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## ABSTRACT

### ASSOCIATION BETWEEN SEDENTARY BEHAVIORS AND BMI IN US ADOLESCENTS: ANALYSIS OF THE 2015 YOUTH RISK BEHAVIOR SURVEY

By

SARAH SADRUDDIN KABANI

April 27, 2017

**INTRODUCTION:** Research has shown a strong link between sedentary behaviors and obesity among adolescents.

**AIM:** This study aims:

- 1) To determine sedentary behaviors in US high school adolescent nationally
- 2) To determine the association between sedentary behaviors and BMI after controlling for demographics, recreational behaviors, diet, and physical activity
- 3) To examine the association between engaging in more than one sedentary behavior and BMI after controlling for demographics, recreational behaviors, diet, and physical activity

**METHODS:** The Youth Risk Behavioral Survey (YRBS) 2015 data was utilized in this study by using weighted percentages to determine the association between sedentary behaviors and BMI while controlling for demographics such as age, sex, race, and grade, recreational behaviors such as smoking and alcohol consumption, diet such as fruit, vegetable, and soda consumption, and physical activity. Univariate logistic regressions and multivariate logistic regressions were conducted to determine the association between sedentary behaviors and BMI. Adjusted and unadjusted odds ratio, 95% confidence intervals, and *p*-values were calculated.

**RESULTS:** 81.6% of adolescents watched TV during a school day, while 18.4% did not watch TV during a school day. For video games/computer usage/social media (PG) usage, 82.6% engaged in PG usage during a school day, while 17.4% did not engage in PG usage during a school day. When stratifying by BMI, overweight adolescents and obese adolescents have significantly different sex distribution ( $p < 0.0001$ ), race/ethnicity distribution ( $p = 0.047$ ), TV usage during a school day ( $p = 0.04$ ), PG usage during a school day ( $p = 0.047$ ), and TV & PG usage during a school day ( $p < 0.02$ ). For TV & PG usage during the school days, adolescents who watch TV and PG, were at higher odds of being obese [AOR = 1.3 (1.04, 1.6),  $p = 0.02$ ] when comparing to adolescents who did not watch TV and PG.

**DISCUSSION:** This study concludes that there is an association between obesity and adolescents who watch TV and use video games/computer/social media during a school day. Sociodemographic factors such as some races, age, and gender are also responsible for obesity among adolescents.

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ANALYSIS OF THE 2015 YOUTH RISK BEHAVIOR SURVEY

by

SARAH SADRUDDIN KABANI

B.S., EMORY UNIVERSITY

A Thesis Submitted to the Graduate Faculty  
of Georgia State University in Partial Fulfillment  
of the  
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303

APPROVAL PAGE

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## Acknowledgments

I would like to sincerely thank Dr. Ike Okosun, my committee chair, and Dr. Rodney Lyn, my committee member, for supporting me through the thesis process and for encouraging me to pursue my passion in childhood obesity. I would like to sincerely thank Zainab Salah for supporting me through the statistical analyses. I would also like to thank my family and friends for their support and guidance.

## Author's Statement Page

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Sarah Sadruddin Kabani  
Signature of Author

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## **CHAPTER I**

### **INTRODUCTION**

Childhood obesity is a major public health problem globally. In the past thirty years, “childhood obesity has more than doubled in children and quadrupled in adolescents” (Almuhanna et al., 2014). In the United States, obesity among adolescents has been increasing at an alarming rate (Han et al., 2010). According to the Center of Disease Control (CDC), from 1980 to 2012, adolescents aged 12-19 years, who were obese, increased from 5% to 21% (Almuhanna et al., 2014). Obesity is measured based on body mass index (BMI) which is calculated using “a person’s weight in kilograms divided by the square of height in meters” (CDC, 2015a). An adult with a BMI of less than 18.5 is considered to be underweight (NIH, 2015). An adult with a BMI between 18.5 and >25 is considered to be of normal weight (NIH, 2015). An adult with a BMI between 25 and >30 is considered to be overweight, and a person with a BMI of greater than 30 is considered to be obese (NIH, 2015). For children and teenagers, BMI calculations are calculated in the same way as adults, but the interpretations for children and teens take into account the individual’s age and sex and are expressed in the form of a percentile: Underweight= 0 to >5th percentile, Normal Weight= 5th to >85th percentile, Overweight= 85th to >95th percentile, and Obese= 95th -100th percentile (CDC, 2015b).

Regardless of race/ethnicity and sex, rates of childhood obesity have increased among all ethnic and racial groups in the United States (Datar, 2015). From a national perspective, childhood obesity among adolescents between the ages of 12 to 19 years has been increasing (Almuhanna et al., 2014). Specifically, the prevalence of obesity among 12-19 year olds differ disproportionately amongst race/ethnicity: Hispanic (22.6%), Black (22.1%), White (19.6%), Asian (11.1%), American Indian/Alaska Native (31%), and Native Hawaiian/Other Pacific

Islander (7.5%) (Ogden et al., 2014) (U.S Department of Health and Human Services, 2016).

When looking at sex among 2-19 years, white and black females have a higher chance of becoming obese than males, while Asian females have a lower chance of becoming obese than males (Ogden et al., 2014).

While there are many determinants that can lead to childhood obesity such as dietary habits and recreational behaviors, one of the many facets that have lead to long-term health effects among adolescents, is the lack of physical activity (Pietiläinen et al., 2008). Physical inactivity has led to weight gain and resulted in health complications such as cardiovascular disease, diabetes, psychological problems, and much more (Pietiläinen et al., 2008) (American et al., 2009) (Taylor et al., 2004) (Pulgaron et al., 2014). Specifically, sedentary lifestyles and behaviors have increased throughout the years among adolescents (CDC, 2013). Sedentary behaviors refer to any waking hours that have a very low level of energy expenditure, such as sitting or lying down (Tremblay, 2012). Specifically, sedentary behaviors are defined as “any waking behavior characterized by an energy expenditure less than or equal to 1.5 METs (metabolic equivalent) while in a sitting or reclining posture” (Tremblay, 2012). This can consist of leisure-time activities, sitting during school, work time, etc. (Troiano, 2012). Specifically in schools, students spend majority of their time sitting which increases the amount of sedentary behaviors students engage in during an average school week (Abbot et al., 2013). From 2003 to 2013, on an average school day, the prevalence of using computers 3 or more hours per day shifted from 22.1 % to 41.3% , and 32.5% of students watched TV for 3 or more hours per day (CDC, 2013). Among youth aged twelve to fifteen, 98.5% reported to watch TV, and 91.1% reported using the computer daily in the past 30 days (CDC, 2014). In adolescents, viewing TV has been associated with obesity (Gortmaker et al., 1996) (Dietz et al., 1985) (Hernandez et al.,

1999) (Crespo et al., 2001). While television viewing is the primary sedentary activity of adolescents, it is not the only sedentary activity adolescents participate in (Mitchell et al. 2009). Adolescents can also engage in sitting, playing video games, cell-phone use, internet use, computer use, and much more. While research has shown a strong link between increased sedentary times and being obese among adults and a strong link between TV use and obesity among adolescents, there has been limited studies exploring the association of obesity to different types of sedentary behaviors among adolescents such as computer/video games/social media use and how engaging in a combination of sedentary behaviors affects obesity (Gortmaker et al., 1996) (Dietz et al., 1985) (Hernandez et al., 1999) (Crespo et al., 2001) (Shields and Tremblay, 2008) (Utter et al., 2003).

### 1.2: Purpose of Study

In this study, the relationship between childhood obesity and sedentary behaviors will be analyzed using the 2015 Youth Risk Behavior Survey data to gain more perspective on how sedentary behaviors affect adiposity/BMI in adolescents. The study will analyze the individual effects of TV use and computer/video games/social media among underweight/normal and overweight/obese adolescents as well as overweight and obese adolescents while controlling for demographics such as age, sex, race, and grade, recreational behaviors such as smoking and alcohol consumption, dietary habits such as fruit, vegetable, and soda consumption, and physical activity. The study will also analyze the combined effect of TV use and computer/video games/social media use among underweight/normal and overweight/obese adolescents as well as overweight and obese adolescents while controlling for demographics such as age, sex, race, and grade, recreational behaviors such as smoking and alcohol consumption, diet such as fruit, vegetable, and soda consumption, and physical activity. Since childhood obesity continues to

rise, it is important to gain a better understanding of how sedentary behaviors affects obesity among adolescents to determine which interventions and policies need to be implemented.

### 1.3 Research Questions

1. What are the levels of sedentary behaviors (TV use, video games/computer usage/social media use, and TV usage and video games/computer usage/social media) in US high school adolescents?
2. Do sedentary behaviors (TV usage, video games/computer usage/social media) affect BMI (underweight/normal and overweight/obese, overweight and obese) after controlling for demographics, recreational behaviors, diet, and physical activity?
3. Does engaging in a combination of sedentary behaviors (TV and video games/computer usage/social media) affect BMI (underweight/normal and overweight/obese, overweight and obese), after controlling for demographics, recreational behaviors, diet, and physical activity?

