an increased child BMI. The regression demonstrated in the first block that age insignificantly predicted child BMI, $\beta = .230$, $t\ (178) = 3.15$, $p < .001$. Similarly, in the first block, gender insignificantly predicted child BMI, $\beta = -.119$, $t\ (178) = -1.63$, $p < .001$. The second block of the regression demonstrated that screen time insignificantly predicted child BMI, $\beta = -.016$, $t\ (178) = -2.18$, $p < .001$. Lastly, the second block of the multiple linear regression identified that physical activity insignificantly predicted child BMI, $\beta = -.031$, $t\ (178) = -.408$, $p < .001$. Overall, the model as a whole was significant, $F_{(2,176)} = 5.97$, $p = .003$ & $F_{(4,174)} = 3.01$, $p = .020$, neither predictor variables were significantly related to child BMI.

Discussion

Parental Perception of Child's Weight

Recognizing overweight or obesity among children is extremely critical for parents to do in order for obesity-prevention treatments to be properly implemented and successfully delivered (Almoosaw, et al., 2016). Recognizing true weight status of children may be hard for parental figures to do or accept, which leads to misperceptions. Misperceptions on child weight status is

common among parents who perceive their child as a healthy weight, when in reality the child could be overweight or obese calculated by their weight for height. Subjective measures are what commonly determine these perceptions, ultimately making objective anthropometric measurements of height and weight to determine an appropriate weight class essential to understanding true weight status (Slater, et al., 2009). Among survey participants, 72% of parents who responded to the survey answered that their child was about the right weight. Furthermore, only 9% of parents perceived their own child's weight status as overweight, far less than the number of parents who believed their child to be of a healthy weight. However, calculated mean child BMI among the parents who believed their children to be of a healthy weight was lower than parents who believed their child to be overweight (18.3 to 21.4). BMIs were calculated based on self-reported height and weight for children and should be taken into account as the accuracy of these BMIs could be influenced by incorrect objective measurements provided.

Exacerbation of health-related issues can arise from weight misperceptions secondary to dietary feeding practices that parents implement for their children. If a child is perceived as underweight, this could result in overfeeding practices from the parents ultimately leading to excess calorie intake and weight gain. Conversely, if a child is perceived as overweight, dietary restrictions may be applied leading to possible disordered eating patterns or nutritional deficiencies. Lastly, a parent may perceive their child as having a normal weight and believe that their child's weight is irrelevant. This could ultimately lead to a child not achieving a normal body weight (over or underweight) induced by poor diet quality (Adamo & Brett, 2014). All of these scenarios result in poor feeding strategies implemented by parents which could impact the health and well-being of the youth, making it exceptionally important for parents to correctly

identify and accept their child's weight. For obesity prevention interventions such as serving healthy foods, reducing screen time, and increasing physical activity to be properly applied, parents must recognize the presence of overweight or obesity among their children in order to ensure successful intervention against the childhood obesity epidemic (Almoosawi, et al., 2016).

Screen Time

Sedentary behaviors significantly impact a child's health and weight negatively if high amounts are reported. The results of this study further support the research with findings of decreased physical activity among children who were perceived as "Overweight." Children of the "overweight" perception were found to consume the greatest amount of screen time with a mean score of 4.44 hours per day, the highest among any group. Parent's children who were perceived as "Underweight" were reported to have the second highest amount of screen time with a mean score of 3.92 hours per day. Lastly, children of "Just the right weight" were found to have the least amount of screen time per 30 days with an average of 3.19 hours per day. All of these findings are consistent with current research suggesting that children who are exposed to increased amounts of sedentary lifestyle behaviors, such as screen time, can be associated with increased weight, increased adiposity, and decreased muscle mass while children who are exposed to less screen time are more likely to achieve healthy weights. Furthermore, this research study and its findings further support the cause and effect relationship between screen time and weight gain and demonstrate that reducing screen media time results in less BMI gain in children (Robinson, et al., 2018).

Physical Activity

Another factor that contributes to the childhood obesity epidemic is the limited amount of physical activity children are getting throughout the week. The Centers for Disease Control and Prevention (CDC) recommends children from ages 6 to 17 to engage in moderate to vigorous physical activity for at least 60 minutes per day. However, previous research suggests less than one quarter (24%) of children ages 6-17 years old get this amount per day, which ultimately contributes to childhood obesity by leading to energy imbalances and a surplus of caloric intake versus energy expended through physical activity. In this current study it was found that decreased moderate to vigorous physical activity can exacerbate the risk for children being susceptible to chronic health conditions such as obesity leading into adulthood, type two diabetes mellitus, and coronary heart disease (Pope et al., 2020).

Conversely, increased physical activity among children has been negatively associated with childhood overweight and obesity, therefore children that are of increased body weight who follow the greater than 60 minutes of moderate to vigorous physical activity are at decreased risk for overweight and obesity. To support this research, in this study 72% of parents who perceived their child as "About the right weight" reported their child received higher amount of days physically active for more than 60 minutes compared to any other group with a mean score of 5.87 out of seven possible days. Furthermore, 10% of parents who perceived their child's weight status as "Overweight" reported that their child received an average of 4.72 out of seven possible days, the second highest among groups. This further supports research that has shown children of normal BMI spend more time participating in MVPA and those of overweight and children of elevated BMIs participate in less MVPA (Goa, et al., 2013). While a cause for these findings

have not been identified, the association of BMI and activity level should be considered when assessing physical activity levels among children.

Strengths and Limitations

There are many strengths and weaknesses of this study. A strength of the survey and the questions analyzed was that the survey consisted of questions that assessed parental perceptions from the 2017-2018 National Health and Nutrition Education Survey questionnaire data source. The survey also asked a variety of questions covering various health-related topics regarding nutrition education level, household income, and weight perceptions and weight analysis (child height, child weight, parent height, parent weight, and calculated BMI). These variables were utilized in data analysis for many statistical tests to assess significance among variables. Another strength of the survey was that it was distributed from a variety of social media sources. This allowed for a decreased chance of bias among participants by answering questions anonymously via their personal social media accounts. Lastly, the study consisted of a rather large sample size of 462 initial survey responses, but after data analysis and exempting any participant error, 248 surveys were accounted for. Surveys allowed for anonymous answers, timely responses, flexibility for participants, convenience, and are cost effective when wanting to gather meaningful data.