## **CHAPTER II**

### **REVEIW OF LITERATURE**

#### 2.1 Body Mass Index/ Childhood Obesity

Body Mass Index (BMI) is a method of estimating the amount of body fat a person has on their body (CDC, 2015c). The calculation correlates a person's height to their weight in a numerical indicator of body fatness (CDC, 2015c). This calculation however does not measure the true amount of body fat but rather gives the evaluator a general weight status (CDC, 2015c). An accurate and more direct method of measuring body fat can be obtained from a skin fold thickness measure, densitometry, or bioelectrical impedance (CDC, 2015c). Since a BMI test is an inexpensive and easy screening method, it has become a key tool in screening body fat and

estimating the overall health and risk potential of developing various diseases for an individual (CDC, 2015c). Calculations for BMI can simply be made by dividing the individuals weight (lbs) by their height (inches) squared and multiplying the result by 703 (CDC, 2015c). According to the CDC, for adults, this calculation will result in the following weight status categories: <18.5 Underweight; 18.5 to >25 Normal Weight; 25 to >30 Overweight; and 30 or more Obese (CDC, 2015b). BMI calculations for children and teens are calculated in the same way as adults but the interpretations for children and teens will take into account the individual's age and sex and expressed in the form of a percentile (CDC, 2015b). The percentiles expressed from the calculations are used to rank the child in comparison to the average growth rate of a child or teen in that age group (CDC, 2015b). Percentile weight statuses include: 0->5<sup>th</sup> percentile Underweight, 5<sup>th</sup> to >85<sup>th</sup> percentile Normal Weight, 85<sup>th</sup> to >95<sup>th</sup> percentile Overweight, and 95<sup>th</sup> -100<sup>th</sup> percentile Obese (CDC, 2015b).

The number of children and teens ranking in the 95<sup>th</sup> and greater percentile has increased over the past 40 years with over 12 million Americans between the ages of 2-19 years old being ranked obese (Ogden et al. 2015). Since 2007 the prevalence of obesity has remained constant with nearly 17 percent of youths between the ages of 2-19 being evaluated as obese (Ogden et al. 2015).

Regardless of race/ethnicity and sex, rates of childhood obesity have increased among all ethnic and racial groups in the United States (Datar, 2015). From a national perspective, childhood obesity among adolescents between the ages of 12 to 19 years has been increasing (Almuhanna et al., 2014). Specifically, in a study conducted among high school students in the US, of the thirty-seven states observed in the Youth Risk Behavior Survey, rates of obesity was above fifteen percent in eleven states while zero of the states had a rate below 10 percent (CDC,

2015b). Specifically, the prevalence of obesity among 12-19 year olds differ disproportionately amongst race/ethnicity: Hispanic (22.6%), Black (22.1%), White (19.6%), Asian (11.1%), American Indian/Alaska Native (31%), and Native Hawaiian/Other Pacific Islander (7.5%) (Ogden et al., 2014) (U.S Department of Health and Human Services, 2016).

Childhood obesity has a variety of harmful effects on the body. According to the CDC, 70% of obese children exhibited at least one risk factor of developing cardiovascular disease with nearly 40% of obese children exhibiting two or more risk factors (CDC, 2017).

Cardiovascular disease risk factors include signs of high blood pressure and high cholesterol (American Heart Association, 2017). Obesity can lead to increased insulin resistance, impaired glucose tolerance, type 2 diabetes, and many more illnesses (American Heart Association, 2017).

In a cross-sectional study conducted by Swallen et al., 2005 using the National Longitudinal Study of Adolescent Health, 4,743 seventh to twelfth grader's height and weight were measured and categorized into five BMI percentile categories: Underweight (under 5<sup>th</sup> percentile), Normal (5<sup>th</sup> to under 85<sup>th</sup> percentile), At Risk Overweight (85<sup>th</sup> to under 95<sup>th</sup> percentile), Overweight (95<sup>th</sup> to under 97<sup>th</sup> percentile), and Obese (97<sup>th</sup> percentile and over) to measure health-related qualities of life: general health, physical health, emotional health, school functioning scale, and social functioning scale (Swallen et al., 2005). Through the analysis, it was found that there was a statistically significant relationship between BMI and general and physical health (Swallen et al., 2005). Adolescents that were overweight [OR: 2.17, 95% CI (1.34, 3.51)] and obese [OR: 4.49, 95% CI (2.87, 7.030)] were significantly more likely to have worse self-reported health (Swallen et al., 2005). They were also more likely to have functional limitation (Swallen et al., 2005).

Obesity not only causes health related issues but can also result in lifestyle problems (Eremis et al., 2004). Obesity has the potential to cause psychological stress, behavioral issues, and problems in school (Eremis et al., 2004). The stresses can lead to a development of lower self esteem, impaired levels of social, emotional, and physical functioning and an overall lower quality of life (Eremis et al., 2004). In a study conducted by Eremis et al., the association between psychiatric disorders and obesity was analyzed among clinical obese, non-clinical obese, and normal weight adolescents by performing non-structured psychiatric interviews (2004). Through the analysis, it was found that clinical obese adolescents had a higher ratio of psychopathology as compared to non-clinical obese adolescents and non-clinical and clinical obese adolescents had a higher ratio of psychopathology which included depression, behavioral problems, and low-esteem (Eremis et al., 2004). Overall, obese children have a higher likelihood of developing obesity in a more severe form as an adult (Eremis et al., 2004)

## 2.2 Sedentary Behaviors

Sedentary behavior is classified as “any waking behavior characterized by an energy expenditure less than or equal to 1.5 METs (metabolic equivalent) while in a sitting or reclining posture” (Tremblay, 2012). This can consist of leisure-time activities, sitting during school, cell phone use, etc. (Troiano, 2012). CDC recommends that children and adolescents participate in at least sixty minutes of one or more of the following three types of activities each day: aerobic activity, muscle strengthening activities, and bone strengthening activities (CDC, 2015d). Regular participation in these activities can result in numerous benefits such as weight control, reduction in the risk of developing cardiovascular disease, type-2 diabetes, and some forms of cancer (CDC, 2015d). Regular activity can help improve mental health, strengthening bones and muscles, and increase the chances of living longer (CDC, 2015d). While there are many benefits

to engaging in physical activity, a majority of children do not meet this goal (Lakka and Bouchard, 2005). Rather, sedentary behaviors are practiced, such as watching TV, which has contributed to the obesity epidemic amongst adolescents (Utter, 2003). In a 2013 study conducted by Mitchell et al., greater screen time was associated with adolescent obesity among fourteen to eighteen year olds. Mitchell et al. surveyed the amount of time spent watching television and calculated the self-reported height and weight to determine the BMI (2013). They found that “greater screen time was more strongly associated with increases in BMI at the upper tail of the BMI distribution, and was not associated with increases in BMI at the lower tail of the BMI distribution” which meant that it was very important for people who were overweight or obese to reduce their screen time (Mitchell et al., 2013). Similarly, in a study conducted in Adelaide, Australia in 2009, Vandelanotte et al. observed the association of using internet leisure-time and computer use among overweight and obese adults, while looking at physical activity and sedentary behaviors. It was found that “participants with a high leisure-time Internet and computer use were 1.46 (95% CI = 1.10, 1.93) times more likely to be overweight” and “2.52 times more likely (95% CI = 1.82, 3.52) to be obese, compared to those who reported no Internet and computer use in their leisure-time” (Vandelanotte et al., 2009). Some of the limitations to this literature included that leisure-time behaviors were only analyzed which prevented the evaluation of the impact of the internet and computer at work on obesity, overweight, and physical activity (Vandelanotte et al., 2009).

Research has shown a strong link between increased sedentary time and being obese/overweight. In a study conducted by Utter et al., 2003, the association between sedentary behaviors and BMI, physical activity, and dietary behaviors among adolescents were analyzed to describe the demographic characteristics of 4,746 middle and high school boys and girls who



engaged in television/video use, computer use, and reading/homework using data from Project EAT (Eating among Teens). Through the analysis, it was found that boys that watched TV/videos and also spent time reading/homework were positively associated with BMI ( $P<0.05$ ) (Utter et al., 2003). Girls who watched TV/video and used computers were positively associated with BMI ( $P<0.05$ ) (Utter et al., 2003). Increased use of TV/video use among both sexes were associated with more unhealthy dietary behaviors such as soft drinks, fried foods, etc (Utter et al., 2003). However, reading/homework was not associated with obesity. Some of the limitations of the literature included that it did not analyze how engaging in a combination of sedentary behaviors affected obesity and how other common sedentary behaviors among adolescents such as cell phone use and video game use affected the BMI.

Adolescents can engage in sedentary behaviors in multiple environments including the home, community and school. Specifically, schools play a major role in the amount of sedentary activities students engage in during an average school week (Beck et al., 2016). Students spend majority of their time in a classroom where the environment dictates prolonged periods of sitting (Abbott et al., 2013). In a study conducted by Abbott et al., 2013, it was found that students accumulated more sedentary time sitting during school hours when compared to non-school hours. In another study, Carson et al., 2015, described the levels of sitting among 3,556 US adolescents between the ages of 12-19. It was found that 7.5 hours per day was spent sitting (Carson et al, 2015). Females were more likely to have higher sitting times than males (Carson et al., 2015). Addressing the amount of sitting time in schools, regardless of whether students are sitting, watching TV, using a computer, or engaging in any form of sedentary activity during or after school, interventions are important for reducing the rates of coronary heart disease, hypertension, diabetes, and colon cancers (CDC, 2013).

## **CHAPTER III**

### **METHODS AND PROCEDURES**

#### **3.1 Youth Risk Behavior Survey Design**

The Youth Risk Behavior Survey (YRBS), a national surveillance system managed by the Center of Disease Control (CDC), is designed to “determine the prevalence of health behaviors, assess whether health behaviors increase, decrease, or stay the same over time, provide comparable data among subpopulations of youth, and much more” (CDC, 2016a). It is conducted every two years using school-based surveys among ninth to twelfth grade students in both public and private schools in the United States (CDC, 2016a). YRBS uses equal probability sampling to collect data from all regular public, Catholic, and private schools, in the 50 states and District of Columbia, and it uses a three-stage cluster sample design (CDC, 2016b).

#### **3.2 Sample Population**

In 2015, 180 schools were included in the sample in which only 125 schools actually participated (69% response rates) (CDC, 2016b). The 2015 data also had an 86% individual student response rate and an overall response rate of 60% (CDC, 2016b). While the YRBS collects different data on youth behaviors, the data associated to BMI, sedentary behaviors, demographics, recreational behaviors, dietary habits, and physical activity were analyzed (CDC, 2015e). Adolescents fourteen and younger to eighteen and older were used in this analysis due to the data provided from the YRBS. In the first study design among underweight/overweight and overweight/obese adolescents, 15,624 students were analyzed, and in the second study design, among overweight and obese adolescents, 4,536 students were analyzed. The study was a 2015 cross-sectional qualitative analysis.