The study consisted of limitations that could have ultimately impacted the outcome of the study's results. Diversity among participants did not seem to vary with the majority of participants being white and living in urban communities. Furthermore, the ANOVA test used tested differences in screen time and activity based on perceived weight status instead of true weight status. Additionally, participants were asked to self-report their own height and weight instead of being correctly measured and weighed. Similarly, parents self-reported height and

weight for their children which ultimately could impact the validity of the calculated BMIs. Surveys can also have a lack of reliable answers based on quality, dishonesty from the participants and limited answers in general where it can be hard to classify responses when analyzing results. Furthermore, BMI is widely criticized as an imperfect measure of adiposity despite its large-scale use. BMI does not take into account the amount of lean body mass someone has, instead it is a number calculated based on just height and weight which could impact how a parent may perceive their child's weight status. BMI of both parents and children was calculated by dividing the weight of in pounds by the height in inches squared and multiplied by 703 and then categorized into 4 categories: Underweight (<18.5), Normal (18.5-24.9), Overweight (25-29.9), and Obese (30 or >). It should be noted that this equation to calculate BMI was used for adult and child height and weight and does not account for the BMI-for-age percentile based on CDC growth charts for children and teens ages 2-19. Lastly, parents were asked on how they consider their child's weight based on underweight, right weight, overweight, and not sure classifications. The wording of these questions may lead to subjective interpretation of these classifications rather than objectively measuring and weighing their children.

Future Implications

The study was able to assess parental perceptions regarding their children's weight and lifestyle factors and how these perceptions can compare to true body weight. Data collected in this study showed significant relationships between calculated BMI compared to the amount of physical activity and screen time children are exposed to. However, influences on how these lifestyle factors are impacted has yet to be studied. This study creates a picture for researchers to further assess factors that impact parental weight perceptions, food choices and feeding practices,

and access to healthcare professionals on how they may impact the health and wellness of the overweight and obese youth. Furthermore, research has shown that misperceptions on children weight among parents exists, but follow-up studies that include obesity interventions have yet to be fully understood. With the lack of research in this related field in combination with what has already been studied, follow-up studies of intervention strategies within the home and community settings communicated by health care professional such as registered dietitians should be further researched to fully understand what approach is most effective towards decreasing childhood obesity rates.

Conclusion

Childhood obesity prevalence has been consistently on the rise for decades with limited research on obesity intervention strategy studies in place. Obesity is a serious health problem for children that may fail to resonate with parents. This current study shows how lifestyle factors and parental perceptions of their child's weight may be inaccurate based on calculated BMI. The results of how lifestyle factors impact BMI among children were found to be consistent with current research today and indicated that a significant relationship existed between parental perceptions and child's calculated BMI, screen time, and physical activity. Children of higher BMIs were exposed to higher amounts of screen time and less amounts of physical activity, while children of lower BMIs were found to have increased amount of physical activity and decreased screen time based on survey answers. However, many other complex and integrated factors influence how child weight may be perceived. Parents need to identify the risks associated with childhood obesity and implement obesity prevention interventions that can be easily applied within home and community settings to combat the childhood obesity epidemic. Although parents cannot completely control all factors that impact obesity rates, they play such

an important role in the development of child eating and lifestyle behaviors. Understanding misconceptions and unhealthy beliefs is an important starting point for the implementation of early intervention strategies against the obesity epidemic that involve parental figures and health care professionals.

CHAPTER II: EXTENDED REVIEW OF LITERATURE

Introduction

According to the Centers for Disease Control and Prevention (CDC), one in five children in the United States has obesity. Obesity is a complex disease in which many non-modifiable and modifiable factors contribute to its prevalence such as genetics, school environments, access to nutrient-dense, healthy foods, eating behaviors, physical activity levels, and sedentary behaviors. Aside from genetics, these factors can be modified by parental figures to ensure healthy weight in children (Bahreyian, et al., 2017). In order for obesity prevention interventions such as serving healthy foods, reducing the amount of screen time exposure, and encouraging increased physical activity to be successful, the recognition of overweight and obesity among children must be established (Almoosawi, et al., 2016). Parental misperception of a child's weight status, activity level, or sedentary behaviors could result in a lack of intervention strategies ultimately contributing to the already established childhood obesity epidemic (Adamo & Brett, 2014).

Parents as Dietary Role Models

Eating behaviors evolve during the first years of life as a result of biological and behavioral influences to ensure health and growth for a child (Savage et al., 2008). Parents are universally known to provide for their children, including choosing what foods and how to prepare these foods for their children (Adamo & Brett, 2014). They are the role models for their children and have a tremendous influence of childhood development. Parental knowledge of nutrition and healthy lifestyle behaviors has a significant influence on their children and that ultimately decreases the risk of nutrition-related disease later in life (Ruby, et al. 2014). Parents may not recognize obesity in their child due to being unaware of growth charts or inaccurately estimating their child's weight status both of which provide objective data to determine obesity

parameters (Regber, et al., 2013). The misperception of the child's weight status, activity level, or dietary intake could result in a lack of initiation towards obesity prevention (Adamo & Brett, 2014).

In addition to feeding their children, parents are the main deciders of what their children eats, model eating behaviors and exercise habits, and make decision regarding their child's lifestyle activities (Vittrup & McClure, 2018). However, given the intergenerational transmission of obesity, parents are a child's key source to discovering new and effective strategies that can prevent childhood obesity (Vittrup & McClure, 2018). Only 15% of American parents were concerned about their child's weight, and of the same parents, 40% of them believed that their child would "grow out of" their weight and lifestyle choices (Wright et al, 2016). This draws for a level of concern considering parents control their child's environment, and 5% of parents would willingly increase their child's daily activity to control their child's weight if elevated (Vitrup & McClure, 2018). Parents who do not accurately perceive their child's weight may not know the correct term for obesity, which could be linked to continuous parenting practices that lead to a lack of physical activity and increased screen time.