### 3.3 Variable Measures

The independent variables are sedentary behaviors (watching TV, using video games/computer usage/social media, and watching TV and video games/computer usage/social media) and the two dependent variables are BMI categorized in to two groups: 1) “underweight/normal” and “overweight/ obese” and 2) “overweight” and “obese.” The covariate variables include: race/ethnicity, sex, age, grade level, smoking, alcohol, fruit, vegetables, soda consumption, and physical activity. The specific aims for this study would be: 1) To determine sedentary behaviors in US high school adolescent nationally, 2) To determine the association between sedentary behaviors and BMI after controlling for demographics, recreational behaviors, diet, and physical activity, and 3) To examine the association between engaging in more than one sedentary behavior and BMI after controlling for demographics, recreational behaviors, diet, and physical activity.

#### *Sedentary Behaviors: TV and Video Games/Computer/Social Media Use*

Two of the main questionnaires that were used to characterize sedentary behaviors were “On an average school day, how many hours do you watch TV?” and “On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Count time spent on things such as Xbox, PlayStation, an iPod, an iPad or other tablet, a smartphone, YouTube, Facebook or other social networking tools, and the Internet.) (CDC, 2015e).” The choices given for the number of hours watched for TV were “I do not watch TV on an average school day,” “Less than 1 hour per day,” “1 hour per day,” “2 hours per day,” “3 hours per day,” “4 hours per day,” “5 or more hours per day” (CDC, 2015e). The choices given for the number of hours playing video or computer games were “I do not play video or computer games or use a computer for something that is not school work,” “Less than 1

hour per day,” “1 hour per day,” “2 hours per day,” “3 hours per day,” “4 hours per day,” “5 or more hours per day” (CDC, 2015e). For each question, the student responses were dichotomized as “0” and “1” for adolescents who did not engage in sedentary behaviors and for adolescents who engaged in sedentary behaviors, respectively. The variable for TV usage was labeled as “TV,” while the variable for Computer Use/Playing Video Games/Social Media was labeled as “PG”. For the purpose of this study, responses that viewed TV or played video/computer games for “less than 1 hour per day” or more were categorized as engaging in sedentary behaviors whereas adolescents who responded “I do not watch TV on an average school day” or “I do not play video or computer games or use a computer for something that is not school work,” were categorized as not engaging in sedentary behaviors. Another variable was created labeled “sed\_combine” in which both TV and PG were combined by an “and” statement where adolescents who responded “I do not watch TV on an average school day” and “I do not play video or computer games or use a computer for something that is not school work,” were categorized as not engaging in any form of sedentary behavior. The other responses were grouped and categorized as engaging in sedentary behaviors. These categorizations were chosen based off the definition of sedentary behaviors.

### *BMI*

For BMI, the two questionnaires used were “How tall are you without your shoes on?” and “How much do you weigh without your shoes on?” (CDC, 2015e). The responses to these questions were self-reported data. The YRBS had already calculated the body mass index percentages by including the sex and age of each adolescent by labeling the variable as “BMIPCT”. The body mass index percentage was then relabeled as “BMI\_PCT” and categorized into two categories: “0” (less than 85 percent) and “1” (85 percent or more). Another variable

labeled “BMI\_new” was created and categorized as “2” (85 to less than 95 percentile) and “3” (95 percentile and more). For “BMI\_new,” only participants who were overweight and obese were taken into consideration, excluding underweight/normal participants. Adolescents who were less than 85 percentile were adolescents who were underweight and normal, and adolescents who were 85 percentile or more were overweight and obese. Adolescents who were 85 percentile to less than 95 percentile were adolescents who were overweight, and adolescents who were 95 percentile or more were obese according to the CDC definition.

### *Race/Ethnicity*

For race, the questionnaire used was “What is your race?” (CDC, 2015e). The adolescents were given the choices of “American Indian or Alaska Native,” “Asian,” “Black or African American,” “Native Hawaiian or Other Pacific Islander,” and “White” and were given the choice to select more than one response (CDC, 2015e). For ethnicity, the questionnaire asked was “Are you Hispanic or Latino?” (CDC, 2015e). The responses included: “Yes” and “No” (CDC, 2015e). Since the students could choose more than one response for race, the YRBS computed the variable “raceeth” combining both the questions. The race/ethnicities were categorized into eight categories: “1” (American Indian or Alaska Native), “2” (Asian), “3” (Black or African American), “4” (Native Hawaiian or Other Pacific Islander), “5” (White), “6” (Hispanic/Latino), “7” (Multiple-Hispanic/Latino), and “8” (Multiple-Non-Hispanic/Latino).

### *Sex*

For sex, the questionnaire that was used was “What is your sex?” (CDC, 2015e). The responses consisted of “Female” and “Male.” The variable was named as Q2 and categorized as “1,” and “2” respectively.

### *Age*

For age, the questionnaire that was used was Q1: “How old are you?” (CDC, 2015e). The responses entailed “12 years old or younger,” “13 years old,” “14 years old,” “15 years old,” “16 years old,” “17 years old,” and “18 years old or older” (CDC, 2015e). Due to a small number of observations in the “12 years old or younger” and “13 years old” categories, these two choices were combined with 14 years old and labeled as “14 years old or younger.” The Q1 question was labeled as “age” and coded as “1” (14 years old or younger), “2” (15 years old), “3” (16 years old), “4” (17 years old), and “5” (18 years old).

#### *Grade Level*

For grade level, the questionnaire that was used was Q3: "In what grade are you?" (CDC, 2015e). The responses consisted of "9th grade," "10th grade," "11th grade," "12th grade," and "ungraded or other grade" (CDC, 2015e). Due to a small number of observations in the “ungraded or other grade,” the category was combined with 12<sup>th</sup> grade. The Q3 question was labeled "grade" and categorized as “1,” “2,” “3,” and “4” respectively.

#### *Behaviors: Smoking and Alcohol*

In order to take into account adolescent behaviors, smoking and alcohol behaviors were analyzed.

For smoking, the questionnaire that was used was "During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?" (CDC, 2015e). The responses consisted of "I did not smoke cigarettes during the past 30 days," "Less than 1 cigarette per day," "1 cigarette per day," "2 to 5 cigarettes per day," "6 to 10 cigarettes per day," "11 to 20 cigarettes per day," and "More than 20 cigarettes per day” (CDC, 2015e). The responses were categorized as "I did not smoke cigarettes during the past 30 days," "having 1 cigarette per day," "2 to 5

cigarettes per day," "6 to 10 cigarettes per day," and "more than 11 cigarettes per day." They were coded as "0," "1," "2," "3," and "4" respectively.

For alcohol, the questionnaire that was used was "During the past 30 days, on how many days did you have at least one drink of alcohol?" (CDC, 2015e). The responses consisted of "0 days," "1 or 2 days," "3 to 5 days," "6 to 9 days," "10 to 19 days," "20 to 29 days," and "All 30 days" (CDC, 2015e). The responses were categorized "0 days," "1 to 5 days," and "6 to all 30 days" and coded as "0" "1," and "2."

#### *Diet: Fruit, Vegetables, Soda*

In order to take into account adolescent dietary patterns, fruit, vegetable, and soda consumption were analyzed.

For fruit consumption (labeled "frt"), the questionnaires that were used were "During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks,)" and "During the past 7 days, how many times did you eat fruit? (Do not count fruit juice.)" (CDC, 2015e). These questions were combined to look at fruit consumption. "The responses were categorized as "I did not drink/eat fruit during the past 7 days," "1 to 3 times during the past 7 days," "4 to 6 times during the past 7 days," "1 time per day," "2 times per day," "3 times per day," and "4 or more times per day." It was coded as "1," "2," "3," "4," "5," "6," and "7" respectively.

For vegetable consumption (labeled "veg"), the questionnaires that were used were "During the past 7 days, how many times did you eat green salad?," "During the past 7 days, how many times did you eat carrots?," and "During the past 7 days, how many times did you eat other vegetables?"(CDC, 2015e). These questions were combined to look at vegetable consumption.

The responses were categorized as "Did not eat vegetables during the past 7 days," "1 to 3 times during the past 7 days," "4 to 6 times during the past 7 days," "1 time per day," "2 times per day," "3 times per day," and "4 or more times per day." It was coded as "1," "2," "3," "4," "5," "6," and "7" respectively.

For soda consumption (labeled "q77"), the questionnaire that was used was "During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not count diet soda or diet pop.)" (CDC, 2015e). The responses entailed "I did not drink soda or pop during the past 7 days," "1 to 3 times during the past 7 days," "4 to 6 times during the past 7 days," "1 time per day," "2 times per day," "3 times per day," and "4 or more times per day." It was coded as "1," "2," "3," "4," "5," "6," and "7" respectively.

#### *Physical Activity*

For physical activity (labeled "q85"), the questionnaire that was used was "During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)" (CDC, 2015e). The responses consisted of "0 days," "1 day," "2 days," "3 days," "4 days," "5 days," "6 days," and "7 days." It was coded as "1," "2," "3," "4," "5," "6," "7," and "8" respectively.

### 3.4 Statistical Analysis

The statistical analyses were performed using the SAS software version 9.4. The YRBS data are weighted to ensure that responses are representative of all students (CDC, 2016b). A weight is applied to each of the student responses to adjust for student nonresponse and to adjust for the distribution of students by grade, sex, and race/ethnicity (CDC, 2016b). Using the SAS ProcFreq procedure, a descriptive statistic table was created where the frequency of each variable



and the weighted frequency percent was recorded. Also, using the SAS ProcFreq, the demographic characteristics of the study population, BMI, as well as other variables, were stratified by sedentary behaviors (TV, PG, TV and PG) and recorded. Using the SAS ProcFreq, sedentary behaviors, demographic characteristics of the study population, as well as other variables were stratified by BMI percentile status, categorizing the underweight/normal adolescents under the 85 BMI percentile and the overweight/obese adolescents 85 BMI percentile or more. The overweight adolescents were categorized as 85 to less than 95 percentile and the obese adolescents were categorized as 95 BMI percentile or more. Using Proc SurveyLogistic, univariate analyses of association of various variables with the two outcomes of interest were analyzed. The first outcome of interest was: Overweight/Obese (85 BMI percentile or more) and the second outcome of interest was Obese (95 BMI percentile or more). The crude odds ratio, the 95% confidence interval, and a *p*-value were recorded. Using Proc SurveyLogistic, a multivariate logistic regression analysis was conducted, while comparing the crude odds ratio to the adjusted odds ratio for Overweight/Obese (85 BMI percentile or more) and Obese (95 BMI percentile or more). The adjusted odds ratio 95% confidence interval and adjusted odds ratio *p*-value (>0.05) were recorded to determine statistical significance.

## **CHAPTER IV**

### **RESULTS**

#### **4.1 Descriptive Statistics of YRBS**

The distribution of sociodemographic and participant characteristics among high school adolescents are shown in Table 1. This table includes the raw frequency counts and weighted frequency percent for each variable included in this study. Weighted frequencies were taken into account due to uneven sampling. The highest weighted percentage for age that participated in this study was 15 year olds (26.1%). For sex, there was approximately an equal distribution of

females (48.7%) and males (51.3%). For race/ethnicity, the highest percentages of students were Whites (54.5%), followed by Black/African American (13.6%). The percentage among grades ninth (27.2%), tenth (25.7%), eleventh (23.9%), and twelfth (23.2%) were almost evenly distributed. For BMI, 2.8% of the adolescents were underweight, 67.3% were normal, 16% were overweight, and 13.9% were obese. 81.6% of adolescents watched TV during a school day, while 18.4% did not watch TV during a school day. For video games/computer usage/social media (PG) usage, 82.6% engaged in PG usage during a school day, while 17.4% did not engage in PG usage during a school day. Other variables (highest percentage recorded) taken into account included factors related to 1) Behavior which included: Number of cigarettes smoked/day (89.1% did not smoke in past 30 days), Number of days having at least one drink of alcohol (0 days: 67.2%), 2) Diet which included: fruit consumption in past 7 days (44.7% ate 1 to 3 times during past 7 days), vegetable consumption in past 7 days (65.7% did not eat any in past 7 days), and soda consumption (35.9% drank 1 to 3 times in past 7 days), and 3) Physical Activity which included: Number of days physically active for at least sixty minutes in past 7 days (27.1%).

#### 4.2 Associations between Adolescents Watching TV and Not Watching TV in Underweight/Normal and Overweight/Obese

Descriptive statistics comparing adolescents watching TV and not watching TV in underweight/normal and overweight/obese are shown in Table 2. TV watchers and non-TV watchers have significantly different race/ethnicity distribution ( $p < 0.0001$ ). For example, Asian constituted only 3.1% of TV watchers, whereas Asians constituted 6.9% of non-TV watchers. Black/African American comprised of 14% of TV watchers, while Black/African American comprised of 11.8% of non-TV watchers. TV watchers and non-TV watchers have

significantly different daily smoking consumptions ( $p=0.001$ ). Adolescents who did not smoke in the past 30 days among TV watchers comprised of 88.5%, whereas adolescents who did not smoke in the past 30 days among non-TV watchers comprised of 92.1%. TV watchers had higher percentages in all other categories of smoking compared to non-TV watcher. TV watchers and non-TV watchers have significantly different daily alcohol consumptions ( $p=<0.0001$ ). Adolescents who did not drink alcohol in the past 30 days among TV watchers comprised of 65.8%, whereas adolescents who did not drink alcohol in the past 30 days among non-TV watchers comprised of 73.6%. TV watchers had higher percentages in all other categories of alcohol consumption compared to non-TV watcher. TV watchers and non-TV watchers have significantly different fruit consumptions ( $p=0.0002$ ). Adolescents who did not drink/eat fruits in the past 7 days among TV watchers comprised of 26.9%, whereas adolescents who did not drink/eat fruits in the past 7 days among non-TV watchers comprised of 32.6%. TV watchers and non-TV watchers have significantly different soda consumptions ( $p=<0.0001$ ). Adolescents who did not drink soda in the past 7 days among TV watchers comprised of 23.6%, whereas adolescents who did not drink soda in the past 7 days among non-TV watchers comprised of 37.2%. TV watchers and non-TV watchers are significantly different in number of days they are physically active for at least 60 minutes in the week ( $p=<0.0001$ ). Adolescents who did not engage in physical activity in the past 7 days among TV watchers comprised of 13.1%, whereas adolescents who did not engage in physical activity in the past 7 days among non-TV watchers comprised of 19.3%. Adolescents who engaged in physical activity all 7 days in the past week among TV watchers comprised of 27.8%, whereas adolescents who engaged in physical activity all 7 days in the past week among non-TV watchers comprised of 23.7%. TV watchers and non-

TV watchers were not statistically significantly in regards to their age ( $p=0.85$ ), sex ( $p=0.07$ ), grade ( $p=0.20$ ), BMI ( $p=0.40$ ), and vegetable consumption ( $p=0.11$ ).

#### 4.3 Associations between Adolescents Using Video Games/Computer/ Social Media (PG) and Not Using Video Games/Computer/Social Media (PG) in Underweight/Normal and Overweight/Obese

Descriptive statistics comparing adolescents using video games/computer/social media (PG) and not using video games/computer/social media (PG) in underweight/normal and overweight/obese are shown in Table 3. PG users and non-PG users have significantly different age distribution ( $p<0.0001$ ), sex distribution ( $p<0.0001$ ), grade distribution ( $p<0.0001$ ), race/ethnicity distribution ( $p=0.004$ ), daily cigarette consumption ( $p=0.01$ ), alcohol consumption ( $p=0.03$ ), soda consumption ( $p<0.0001$ ), and physical activity ( $p<0.0001$ ). When looking at age, 14 years old and younger adolescents constituted 11.0% of PG users, whereas they only constituted 6.9% of non-PG users. For sex, female adolescents who used PG comprised of 46.3%, whereas male adolescents who used PG comprised of 53.7%. Non-PG female users comprised of 60.2%, whereas non-PG males comprised of 39.8%. According to grade, 9<sup>th</sup> grade adolescents constituted 28.6% of PG watchers, whereas 9<sup>th</sup> graders only constituted 20.4% of non-PG users. For race/ethnicity, Black/African American comprised of 13% of PG users, while Black/African American comprised of 16.6% of non-PG users. Adolescents who did not smoke in the past 30 days among PG users comprised of 89.3%, whereas adolescents who did not smoke in the past 30 days among non-PG users comprised of 88.2%. Adolescents who did not consume alcohol in the past 30 days among PG users comprised of 67.6%, whereas adolescents who did not consume alcohol in the past 30 days among non-PG users comprised of 65.2%. Adolescents who did not drink soda in the past 7 days among PG users comprised of 24.3%,

whereas adolescents who did not drink soda in the past 7 days among non-PG users comprised of 35.1%. Adolescents who did not engage in physical activity in the past 7 days among PG users comprised of 13.7%, whereas adolescents who did not engage in physical activity in the past 7 days among non-PG users comprised of 17.3%. Adolescents who engaged in physical activity all 7 days in the past week among PG users comprised of 26.2%, whereas adolescents who engaged in physical activity all 7 days in the past week among non-PG users comprised of 30.9%. PG users and non-PG users were not statistically significantly in regards to their BMI ( $p=0.75$ ), fruit consumption ( $p=0.08$ ), and vegetable consumption ( $p=0.53$ ).

#### 4.4 Associations between Adolescents Watching TV and Not Watching TV in Overweight and Obese

Descriptive statistics comparing adolescents watching TV and not watching TV in overweight and obese are shown in Table 4. TV watchers and non-TV watchers have significantly different grade distribution ( $p=0.04$ ). For example, 9<sup>th</sup> graders constituted 27.4% of TV watchers, whereas 9<sup>th</sup> graders constituted 23.8% of non-TV watchers. TV watchers and non-TV watchers have significantly different BMI distribution ( $p=0.04$ ). Obese adolescents comprised 47.7% of TV watchers, whereas obese adolescents constituted 40.5% of non-TV watchers. TV watchers and non-TV watchers have significantly different alcohol consumption ( $p=0.01$ ). Adolescents who did not drink alcohol in the past 30 days among TV watchers comprised of 64.7%, whereas adolescents who did not drink alcohol in the past 30 days among non-TV watchers comprised of 72.0%. TV watchers had higher percentages in all other categories of alcohol consumption compared to non-TV watcher. TV watchers and non-TV watchers have significantly different soda consumption ( $p=<0.0001$ ). Adolescents who did drank soda 4 to 6 times in the past 7 days among TV watchers comprised of 20.3%, whereas

adolescents who drank soda 4 to 6 times in the past 7 days among non-TV watchers comprised of 12.1%. TV watchers and non-TV watchers have significantly different physical activity distributions ( $p=0.001$ ). Adolescents who did not engage in physical activity in the past 7 days among TV watchers comprised of 13.7%, whereas adolescents who did not engage in physical activity in the past 7 days among non-TV watchers comprised of 21.1%. Adolescents who engaged in physical activity all 7 days in the past week among TV watchers comprised of 25.0%, whereas adolescents who engaged in physical activity all 7 days in the past week among non-TV watchers comprised of 18.7%. TV watchers and non-TV watchers were not statistically significantly in regards to their age ( $p=0.85$ ), sex ( $p=0.07$ ), race/ethnicity ( $p=0.16$ ), cigarette consumption ( $p=0.13$ ), fruit consumption ( $p=0.14$ ), and vegetable consumption ( $p=0.20$ ).