Parental Obesity Status & Impact on Child's Weight

Parental weight is one of many predictors that influence obesity among children (Bahreyian, et al., 2017). The way a parent may go about their dietary and lifestyle habits could influence child behavior and if undesirable, may cause an increased risk for childhood obesity. A longitudinal study conducted by Mears, et al. (2020) aimed to explore whether or not BMI z-scores would increase through childhood and if an association between parent BMI and child BMI z-scores would exists. The study was completed in two phases: a 1-year initial phase and a 4-year follow up phase by assessing child height, weight, and BMI of the child's parent. Of the

1,299 children enrolled in the study, 538 children participated in both year 1 (12% overweight & 8% obese) and year 4 phases (14% overweight and 10% obese). Multivariable linear regression models examined the cross-sectional associations between child BMI z-score and parent BMI in Year 1 and 4 by demonstrating a strong association between increased child BMI z-score 0.198 to 0.330 ($p = < 0.005$). Similarly, for every unit increase in parent BMI, an increase in BMI z-score among children was discovered: 0.047 in Year 1 ($p = < 0.005$) and of 0.059 in Year 4 ($p = < 0.005$). Researchers concluded that an increased BMI at a young age could be associated with an increase in BMI at later ages and that parental BMI scores were independently associated with their child's BMI z-score.

Similarly, a cross-sectional nationwide study conducted by Bahreyian, et al., (2017) assessed an association between obesity and parental weight status in children and adolescents by comparing BMI values of children to BMI values of parents. Of the 23,043 participating children and one of their parent figures, mean BMI values were calculated. Mean BMI of parents (65.6% overweight/obese) was 27.0 ± 4.57 kg/m2, and mean BMI of children (15.1% overweight/obese) was 18.8±4.4 kg/m2, respectively. Ordinal regression models were utilized by researchers to estimate odds ratio (ORs) and 95% confidence intervals of obesity by parental weight status after adjusting for confounders. Due to varying weight statuses among girls and boys, both genders were analyzed separately. Results showed that in children who had obese parents, OR of being obese was 2.79 for boys (OR=2.79; 95% confidence interval (CI)=2.44-3.20) and 3.46 for girls (OR=3.46; 95% CI=3.03-3.94) compared to boys and girls with parents of normal weight status. Boys were also 1.7 times more overweight than those with parents of normal weight parents. Overall, the study concluded that a shared-family environment was found to be multi-factorial contributor to the childhood obesity epidemic and that the implementation

of family-centered obesity preventive programs are necessary to decrease childhood obesity rates.

Activity Level and Parental Perception of Child's Weight

Physical activity starting at a young age is one of many factors to prevent childhood obesity and obesity development later in life. However, physical activity as an intervention that may never be initiated if the parent does not perceive their child as overweight (Vangeepuram, et al., 2016). Most children do not engage in moderate to vigorous physical activity that reach durations long enough to promote a healthy body weight, and those who are more physically active are the children of a normal body mass index (Brunet, et al., 2014). Parents of children who have an elevated BMI are less likely to encourage physical activity if they show no concern of their current weight status (Tompkins, et al., 2015). Correctly identifying weight status of a child, particularly in the overweight or obese category, may incline a parent to take measures that encourage a healthy lifestyle and behavior for their child.

The Centers for Disease Control and Prevention (CDC) recommends children from the ages of 6 to 17 years old engage in at least 60 minutes of moderate to vigorous physical activity each day. If parents can correctly acknowledge their child's weight status, the next step would be to understand the importance of physical activity and if their child gets enough using the CDC's recommendations as a reference. Parental support for physical activity mediates the relationship between physical activity behavior and a child's participation in physical activity (Tompkins, et al., 2015). If left unrecognized, excess weight in children can increase the risk for obesity-related diseases in the future as they age.

Children's Weight Status and Impact on Activity Level

Excess weight among children is a multi-factorial disorder and is commonly derived from two origins: genetic and environmental factors (Bahreyian, et al., 2017). Given the negative health outcomes that are associated with childhood obesity (coronary heart disease, diabetes, etc.) leading into adulthood, daily physical activity among children is a lifestyle behavior that could be paramount in decreasing the risk of these outcomes (Pope, et al, 2020). A child's body mass index (BMI) has been shown to impact behavior towards the type of physical activity, the duration of physical activity, and sedentary behavior. Among children, schools play a large role in preventing childhood obesity with 95% of children enrolled in schools that allow students to participate in structured physical education (PE) programs (Gao, et al., 2013). With the majority of children exposed to physical activity programs in school to promote a positive environmental setting for children, a correlation of increased BMI and decreased physical activity still exists.

A cross-sectional study conducted by Pope, et al (2020) examined body mass index and its impact of physical activity among 138 first- and second-grade children via accelerometry over a three-day period during morning recess, lunch recess, and after school. Descriptive analyses were used to describe the characteristics of the sample, number of children classified as healthy weight, overweight, and obese, and the number of minutes children spent in sedentary behavior (SB), light physical activity (LPA), and moderate to vigorous physical activity (MVPA). Significantly higher MVPA was observed among children of healthy weight versus children of overweight/obese body weight during morning recess, $t(136) = 2.15$, $p = 0.03$, after school, $t(136) = 2.68$, $p < 0.01$, and overall, $t(136) = 2.65$, $p < 0.01$ (Pope, et al., 2020). A similar study conducted by Gao, et al (2013) discovered that children of normal BMI spent significantly more

time participating in MVPA during physical education class and those of overweight and obese BMIs were found to have increased sedentary behaviors and participated in less MVPA.

While a cause for these findings has not been identified, the association of BMI and activity level should be considered when assessing physical activity levels among children, especially with prior knowledge of increased negative health outcomes with sedentary behavior (Brunet, et al., 2014). Environments that promote and allow for children to participate in MVPA, especially school settings, throughout the day could decrease sedentary behavior among children and ultimately result in improved weight management which could lead to better health outcomes in adulthood (Pope, et al., 2020).

Screen Time and Parent's Role

Sedentary behaviors, predominantly excess screen time, impact child's health and weight status in a negative way. Parents play a pivotal role in the early years of their child's life when it comes to establishing and shaping the sedentary behaviors, primarily through role modeling and creating a healthy at-home environment (Xu, et al., 2014). Current research has found that children who consume more screen media time have a lower dietary intake of fruits and vegetables and more energy-dense food and drink with most of the calories coming from fats, meaning the foods are also high calorie (Robinson, et al., 2018). Increased screen exposure and consumption of unhealthy, high-calorie foods is one of the contributing factors of the childhood obesity pandemic. On top of that, increased sedentary behavior and decreased physical activity result in excess weight gain.

Screen time is just one of the many factors that contributes to obesity rates in children, but limiting this sedentary behavior is correlated with a reduction of weight among children (Robinson, et al., 2018). This cause and effect relationship can be limited through healthy

behaviors that encourage less usage of a screen. limiting screen time can lead towards behaviors that ultimately result in a healthy lifestyle and weight loss among overweight children. Parents are the primary initiators of these intervention tactics and must consider their child's screen usage to decrease the risk of obesity, for it is one of many factors widely documented that contributes to excess weight at a young age (Bai, et al., 2016).

Parental Perceptions and Child Diet Quality

Parental perception of their child's dietary patterns or of their weight status can be inaccurate allowing for parental decisions that may be deemed unhealthy, thus resulting in increased child weight. These decisions are powered by a number of influences that shape parental perceptions that ultimately are linked to diet quality in their children. Influences include socioeconomic status, social pressures, self-knowledge of food/food choices, media, and biological factors such as genetic makeup of parents (Adamo & Brett, 2014). From these influences, a parent's perception is formed, completely ignoring what has been proven to be healthy for young children, which leads to poor diet quality. However, a child's diet quality may also be affected by other factors that do not include parental behavior and attitude. A child who attends schools may also be exposed to social pressures, have excess or limited food availability, and watch television/media that can form their own perceptions towards food (Adamo & Brett, 2014).

Poor diet quality in children can be linked to under or overnutrition depending on what feeding practices a parent uses. It is pivotal for parents to have the correct perception of a nutritious diet to ensure a high-quality diet. If a parent is not knowledgeable of calorie-dense foods versus nutrient-dense foods, portion sizes, or energy balance, the quality of eating behaviors can be impacted in a negative way. Based on the 2020 Dietary Guidelines for

Americans, children of the ages 2-8 years old following a 2,000-calorie diet should consume 2 cups of fruit and 2 ½ cups of vegetables, and children of the ages nine and above should consume 2 cups of fruit and 3 ½ cups vegetable. With increased obesity rates, especially in children, the intake of fruits and vegetables is small while the intake of calorie-dense, high-sugar foods is increased (Eliason, et al., 2020). This requires interventions and realization from the parent that their child's diet is not considered healthy. Improving children's consumption of fruits and vegetables starts with the parent perceiving their child's diet as unhealthy to initiate a change towards their own perception and allowing for improved dietary patterns (Eliason, et al., 2020)

Parental Perception on Child's Weight

Parents often perceive their child as being healthy or may not even realize that their child is over or underweight. No parent wants to think that their parenting style towards their children is wrong or unjust. However, recognizing overweight and obesity is critical for a parent to promptly act with approaches to treat obesity (Almoosawi, et al., 2016). Failure to realize excessive body weight of a child may prolong unhealthy eating behaviors and ultimately lead to the development of chronic disease later in life. Just like parental perceptions of a healthy diet, there are a number of factors that influence the perception of a parent and their child's weight status and body composition. These factors include the parent's weight, weight of the child's peers, cultural beliefs, and stereotypes portrayed by the media. Of the factors that influence parental perception on a healthy diet, these influences on parental perception on child weight have similarities.

Misperceptions on child weight status is often identified when the parent believes their child is of a healthy weight when in reality, they are overweight or obese. Research has shown a

link of misperception and child weight. Parents use subjective measures to determine their perceptions, which supports parents' need for objective education on methods to determine anthropometric data to accurately determine if their child is of appropriate weight (Slater, et al., 2009). In a study of 172 children (40% of these children being overweight or obese according to the CDC's BMI-for-age growth charts), parental misperception of their child's weight status was found to be significant, indicating that all parents of overweight children and 75% of parents with obese children incorrectly identified as their children being of normal weight (Vittrup & McClure, 2018).

Many scenarios have been suggested that may be linked to poor diet quality in children based on parental misperception. According to Adamo and Brett (2014), a child that is misperceived as underweight could result in an overfeeding pattern induced by the parents for their child to reach a healthy weight. This could lead to excess calorie intake and ultimately childhood obesity. Another scenario is opposite of the previous stated one. A parent may perceive their child as overweight and restrict their caloric intake. A result for a child of this scenario is a caloric deficit, thus resulting in the possibility of disordered eating patterns and nutrient deficiencies. Lastly, a child could be of a normal weight and a parent may perceive their child's dietary intake as irrelevant. This could lead a parent to choose unhealthy foods for a child because it will have no effect on their weight status and body composition. All of these scenarios ultimately result in poor diet quality for the child by impacting their eating behaviors and practices. The long-term effects of poor diet quality could lead to undernutrition or obesity, which is why it is important for parents to identify their child's weight status and health accurately.