#### 4.5 Associations between Adolescents Using Video Games/Computer/ Social Media (PG) and Not Using Video Games/Computer/Social Media (PG) in Overweight and Obese

Descriptive statistics comparing adolescents using video games/computer/social media (PG) and not using video games/computer/social media (PG) in overweight and obese are shown in Table 5. PG users and non-PG users have significantly different age distribution ( $p=0.01$ ), sex distribution ( $p=<0.0001$ ), BMI distribution ( $p=0.047$ ), daily cigarette consumption ( $p=0.002$ ), and soda consumption ( $p=<0.0001$ ). When looking at age, 14 years old and younger adolescents constituted 11.1% of PG users, whereas they only constituted 8.7% of non-PG users. For sex, female adolescents who used PG comprised of 41.7%, whereas male adolescents who used PG comprised of 58.3%. Non-PG female users comprised of 57.6%, whereas non-PG males comprised of 42.4%. Obese adolescents comprised 47.7% of PG users, whereas obese adolescents constituted 40.3% of non-PG users. Adolescents who did not smoke in the past 30 days among PG users comprised of 86.0%, whereas adolescents who did not smoke in the past

30 days among non-PG users comprised of 83.0%. Adolescents who did not drink soda in the past 7 days among PG users comprised of 21.4%, whereas adolescents who did not drink soda in the past 7 days among non-PG users comprised of 37.2%. PG users and non-PG users were not statistically significantly in regards to their grade ( $p=0.08$ ), race/ethnicity ( $p=0.06$ ), alcohol consumption ( $p=0.68$ ), fruit consumption ( $p=0.49$ ), vegetable consumption ( $p=0.26$ ), and physical activity ( $p=0.06$ ).

#### 4.6 Associations between Adolescents Watching TV and Video Games/Computer/ Social Media (PG) and Not Watching TV and Video Games/Computer/ Social Media (PG in Underweight/Normal and Overweight/Obese

Descriptive statistics comparing adolescents watching TV and using video games/computer/social media (PG) and not watching TV and using video games/computer/social media (PG) in underweight/normal and overweight/obese are shown in Table 6. TV and PG users and non-TV and non-PG users have significantly different age distribution ( $p=<0.0001$ ), sex distribution ( $p=0.0003$ ), grade distribution ( $p=<0.0001$ ), race/ethnicity distribution ( $p=0.001$ ), daily cigarette consumption ( $p=0.02$ ), soda consumption ( $p=<0.0001$ ), and physical activity ( $p=<0.0001$ ). When looking at age, 14 years old and younger adolescents constituted 10.9% of TV and PG users, whereas they only constituted 8.9% of non-TV and non-PG users. For sex, female adolescents who used TV and PG comprised of 46.9%, whereas male adolescents who used TV and PG comprised of 53.1%. Non-TV and non-PG female users comprised of 52.7%, whereas non-TV and non-PG males comprised of 47.3%. According to grade, 9<sup>th</sup> grade adolescents constituted 29.1% of TV and PG users, whereas 9<sup>th</sup> graders only constituted 23.1% of non-TV and non-PG users. For race/ethnicity, Asians comprised of 3.1% of TV and PG users, while Asians comprised of 5.1% of non-TV and non-PG users. Adolescents

who did not smoke in the past 30 days among TV and PG users comprised of 88.6%, whereas adolescents who did not smoke in the past 30 days among non-TV and non-PG users comprised of 90.2%. Adolescents who did not drink soda in the past 7 days among TV and PG users comprised of 22.4%, whereas adolescents who did not drink soda in the past 7 days among non-TV and non-PG users comprised of 34.2%. Adolescents who did not engage in physical activity in the past 7 days among TV and PG users comprised of 13.0%, whereas adolescents who did not engage in physical activity in the past 7 days among non-TV and non-PG users comprised of 17.1%. Adolescents who engaged in physical activity all 7 days in the past week among TV and PG users comprised of 27.3%, whereas adolescents who engaged in physical activity all 7 days in the past week among non-TV and non-PG users comprised of 26.4%. TV and PG users and non-TV and non-PG users were not statistically significantly in regards to their BMI ( $p=0.28$ ), alcohol consumption ( $p=0.06$ ), fruit consumption ( $p=0.11$ ), and vegetable consumption ( $p=0.38$ ).

#### 4.7 Associations between Adolescents Watching TV and Video Games/Computer/ Social Media (PG) and Not Watching TV and Video Games/Computer/ Social Media (PG) in Overweight and Obese

Descriptive statistics comparing adolescents watching TV and using video games/computer/social media (PG) and not watching TV and using video games/computer/social media (PG) in overweight and obese are shown in Table 7. TV and PG users and non-TV and non-PG users have significantly different sex distribution ( $p=0.01$ ), BMI distribution ( $p=0.02$ ), daily cigarette consumption ( $p=0.02$ ), soda consumption ( $p<0.0001$ ), and physical activity ( $p=0.009$ ). When looking at sex, female adolescents who used TV and PG comprised of 42.1%, whereas male adolescents who used TV and PG comprised of 57.9%. Non-TV and non-PG female users comprised of 49.6%, whereas non-TV and non-PG males comprised of 50.4%.



According to BMI distribution, obese adolescents constituted 48.6% of TV and PG users, whereas obese adolescents only constituted 41.6% of non-TV and non-PG users. Adolescents who did not smoke in the past 30 days among TV and PG users comprised of 85.2%, whereas adolescents who did not smoke in the past 30 days among non-TV and non-PG users comprised of 86.2%. Adolescents who did not drink soda in the past 7 days among TV and PG users comprised of 19.9%, whereas adolescents who did not drink soda in the past 7 days among non-TV and non-PG users comprised of 33.7%. Adolescents who did not engage in physical activity in the past 7 days among TV and PG users comprised of 13.5%, whereas adolescents who did not engage in physical activity in the past 7 days among non-TV and non-PG users comprised of 18.5%. Adolescents who engaged in physical activity all 7 days in the past week among TV and PG users comprised of 24.6%, whereas adolescents who engaged in physical activity all 7 days in the past week among non-TV and non-PG users comprised of 22.3%. TV and PG users and non-TV and non-PG users were not statistically significantly in regards to their age ( $p=0.14$ ), grade ( $p=0.06$ ), race/ethnicity ( $p=0.10$ ), alcohol consumption ( $p=0.33$ ), fruit consumption ( $p=0.82$ ), and vegetable consumption ( $p=0.30$ ).

#### 4.8 Associations between Underweight/ Normal and Overweight/Obese Adolescents Among TV, PG, and TV and PG Users

Descriptive statistics comparing underweight/normal adolescents and overweight/obese adolescents among TV, PG, and TV & PG users are shown in Table 8. Underweight/normal and overweight/obese adolescents have significantly different sex distribution ( $p=0.002$ ), race/ethnicity distribution ( $p=<0.0001$ ), PG usage during a school day ( $p=<0.0001$ ), daily cigarette consumption ( $p=<0.0001$ ), and physical activity ( $p=0.0002$ ). When looking at sex, female adolescents who were underweight/normal comprised of 50.4%, whereas male

adolescents who were underweight/normal comprised of 49.6%. Overweight/obese female comprised of 44.4%, overweight/obese males comprised of 55.6%. For race/ethnicity, Asians comprised of 4.3% of underweight/normal adolescents, while Asians comprised of 2.1% of overweight/obese. Black/ African Americans comprised of 12.3% of underweight/normal adolescents, while Black/ African Americans comprised of 14.8% of overweight/obese. Hispanic/Latinos comprised of 8.8% of underweight/normal adolescents, while Hispanic/Latinos comprised of 11.3% of overweight/obese. PG usage among adolescents who were underweight/normal comprised of 82.6%, whereas PG usage among adolescents who were overweight/obese comprised of 82.9%. Underweight/normal adolescents who did not smoke in the past 30 days comprised of 90.8%, whereas overweight/obese adolescents who did not smoke in the past 30 days comprised of 85.5%. Underweight/normal adolescents who did not engage in physical activity in the past 7 days comprised of 13.0%, whereas overweight/obese adolescents who did not engage in physical activity in the past 7 days comprised of 15.0%. Underweight/normal adolescents who engaged in physical activity all 7 days in the past week comprised of 29.2%, whereas overweight/obese adolescents who engaged in physical activity all 7 days in the past week among comprised of 23.9%. Underweight/normal adolescents and overweight/obese adolescents were not statistically significantly in regards to their age ( $p=0.37$ ), grade ( $p=0.65$ ), TV usage during a school day ( $p=0.40$ ), TV and PG usage during a school day ( $p=0.28$ ), alcohol consumption ( $p=0.17$ ), fruit consumption ( $p=0.86$ ), vegetable consumption ( $p=0.41$ ), and soda consumption ( $p=0.06$ ).

#### 4.9 Associations between Overweight Adolescents and Obese Adolescents Among TV, PG, and TV and PG Users

Descriptive statistics comparing overweight and obese adolescents among TV, PG, and TV and PG users are shown in Table 9. Overweight adolescents and obese adolescents have significantly different sex distribution ( $p < 0.0001$ ), race/ethnicity distribution ( $p = 0.047$ ), TV usage during a school day ( $p = 0.04$ ), PG usage during a school day ( $p = 0.047$ ), and TV and PG usage during a school day ( $p < 0.02$ ). When looking at sex, female adolescents who were overweight comprised of 50.1%, whereas male adolescents who were overweight comprised of 49.9%. Obese female comprised of 37.8%, overweight/obese males comprised of 62.2%. For race/ethnicity, Asians comprised of 2.7% of overweight adolescents, while Asians comprised of 1.5% of obese adolescents. Whites comprised of 52.9% of overweight adolescents, while Whites comprised of 49.8% of obese adolescents. Black/ African Americans comprised of 14.0% of overweight adolescents, while Black/ African Americans comprised of 15.7% of obese adolescents. Hispanic/Latinos comprised of 10.9% of overweight adolescents, while Hispanic/Latinos comprised of 11.9% of obese adolescents. TV usage among adolescents who were overweight comprised of 80.5%, whereas TV usage among adolescents who were obese comprised of 84.7%. PG usage among adolescents who were overweight comprised of 81.0%, whereas PG usage among adolescents who were obese comprised of 85.2%. TV and PG usage among adolescents who were overweight comprised of 67.0%, whereas TV usage among adolescents who were obese comprised of 73.0%. Overweight adolescents and obese adolescents were not statistically significantly in regards to their age ( $p = 0.67$ ), grade ( $p = 0.21$ ), cigarette consumption ( $p = 0.69$ ), alcohol consumption ( $p = 0.58$ ), fruit consumption ( $p = 0.16$ ), vegetable consumption ( $p = 0.32$ ), soda consumption ( $p = 0.38$ ), and physical activity ( $p = 0.71$ ).

#### 4.10 Univariate and Multivariate Logistic Regression Analyses

The results of the univariate and multivariate analyses of association of independent variables are shown in Table 10, in which the odds of being overweight/obese among adolescents who watch TV or PG are recorded, Table 11, in which the odds of being obese among adolescents who watch TV or PG are recorded, Table 12, in which the odds of being overweight/obese among adolescents who watch TV and PG are recorded, and Table 13, in which the odds of being obese among adolescents who watch TV and PG are recorded. For Tables 10-13, the crude and adjusted odds ratio, crude and adjusted odds ratio 95% confidence interval, and crude and adjusted odds ratio *p*-value are recorded. All adjusted values were reported using the covariates in the respected tables.

The univariate and multivariate logistic regression analyses in Table 10 reports the odds of being overweight/ obese among adolescents who watch TV or use PG. In Table 10, the multivariate logistic regression analyses suggested lower odds of being overweight/obesity among fifteen [AOR =0.8 (0.6, 0.9), *p*= 0.006] and seventeen year olds [AOR =0.7 (0.5, 0.98), *p*= 0.04] when compared to fourteen years of age and younger. The other adolescent's odds were indifferent. When comparing males and females, females were at a significantly lower odds of being overweight/obese [AOR =0.7 (0.6, 0.9), *p* = 0.0001]. Compared to Whites, Black/African Americans [AOR =1.3 (1.03, 1.7), *p* = 0.03], Hispanic/Latino [AOR =1.3 (1.2, 1.6), *p* = <0.0001], and Multiple-Hispanic/Latino [AOR =1.4 (1.1, 1.6), *p* = 0.002] were at a higher odds of being overweight/obese, while Asians [AOR =0.5 (0.4, 0.7), *p* = <0.0001] were at a lower odds of being overweight/obese. Other races/ethnicities were not significantly different compared to Whites. When looking at behavior for the number of cigarettes smoked/ day, adolescents who smoked less than one to one cigarette/ day [AOR =1.7 (1.4, 2.2), *p* = <0.0001]

and adolescents who smoked two to five cigarettes/ day [AOR =1.8 (1.3, 2.6),  $p= 0.0005$ ] were at a significantly higher odds of being overweight/obese compared to adolescents who did not smoke in the past 30 days. The other adolescent's odds were indifferent. Adolescents who were physically active for at least 60 minutes for six days [AOR =0.8 (0.6, 0.97),  $p = 0.02$ ] or seven days [AOR =0.6 (0.5, 0.8),  $p = <0.0001$ ] in the past week, were significantly at lower odds of being overweight/obese compared to adolescents who are not physically active. The other adolescent's odds were indifferent. Grade, TV usage during a school day, PG usage during a school day, alcohol consumption, fruit intake, vegetable intake, and soda consumption were not associated with the odds of being overweight/obese.

The univariate and multivariate logistic regression analyses in Table 11 reports the odds of being obese among adolescents who watch TV or PG. In Table 11, the multivariate logistic regression analyses suggested lower odds of being obese among females [AOR =0.5 (0.4, 0.7),  $p= <0.001$ ] when compared to males. For race/ethnicity, Asians were [AOR =0.4, (0.2, 0.8),  $p = 0.01$ ] at a significantly lower odds of being obese when compared to Whites. Other races/ethnicities were not significantly different when compared to Whites. When looking at dietary habits, adolescents who ate fruits/ 100% fruit juice three times per day in the past seven days were at lower odds of being obese [AOR =0.4 (0.2, 0.9),  $p = 0.01$ ] when compared to adolescents who did not eat fruit or drink 100% fruit juice in the past 7 days. The other adolescent's odds were indifferent. Age, grade, TV usage during a school day, PG usage during school day, smoking consumption, alcohol consumption, vegetable consumption, soda consumption, and physical activity were not associated with the odds of being obese.

The univariate and multivariate logistic regression analyses in Table 12 reports the odds of being overweight/obese among adolescents who watch TV and PG. In Table 12, the

multivariate logistic regression analyses suggested lower odds of being overweight/obesity among fifteen [AOR =0.8 (0.6, 0.9),  $p = 0.006$ ] and seventeen year olds [AOR =0.7 (0.5, 0.98),  $p = 0.04$ ] when compared to fourteen years of age and younger. The other adolescent's odds were indifferent. Among sex, females [AOR =0.7 (0.6, 0.9),  $p = 0.0002$ ] were at lower odds of being overweight/obese when compared to males. Compared to Whites, Black/African Americans [AOR =1.3 (1.03, 1.7),  $p = 0.03$ ], Hispanic/Latino [AOR =1.4 (1.2, 1.6),  $p = <0.0001$ ], and Multiple-Hispanic/Latino [AOR =1.3, (1.1, 1.6),  $p = 0.002$ ] were at a significantly higher odds of being overweight/obese, while Asians [AOR =0.5, (0.4, 0.7),  $p = <0.0001$ ] were at a significantly lower odds of being overweight/obese. Other races/ethnicities were not significantly different compared to Whites. When looking at behavior for the number of cigarettes smoked/ day, adolescents who smoked less than one to one cigarette/ day [AOR =1.7 (1.4, 2.2),  $p = <0.0001$ ] and adolescents who smoked two to five cigarettes/ day [AOR =1.8 (1.3, 2.6),  $p = 0.0005$ ] were at a significantly higher odds of being overweight/obese compared to adolescents who did not smoke in the past 30 days. When looking at physical activity, adolescents who were physically active for at least 60 minutes for six days [AOR =0.8 (0.6, 0.97),  $p = 0.03$ ] or seven days [AOR =0.7 (0.5, 0.8),  $p = <0.0001$ ] in the past week, were significantly at lower odds of being overweight/obese compared to adolescents who are not physically active. The other adolescent's odds were indifferent. Grade, TV and PG Usage during a school day, alcohol consumption, fruit consumption, vegetable consumption, and soda consumption were not associated with the odds of being overweight/obese.

The univariate and multivariate logistic regression analyses in Table 13 reports the odds of being obese among adolescents who watch TV and PG. In Table 13, the multivariate logistic regression analyses suggested lower odds of being obese among females [AOR =0.5 (0.4, 0.6),  $p$

= <0.0001] when compared to males. For race/ethnicity, Asians were [AOR =0.5 (0.2, 0.9),  $p = 0.01$ ] at a significantly lower odds of being obese when compared to Whites. Other races/ethnicities were not significantly different when compared to Whites. For TV and PG usage during a school day, adolescents who watch TV and PG, were at higher odds of being obese [AOR =1.3 (1.04, 1.6),  $p = 0.02$ ] as compared to adolescents who did not watch TV and PG. When looking at dietary habits, adolescents who ate fruits/ 100% fruit juice three times per day in the past seven days were at lower odds of being obese [AOR =0.4 (0.2, 0.9),  $p = 0.01$ ] when compared to adolescents who did not eat fruit or drink 100% fruit juice in the past 7 days. The other adolescent's odds were indifferent. Age, grade, smoking consumption, alcohol consumption, vegetable consumption, soda consumption, and physical activity were not associated with the odds of being obese.

## **CHAPTER V**

### **DISCUSSION AND CONCLUSION**

In today's society, adolescents are more likely to engage in sedentary behaviors such as TV use which has contributed to the childhood obesity epidemic. In order to understand the relationship of sedentary behaviors and childhood obesity, the main focus of this study was to examine how TV usage and video games/computer/social media (PG) usage affects adiposity/BMI in US high school adolescents, using the YRBS 2015 data. Nationally, adolescents who engage in watching TV and using video games/computers/ social media are significantly more likely to become obese [AOR =1.3 (1.04, 1.6),  $p = 0.02$ ] when compared to adolescents who do not watch TV and PG. In the US, four-fifths of the adolescents watch TV during a school day, and four-fifths of the adolescents used video games/computers/ and social media (PG) during a school day. This study is consistent with recent literature reporting that

sedentary behaviors are increasing among the US population and that the majority of our time is spent in activities that expend little energy (Matthews et al., 2008). Within YRBS sample, adolescents who watched TV were 1.1 times higher at odds of being overweight/ obese, and adolescents who engaged in video games/computers/social media were 1.03 times higher at odds of being overweight/obese. Adolescents who engaged in both sedentary behaviors were 1.1 times higher at odds of being overweight/ obese. Within the YRBS sample, adolescents who watched TV were 1.2 times higher at odds of being obese and adolescents who engaged in video games/computers/social media were 1.3 times higher at odds of being obese. However, this was not statistically significant. Gender differences were observed among sedentary behaviors where females were significantly less likely than males to engage in activities that expend little energy. This was consistent to other findings from previous studies among adults (Shields and Tremblay, 2008); however, it was also inconsistent with Utter et al., 2003 where girls who watched TV/video and used computers were positively associated with BMI. Age differences were observed where 15 and 17 year olds were significantly less likely to become overweight/ obese when compared to 14 year old and younger adolescents. Black/African Americans, Hispanic/Latino, and Multiple-Hispanic/Latino were significantly more likely to be overweight or obese where as Asians were significantly less likely to become overweight or obese. Similar to previous studies, this data represents how racial minorities are more disproportionately affected among other races (Albrecht, 2013). Adolescents who engaged in smoking less than 1 to 1 cigarette/day and adolescents who smoked 2 to 5 cigarettes/day were more likely to become overweight/obese. This is consistent with other literature which showed that sedentary behaviors were significantly higher among smokers when comparing to nonsmokers and former smokers (Kaufman et al., 2011). Adolescents who ate fruits/drank 100% fruit juice three times per day



were less likely to become obese. Similarly, other findings have shown that there is an inverse relation among fruit consumption and body weight (Bertoia et al., 2015). Among the number of days physically active for at least 60 minutes in the past seven days, adolescents who were active 6 or 7 days in the week were less likely to become overweight/ obese. This is also consistent with other literature which states that engaging in 40 to 60 minutes physical activity per day prevents weight gain and obesity (Lakka and Bouchard, 2005).