Research has suggested that parents may be failing to recognize overweight and obesity in their own children (Hudson, et al., 2011). A study conducted by Hudson et al. (2011), revealed that parents commonly misinterpret their child's weight status, and sometimes even their own. A national dietary survey was distributed among 1,885 parents in rural/urban Ireland to assess perception of their child's weight. Of the 1,885 parents who participated, 441 children were enrolled in the study. The survey assessed parental perception of their child's weight status by whether the parents agreed to the statement, "My child/teenager's weight is fine for his/her height," and answers obtained from the survey were then compared to their child's BMI calculated from objective measurements of height and weight. Results showed that 83.3% of parents with an overweight (BMI > 25 kg/m^2) boy and 79.3% of parents with an overweight girl responded to the national survey that their child's weight was "fine for his/her height." Furthermore, 44.4% of parents of obese (BMI > 30 kg/m^2) boys and 45.3% parents of obese girls answered the same response. Overall, roughly 50% of parents with obese children and 81% of parents with overweight children failed to correctly report that their child's weight for the height, concluding that parents who lack the ability to correctly identify obesity-related risks among their children may result in childhood obesity leading into adulthood and lack of initiation of obesity-prevention interventions.

Parental Barriers Towards Childhood Obesity & Role in Prevention Strategies

Obesity in children increases the risk of obesity later in life. One-third of preschool-age children, and one-half of school-age children become obese adults (Cullinan & Cawley, 2017). To combat childhood obesity as a society, it is important to understand how the parents of a child feel about obesity and diet-related issues to reveal disparities or create opportunities to implement future childhood obesity prevention plans (Vittrup & McClure, 2018). Many barriers

exist for parents who lack nutrition-related knowledge which can influence how parents implement dietary and lifestyle habits for their children. However, in order for parents to become proactive about their child's health by improving their diet, encouraging physical activity, or seeking health care guidance from a medical professionals (pediatricians, primary care physicians, or registered dietitians), parents much first recognize that their child is in fact overweight or obese and ignore any social desirability bias that they may have (Cullinan & Cawley, 2017).

A study conducted by Eck, et al. (2018), revealed that parents commonly reported a self-barrier of accurately serving appropriate portion sizes to their children and understanding age-appropriate portion sizes. Of a similar study, parents also self-identify food cost, lack of nutrition-related knowledge, and lack of time to prepare foods as barriers to obesity prevention techniques (Vittrup & McClure, 2018). However, given the authority parents have over their children when it comes to their diet and lifestyle at a young age, health professionals should advocate for ways to empower parental figures on ways to implement obesity prevention strategies once their perceptions and barriers are understood.

Given their role in shaping their child's lifestyle behaviors and eating habits in combination with understanding any self-perceived barriers that parents may express that make it difficult for to achieve a healthy body weight for their children, change can be implemented. Parents heavily influence their children's eating behaviors, physical activity, and sedentary behaviors through their food and activity parenting techniques, therefore intervention aimed to prevent childhood obesity should also engage and change the behaviors of the parent figure (O'Kane, et al., 2017). Although there has not been enough scientific evidence of specific intervention programs that parents can utilize to prevent their child from becoming overweight or

obese, a meta-analysis of 119 articles published from 2008 to 2015 about unique childhood obesity interventions was conducted and results showed that the home (28%), primary health care (27%), and community (33%) were the most common intervention settings and that diet (90%) and physical activity (82%) were the two highest factors targeted in interventions programs (Ash, et al., 2017). This would indicate that for prevention and intervention efforts to be effective, parent support is pivotal (Vittrup & McClure, 2018).

Dietitians of Canada conducted a study that conducted four focus groups with 28 parents of children between the ages of 2-5 that assessed their perceptions of strategies to support the development of healthful weight-related behaviors and approaches to measure weight-related behaviors and outcomes among children and families. The results showed that parents from all focus groups reported that a family health program should provide practical strategies that could be easily implemented to their lives communicated by nutrition professionals, such as dietitians working in a public health setting (O'Kane, et al., 2017).

Conclusion

In conclusion, parental barriers must be addressed to properly approach the childhood obesity pandemic with effective intervention strategies (Vittrup & McClure, 2018). Once these parental barriers are better understood, intervention strategies that involve both the parent and child should aim to improve dietary and lifestyle habits (O'Kane, et al., 2017). Research has shown that parental misperceptions of their child's weight status, lifestyle activities, and dietary behaviors exist, but ways to address these misperceptions have yet to be fully understood. With the lack of research in this related field in combination with what has already been studied, follow-up studies of intervention strategies within the home and community settings should be

further researched to fully understand what approach is most effective towards decreasing childhood obesity rates.

Table 1.1: Effect of Parental Perception of Child Weight Status on Calculated Child BMI

Child BMI	Underweight	19	16.6	3.07	.005
	About the Right Weight	131	18.3	4.46	
	Overweight	17	21.4	5.39	
	Not Sure	14	16.9	1.88	
Total	181	181	18.3	4.42	

Table 1.2: Effect of Parent-Reported Screen Time on Calculated Child BMI

Child BMI	Underweight	19	16.6	3.07	.005
	About the Right Weight	131	18.3	4.46	
	Overweight	17	21.4	5.39	
	Not Sure	14	16.9	1.88	
Total	181	181	18.3	4.42	

Table 1.3: Effect of Days Active Compared to Perceived Child BMI

Child BMI	Underweight	19	16.6	3.07	.005
	About the Right Weight	131	18.3	4.46	
	Overweight	17	21.4	5.39	
	Not Sure	14	16.9	1.88	
Total	181	181	18.3	4.42	

Table 2.3: Ethnicity of Participants

Race	**N**	**Percent**
Asian	10	3.6
Nattive Hawaiian or other Pacific Islander	5	1.8
Black or African American	19	6.8
Hispanic or Latino	6	2.1
White	239	85.4
Prefer not to answer	1	.4
Total	280	100.0

Table 2.4: Age of Participants

Age (In Years)	N	Percent
18-34	96	34.3
35-44	149	53.2
45-64	35	12.5
Total	**280**	100

Table 2.5: Age of Children Participants

Age (In Years)	N	Percent
2-5	90	32.1
6-9	107	38.2
10-12	79	28.2
Total	**276**	98.6

Table 2.6: Gender of Participants

Gender	N	Percent
Male	62	22.1
Female	215	76.8
Genderqueer/Gender non-conforming	1	.4
Other	2	.7
Total	277	100.0

Table 2.7: Gender of Children

Gender	N	Percent
Male	148	52.9
Female	127	45.4
Genderqueer/Gender non-conforming	1	.4
Other	1	.4
Total	277	98.9

Table 2.8: Children Among Household

Number of Children	N	Percent
1	101	36.1
2	127	45.4
3	34	12.1
4	17	6.1
7 or more	1	.4
Total	280	100.0

Figure 1.1 Calculated Child BMI compared to Perceived Child BMI

Significant effect of parental weight perceptions on child BMI.

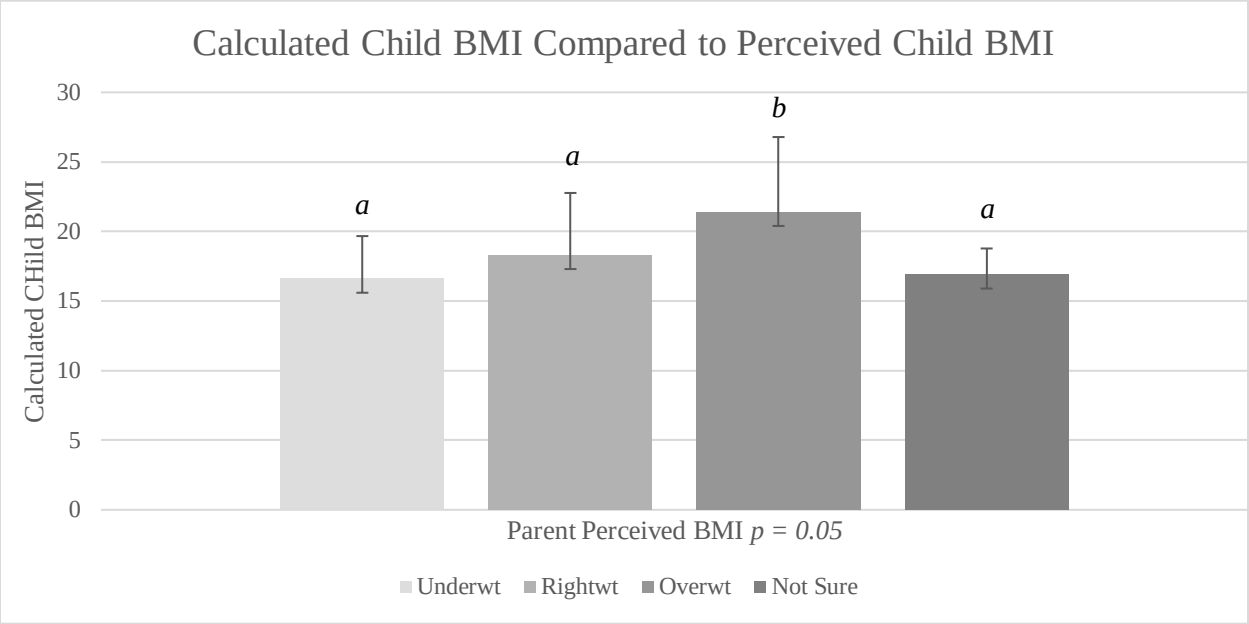


Figure 1.2: Child Screen Time Compared to Perceived Child BMI

Significant effect of parental weight perception on reported screen time.

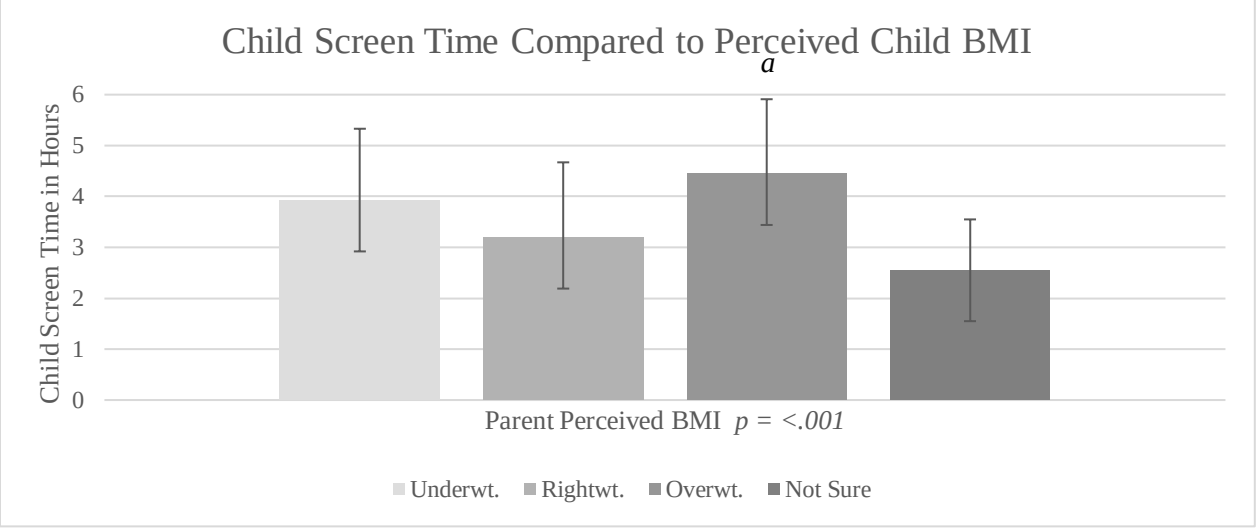
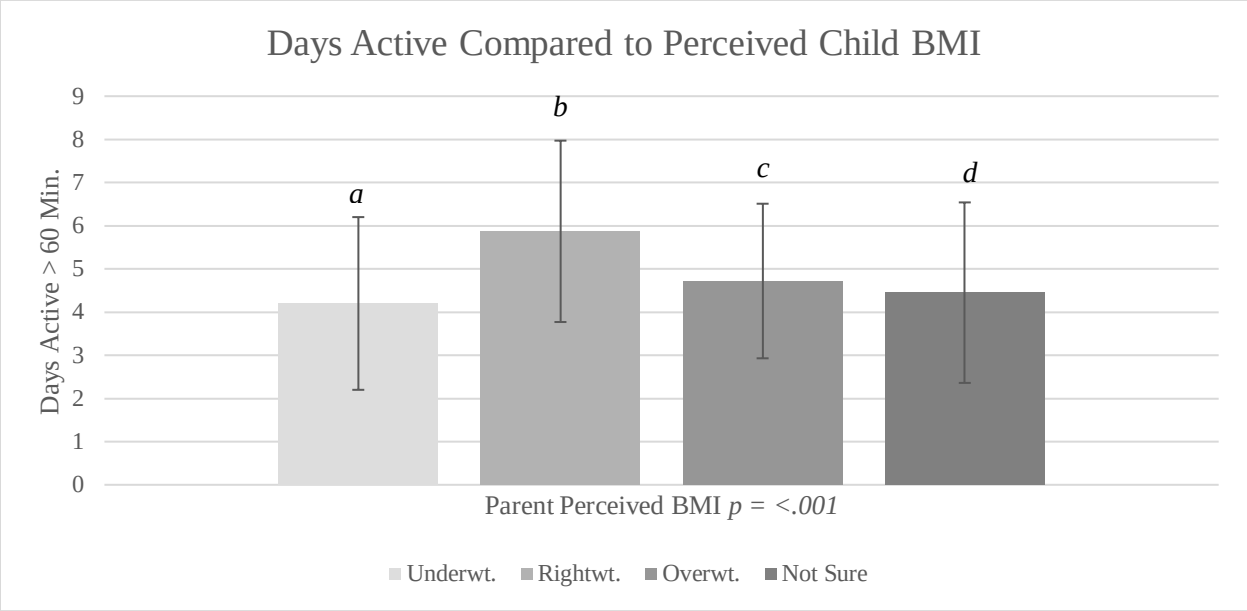