### 5.2 Limitations and Strengths

One of the main limitations of this study was that it was a cross-sectional study which only evaluated the association in 2015. Even though there was an association among adolescents who engaged in TV and PG with obesity, the directionality of the association and the causal inferences could not be determined to see if sedentary behaviors caused obesity or if obesity caused in sedentary behaviors. Another limitation of this study included that sedentary behaviors were only viewed among adolescents through an average school day. Due to the limitation of the questionnaire used in the YRBS, this study did not account for sedentary behaviors that occurred over a non-school day such as the weekend. This may have caused the results to be insignificant when looking at the sedentary behaviors (TV, PG) individually. Other limitations of this study included that the YRBS is self-reported which could have resulted in a recall-bias or an over-or-under estimation. The YRBS survey does not report data on socio-economic status, parent education, or the type of school (public, private, charter, etc.) the adolescents attend, preventing the analyses of how these variables can affect the outcomes. Some of the strengths of this study included that the study had a large sample size. The study also looked at behavior, diet, and physical activity when assessing the association between sedentary behaviors and obesity.

### 5.3 Implications and Recommendations

This study was designed to determine how sedentary behaviors, such as watching TV and computer use, affected obesity among adolescents. The results of this study can help in developing curriculum in schools to decrease sedentary behaviors which stray away from computer based or TV based activities, especially since students sit majority of their time in school (Abbott et al., 2013). Schools can start to incorporate more active lesson plans within the curriculum. Also, adolescents can reduce the number of sedentary activities they engage in to reduce their risk of obesity. One of the campaigns that are already in place that aims to reduce childhood obesity is the “Let’s Move” campaign led by Michelle Obama. The goal of this campaign is to create “a healthy start for children,” empower parents and caregivers, provide healthy food in schools, improve access to healthy and affordable foods, and increase physical activity (Let’s Move, n.d.) It is important to understand that obesity is multifaceted and that everyone plays an influential role in reducing the rates of childhood obesity. Involvement from parents, schools, governments, healthcare organizations, etc. can lead to a healthy future for our youth. Further studies can evaluate sedentary behaviors/childhood obesity among adolescents everyday of the week. A study can be conducted longitudinally to determine the causal pathway by incorporating all types of sedentary behaviors to assess its association to obesity.

### 5.4 Conclusions

This study concludes that there is an association between obesity and adolescents who watch TV and use video games/computer/social media during a school day. Sociodemographic factors such as some races, age, and gender can also be responsible for obesity among TV and PG users.

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## APPENDICES

**Table 1:** Descriptive Statistics of 2015 YRBS Participants

Descriptive	N	Weighted Frequency Percent (%)
<b>Age</b>		
14 years old & younger	1744	10.3
15 years old	3817	26.1
16 years old	4033	25.1
17 years old	3833	23.7
18 years old or older	2131	14.8
<b>Sex</b>		
Females	7757	48.7
Males	7749	51.3
<b>Grade</b>		
9 <sup>th</sup> grade	4003	27.2
10 <sup>th</sup> grade	3938	25.7
11 <sup>th</sup> grade	3930	23.9
12 <sup>th</sup> grade/Ungraded	3636	23.2
<b>Race/Ethnicity</b>		
Am Indian/Alaska Native	163	0.6
Asian	627	3.8
Black/ African Am	1667	13.6
Native Hawaiian/other	100	0.7
White	6849	54.5
Hispanic/Latino	2365	9.9
Multiple-Hispanic	2756	12.3
Multiple-Non Hispanic	739	4.6
<b>BMI</b>		
Underweight	391	2.8
Normal	9431	67.3
Overweight	2365	16.0
Obese	2171	13.9
<b>TV Usage During A School Day</b>		
Watch TV	12753	81.6
Not Watch TV	2871	18.4
<b>PG Usage During A School Day</b>		
Use PG	12825	82.6
Not Use PG	2799	17.4
<b>TV &amp; PG Usage During A School Day</b>		
Use TV and PG Usage	10729	68.7
Not Use TV and PG Usage	4895	31.3
<b># of Cigarettes Smoked/ Day</b>		
Did not smoke in the past 30 days	13178	89.1
Smoke >1 to 1 cigarettes/day	791	5.3
2 to 5 cigarettes/ day	543	3.5
6 to 10 cigarettes/ day	144	1.2
11 or more cigarette/ day	141	0.9
<b># of Days Drinking At Least One Drink of</b>		

<b>Alcohol</b>		
0 days	9455	67.2
1 to 5 days	3549	25.4
6 to 30 days	1110	7.3
<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>		
Did not drink & eat during past 7 days	4435	28.0
1 to 3 times during past 7 days	6745	44.7
4 to 6 times during past 7 days	2037	13.3
1 time per day	879	6.0
2 times per day	660	4.4
3 times per day	223	1.2
4 or more times per day	415	2.4
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>		
Did not eat during past 7 days	10191	65.7
1 to 3 times during past 7 days	4158	27.5
4 to 6 times during past 7 days	486	3.4
1 time per day	295	1.9
2 times per day	97	0.5
3 times per day	29	0.2
4 or more times per day	125	0.8
<b># of Times Drinking Soda</b>		
Did not drink in past 7 days	3734	26.2
1 to 3 times in past 7 days	5497	35.9
4 to 6 times in past 7 days	2648	17.5
1 time per day	1171	7.4
2 times per day	976	5.9
3 times per day	489	2.8
4 or more times per day	777	4.3
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>		
0 days	2341	14.3
1 day	1126	6.5
2 days	1458	8.9
3 days	1745	11.5
4 days	1517	10.2
5 days	2169	14.5
6 days	996	7.00
7 days	3893	27.1

\*Table includes raw counts and weighted frequency percentages.

\*\*Weighted frequencies may not add up to 100% due to rounding

**Table 2:** Descriptive Statistics Comparing Adolescents Watching TV and Not Watching TV in Underweight/Normal and Overweight/Obese: YRBS (2015)

	Watch TV N (%)	Not Watch TV N (%)	P-Value
<b>Age</b>			0.85
14 yrs old & younger	1452 (10.4)	292 (10.0)	
15 years old	3145 (26.4)	672 (24.9)	
16 years old	3266 (24.9)	767 (25.9)	
17 years old	3084 (23.7)	749 (24.2)	
18 years old or older	1752 (14.8)	379 (15.0)	
Total	12699 (100)	2859 (100)	
<b>Sex</b>			0.07
Females	6348 (49.3)	1409 (45.9)	
Males	6317 (50.7)	1432 (54.1)	
Total	12665 (100)	2841 (100)	
<b>Grade</b>			0.20
9 <sup>th</sup> grade	3329 (27.7)	674 (25.0)	
10 <sup>th</sup> grade	3194 (25.4)	744 (26.9)	
11 <sup>th</sup> grade	3200 (24.1)	730 (23.2)	
12 <sup>th</sup> grade/Ungraded	2935 (22.9)	701 (24.9)	
Total	12658 (100)	2849 (100)	
<b>Race/Ethnicity</b>			<0.0001
Am Indian/Alaska Native	138 (0.7)	25 (0.3)	
Asian	419 (3.1)	208 (6.9)	
Black/ African Am	1405 (14.0)	262 (11.8)	
Native Hawaiian/other	88 (0.7)	12 (0.4)	
White	5639 (54.9)	1210 (52.6)	
Hispanic/Latino	1960 (10.0)	405 (9.9)	
Multiple-Hispanic/Latino	2227 (12.3)	529 (12.6)	
Multiple-Non-Hispanic/Latino	594 (4.4)	145 (5.5)	
Total	12470 (100)	2796 (100)	
<b>BMI</b>			0.40
Underweight/Normal	7995 (70.0)	1827 (71.2)	
Overweight/Obese	3738 (30.0)	798 (28.8)	
Total	11733 (100)	2625 (100)	
<b># of Cigarettes Smoked/ Day</b>			0.001
Did not smoke in the past 30 days	10705 (88.5)	2473 (92.1)	
Smoke >1 to 1 cigarettes/day	667 (5.6)	124 (4.0)	
2 to 5 cigarettes/ day	463 (3.8)	80 (2.5)	
6 to 10 cigarettes/ day	111 (1.3)	33 (0.8)	
11 or more cigarette/ day	120 (0.9)	21 (0.6)	
Total	12066 (100)	2731 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<0.0001
0 days	7608 (65.8)	1847 (73.6)	
1 to 5 days	2960 (26.4)	589 (21.2)	
6 to 30 days	948 (7.8)	162 (5.2)	
Total	11516 (100)	2598 (100)	