Figure 1.3: Days Active Compared to Perceived Child BMI

Significant effect of parental perception on child weight and physical activity.



REFERENCES

Adamo, K., & Brett, K. (2014). Parental perceptions and childhood dietary quality. *Maternal & Child Health Journal, 18(4),* 978–995. https://doi.org/10.1007/s10995-013-1326-6

Almoosawi, S., Jones, A.R., Parkinson, K.N., Pearce, M.S., Collins, H., & Adamson, A.J. (2016). Parental perception of weight status: influence on children's diet in the gateshead millennium study. *PloS one, 11(2).* https://doi.org/10.1371/journal.pone.0144931

Ash, T. (2017, August 24). Family-based childhood obesity prevention interventions: a systematic review and quantitative content analysis - International Journal of Behavioral Nutrition and Physical Activity. BioMed Central. https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-017-0571-2

Bahreynian M, Qorbani M, Khaniabadi BM, et al. Association between Obesity and Parental Weight Status in Children and Adolescents. *J Clin Res Pediatr Endocrinol. 2017;9(2)*:111-117. doi:10.4274/jcrpe.3790

Bai, Yang et al. "The Associations of Youth Physical Activity and Screen Time with Fatness and Fitness: The 2012 NHANES National Youth Fitness Survey." *PloS one* vol. 11,1 e0148038. 28 Jan. 2016, doi:10.1371/journal.pone.0148038

Brunet, J., Sabiston, C., O'Loughlin, J., Mathieu, M., Tremblay, A., Barnett, T., & Lambert, M. (2014) Perceived Parental Social Support and Moderate-to-Vigorous Physical Activity in Children at Risk of Obesity, Research Quarterly for Exercise and Sport, 85:2, 198-207, DOI:10.1080/02701367.2014.893049

Campbell, K.J., Crawford, D.A., Salmon, J., Carver, A., Garnett, S.P., and Baur, L.A. (2007), Associations Between the Home Food Environment and Obesity-promoting Eating Behaviors in Adolescence. *Obesity, 15*, 719-730. https://doi.org/10.1038/oby.2007.553

Eck, K., Delaney, C., Leary, M., Famodou, O., Olfert, M., Shelnutt, K., & Byrd-Bredbenner, C. (2018). "My Tummy Tells Me" Cognitions, Barriers and Supports of Parents and School-Age Children for Appropriate Portion Sizes. *Nutrients, 10(8),* 1040. https://doi.org/10.3390/nu10081040

Eliason J., Acciai F., DeWeese R., Lopez S., and Vachaspati P. (2020). Children's consumption patterns and their parent's perception of a healthy diet. *Nutrients, 12(8),* 2322. https://doi.org/10.3390/nu12082322

Etelson, D., Brand, D.A., Patrick, P.A. and Shirali, A. (2012). Childhood obesity: do parents recognize this health risk?. *Obesity Research, 11(11),* 1362-1368. https://doi.org/10.1038/oby.2003.184

Gao Z., Oh H., Sheng H. Middle school students' body mass index and physical activity levels in physical education. Res. Q. *Exerc. Sport*. 2013; 82:145–150. doi: 10.1080/02701367.2011.10599732.

Hudson E, McGloin A, McConnon A. Parental weight (mis)perceptions: factors influencing parents' ability to correctly categorise their child's weight status. *Maternal Child Health J.* 2012 Dec;16(9):1801-9. doi: 10.1007/s10995-011-0927-1. PMID: 22139047.

Huilan Xu, Li Ming Wen, Chris Rissel, "Associations of Parental Influences with Physical Activity and Screen Time among Young Children: A Systematic Review", *Journal of Obesity*, vol. 2015, Article ID 546925, 23 pages, 2015. https://doi.org/10.1155/2015/546925

Mears, R., Salway, R., Sharp, D., Shield, J. P. H., & Jago, R. (2020). A longitudinal study investigating change in BMI z-score in primary school-aged children and the association of child BMI z-score with parent BMI. *BMC Public Health, 20(1),* 1–7. https://doi.org/10.1186/s12889-020-10001-2

Natale, R. A., Messiah, S. E., Asfour, L., Uhlhorn, S. B., Delamater, A., & Arheart, K. L. (2014). Role Modeling as an Early Childhood Obesity Prevention Strategy. *Journal of Developmental & Behavioral Pediatrics*, *35*(6), 378–387. https://doi.org/10.1097/dbp.0000000000000074

O'Kane, C., Wallace, A., Wilson, L., Annis, A., Ma, D. W., & Haines, J. (2018). Family-Based Obesity Prevention: Perceptions of Canadian Parents of Preschool-Age Children. *Canadian Journal of Dietetic Practice and Research, 79(1),* 13–17. https://doi.org/10.3148/cjdpr-2017-027

Pope ZC, Huang C, Stodden D, McDonough DJ, Gao Z. Effect of Children's Weight Status on Physical Activity and Sedentary Behavior during Physical Education, Recess, and After School. *J Clin Med.* 2020;9(8):2651. Published 2020 Aug 15. doi:10.3390/jcm9082651

Regber, S., Novak, M., Eiben, G., Bammann, K., De Henauw, S., Fernández, A. J. M., Gwozdz, W.Kourides, Y., Moreno, L. A., Molnár, D., Pigeot, I., Reisch, L., Russo, P., Veidebaum, T., Borup, I., & Mårild, S. (2013). Parental perceptions of and concerns about child's body weight in eight European countries - the IDEFICS study. *Pediatric Obesity, 8(2),* 118–129. https://doi.org/10.1111/j.2047-6310.2012.00093.x

Robinson, T. N., Banda, J. A., Hale, L., Lu, A. S., Fleming-Milici, F., Calvert, S. L., & Wartella, E. (2018). Screen Media Exposure and Obesity in Children and Adolescents. *Pediatrics, 140*(Suppl 2), S97–S101. https://doi.org/10.1542/peds.2016-1758K

Savage, J. S., Fisher, J. O., & Birch, L. L. (2007). Parental influence on eating behavior: conception to adolescence. *The Journal of law, medicine & ethics: a journal of the American Society of Law, Medicine & Ethics, 35*(1), 22–34. https://doi.org/10.1111/j.1748-720X.2007.00111.x

Slater, A., Bowen J., Corsini N., Gardner C., Galley R., and Noakes M. (2009). Understanding parent concerns about children's diet, activity and weight status: an important step towards effective obesity prevention interventions. *Public Health Nutrition, 13 (8),* 1221-1228. https://doi.org/10.1017/S1368980009992096

Tompkins, C., Seablom, M., & Brock, D. (2015). Parental Perception of Child's Body Weight: A Systematic Review. *Journal of Child & Family Studies, 24(5),* 1384–1391. https://doi.org/10.1007/s10826-014-9945-0

U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2015.* 9th Edition. January 2021. Available at DietaryGuidelines.gov.

Vangeepuram, N., Ramos, M. A., Fei, K., Fox, A. M., Horowitz, C. R., Kleinman, L. C., & Galvez, M. P. (2016). Are Parental Perceptions of Child Activity Levels and Overall Health More Important than Perceptions of Weight?. *Maternal and child health journal, 20(7),* 1456–1463. https://doi.org/10.1007/s10995-016-1944-x

Vittrup, B., & McClure, D. (2018). Barriers to Childhood Obesity Prevention: Parental Knowledge and Attitudes. *Pediatric Nursing, 44(2)*, 81–94.

Wright, D. R., Lozano, P., Dawson-Hahn, E., Christakis, D., Haaland, W. L., & Basu, A. (2016). Parental predictions and perceptions regarding long-term childhood obesity-related health risks. *Academic Pediatrics, 16(5)*, 475–481. https://doi.org/10.1016/j.acap.2016.02.007

Xu, H., Wen, L. M., & Rissel, C. (2015). Associations of parental influences with physical activity and screen time among young children: a systematic review. *Journal of obesity*, *2015*, 546925. https://doi.org/10.1155/2015/546925

APPENDIX: SURVEY QUESTIONS

1. How many children are in your household? ____
2. What is your average household income? _____
3. What is your race?
    a. Asian
    b. Native Hawaiian or other Pacific Islander
    c. Black or African American
    d. Hispanic or Latino
    e. White
    f. Other
4. Do you live in a rural or urban area?
    a. Rural
    b. Urban
    c.
5. What is your highest level of education?
    a. Less than high school
    b. Highschool
    c. Associates
    d. Bachelors
    e. Masters
    f. Doctoral
6. What is your highest level of *nutritional* education?
    a. None

b. High school class

c. College course

d. Certificate

e. Degree

7. In years, how old are you? ____

    a. Your child or children? ____

8. What is the gender of your child/ren?

    a. Male

    b. Female

    c. Prefer not to answer

9. What is your height in feet and inches? _____

10. What is the height of your child or children in height and inches? _____

1. How tall is your child without shoes? Please enter height in feet and inches.
2. How much does your child weigh? Please record current weight and enter in pounds.
3. How do you consider your child's weight? Please select the most appropriate answer.

    a. Overweight

    b. Underweight

    c. About the right weight

    d. Do not know

4. Over the past 30 days, on average how many hours per day did your child sit and watch TV or videos? Please select the most appropriate answer.

    a. Less than 1 hour

b. 1 hour

c. 2 hours

d. 3 hours

e. 4 hours

f. 5 hours or more

5. During the past 7 days, on how many days was your child physically active for a total of at least 60 minutes? Please select the most appropriate answer.

    a. 0 days

    b. 1 day

    c. 2 day

    d. 3 day

    e. 4 days

    f. 5 days

    g. 6 days

    h. 7 days