<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			<b>0.0002</b>
Did not drink/eat during past 7 days	3430 (26.9)	1005 (32.6)	
1 to 3 times during past 7 days	5613 (45.6)	1132 (40.8)	
4 to 6 times during past 7 days	1668 (13.3)	369 (13.7)	
1 time per day	721 (6.0)	158 (6.1)	
2 times per day	563 (4.7)	97 (3.3)	
3 times per day	195 (1.3)	28 (0.7)	
4 or more times per day	343 (2.3)	72 (2.8)	
Total	12533 (100)	2861 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.11</b>
Did not eat during past 7 days	8238 (65.3)	1953 (67.3)	
1 to 3 times during past 7 days	3448 (28.2)	710 (24.6)	
4 to 6 times during past 7 days	374 (3.2)	112 (4.6)	
1 time per day	249 (1.8)	46 (2.0)	
2 times per day	81 (0.6)	16 (0.5)	
3 times per day	22 (0.2)	7 (0.2)	
4 or more times per day	105 (0.7)	20 (0.9)	
Total	12517 (100)	2864 (100)	
<b># of Times Drinking Soda</b>			<b>&lt;0.0001</b>
Did not drink in past 7 days	2714 (23.6)	1020 (37.2)	
1 to 3 times in past 7 days	4514 (36.3)	983 (34.4)	
4 to 6 times in past 7 days	2291 (18.9)	357 (11.1)	
1 time per day	993 (7.5)	178 (7.0)	
2 times per day	853 (6.3)	123 (4.3)	
3 times per day	422 (2.8)	67 (2.4)	
4 or more times per day	649 (4.5)	128 (3.5)	
Total	12436 (100)	2856 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			<b>&lt;0.0001</b>
0 days	1738 (13.1)	603 (19.3)	
1 day	902 (6.5)	224 (6.6)	
2 days	1172 (8.8)	286 (9.3)	
3 days	1443 (11.3)	302 (12.4)	
4 days	1264 (10.4)	253 (9.5)	
5 days	1780 (14.9)	389 (13.1)	
6 days	837 (7.2)	159 (6.2)	
7 days	3253 (27.8)	640 (23.7)	
Total	12389 (100)	2856 (100)	

\*Table includes raw counts and weighted frequency percentages

\*\*Weighted percent may not add up to 100% due to rounding

**Table 3:** Descriptive Statistics Comparing Adolescents Using Video Games/Computer/ Social Media (PG) and Not Using Video Games/Computer/Social Media (PG) in Underweight/Normal and Overweight/Obese: YRBS (2015)

	Use PG N (%)	Not Use PG N (%)	P-Value
<b>Age</b>			<b>&lt;0.0001</b>
14 yrs old & younger	1504 (11.0)	240 (6.9)	
15 years old	3234 (27.0)	583 (21.8)	
16 years old	3296 (24.8)	737 (26.6)	
17 years old	3043 (22.9)	790 (27.5)	
18 years old or older	1692 (14.3)	439 (17.2)	
Total	12769 (100)	2789 (100)	
<b>Sex</b>			<b>&lt;0.0001</b>
Females	6063 (46.3)	1694 (60.2)	
Males	6669 (53.7)	1080 (39.8)	
Total	12732 (100)	2774 (100)	
<b>Grade</b>			<b>&lt;0.0001</b>
9 <sup>th</sup> grade	3441 (28.6)	562 (20.4)	
10 <sup>th</sup> grade	3247 (25.6)	691 (26.1)	
11 <sup>th</sup> grade	3179 (23.4)	751 (26.4)	
12 <sup>th</sup> grade/Ungraded	2865 (22.4)	771 (27.1)	
Total	12732 (100)	2775 (100)	
<b>Race/Ethnicity</b>			<b>0.004</b>
Am Indian/Alaska Native	134 (0.6)	29 (0.5)	
Asian	533 (3.9)	94 (3.0)	
Black/ African Am	1313 (13.0)	354 (16.6)	
Native Hawaiian/other	82 (0.7)	18 (0.6)	
White	5686 (55.2)	1163 (51.3)	
Hispanic/Latino	1965 (9.8)	400 (10.5)	
Multiple-Hispanic/Latino	2231 (12.1)	525 (13.4)	
Multiple-Non-Hispanic/Latino	604 (4.7)	135 (4.3)	
Total	12548 (100)	2718 (100)	
<b>BMI</b>			<b>0.75</b>
Underweight/Normal	8050 (70.0)	1772 (70.5)	
Overweight/Obese	3745 (30.0)	791(29.5)	
Total	11795 (100)	2563 (100)	
<b># of Cigarettes Smoked/ Day</b>			<b>0.01</b>
Did not smoke in the past 30 days	10849 (89.3)	2329 (88.2)	
Smoke >1 to 1 cigarettes/day	665 (5.4)	126 (4.6)	
2 to 5 cigarettes/ day	424 (3.3)	119 (4.7)	
6 to 10 cigarettes/ day	105 (1.0)	39 (1.9)	
11 or more cigarette/ day	115 (0.9)	26 (0.7)	
Total	12158 (100)	2639 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<b>0.03</b>
0 days	7849 (67.6)	1606 (65.2)	
1 to 5 days	2886 (25.4)	663 (25.5)	
6 to 30 days	882 (6.9)	228 (9.3)	

Total	11617 (100)	2497 (100)	
<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			<b>0.08</b>
Did not drink/eat during past 7 days	3598 (27.8)	837 (28.6)	
1 to 3 times during past 7 days	5572 (44.9)	1173 (43.4)	
4 to 6 times during past 7 days	1682 (13.5)	355 (12.7)	
1 time per day	730 (6.1)	149 (5.6)	
2 times per day	520 (4.3)	140 (5.2)	
3 times per day	179 (1.2)	44 (1.1)	
4 or more times per day	322 (2.2)	93 (3.4)	
Total	12603 (100)	2791 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.53</b>
Did not eat during past 7 days	8353 (65.9)	1838 (64.6)	
1 to 3 times during past 7 days	3411 (27.5)	747 (28.0)	
4 to 6 times during past 7 days	383 (3.3)	103 (3.9)	
1 time per day	237 (1.8)	58 (2.1)	
2 times per day	79 (0.6)	18 (0.3)	
3 times per day	20 (0.2)	9 (0.3)	
4 or more times per day	103 (0.7)	22 (0.9)	
Total	12586 (100)	2795(100)	
<b># of Times Drinking Soda</b>			<b>&lt;0.0001</b>
Did not drink in past 7 days	2823 (24.3)	911 (35.1)	
1 to 3 times in past 7 days	4496 (36.1)	1001 (35.2)	
4 to 6 times in past 7 days	2249 (18.3)	399 (13.6)	
1 time per day	995 (7.7)	176 (6.2)	
2 times per day	851 (6.3)	125 (4.5)	
3 times per day	418 (2.8)	71 (2.6)	
4 or more times per day	675 (4.6)	102 (2.9)	
Total	12507 (100)	2785 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			<b>&lt;0.0001</b>
0 days	1798 (13.7)	543 (17.3)	
1 day	944 (6.7)	182 (5.8)	
2 days	1221 (9.0)	237 (8.2)	
3 days	1464 (11.7)	281 (10.7)	
4 days	1272 (10.3)	245 (9.5)	
5 days	1846 (15.2)	323 (11.8)	
6 days	836 (7.2)	160 (5.9)	
7 days	3077 (26.2)	816 (30.9)	
Total	12458 (100)	2787 (100)	

\*Table includes raw counts and weighted frequency percentages.

\*\*Weighted percent may not add up to 100% due to rounding

**Table 4:** Descriptive Statistics Comparing Adolescents Watching TV and Not Watching TV in Overweight and Obese: YRBS (2015)

	Watch TV N (%)	Not Watch TV N (%)	P-Value
<b>Age</b>			0.26
14 yrs old & younger	431 (10.4)	94 (12.3)	
15 years old	901 (25.8)	182 (22.2)	
16 years old	1007 (26.4)	216 (25.8)	
17 years old	925 (23.5)	198 (22.2)	
18 years old or older	474 (13.9)	108 (17.6)	
Total	3738 (100)	798 (100)	
<b>Sex</b>			0.68
Females	1715 (44.7)	354 (43.0)	
Males	2023 (55.3)	444 (57.0)	
Total	3738 (100)	798 (100)	
<b>Grade</b>			<b>0.04</b>
9 <sup>th</sup> grade	987 (27.4)	182 (23.8)	
10 <sup>th</sup> grade	936 (26.2)	220 (27.7)	
11 <sup>th</sup> grade	993 (25.0)	195 (21.6)	
12 <sup>th</sup> grade/Ungraded	808 (21.4)	198 (26.9)	
Total	3724 (100)	795 (100)	
<b>Race/Ethnicity</b>			0.16
Am Indian/Alaska Native	46 (0.7)	7 (0.26)	
Asian	72 (1.8)	40 (3.7)	
Black/ African Am	420 (15.2)	78 (12.7)	
Native Hawaiian/other	27 (0.6)	4 (0.4)	
White	1528 (51.1)	310 (53.1)	
Hispanic/Latino	634 (11.1)	141 (12.5)	
Multiple-Hispanic/Latino	755 (14.1)	173 (13.8)	
Multiple-Non-Hispanic/Latino	196 (5.4)	30 (3.6)	
Total	3678 (100)	783 (100)	
<b>BMI</b>			<b>0.04</b>
Overweight	1931 (52.3)	434 (59.5)	
Obese	1807 (47.7)	364 (40.5)	
Total	3738 (100)	798 (100)	
<b># of Cigarettes Smoked/ Day</b>			0.13
Did not smoke in the past 30 days	3085 (84.7)	678 (89.5)	
Smoke >1 to 1 cigarettes/day	249 (8.0)	45 (5.7)	
2 to 5 cigarettes/ day	154 (5.2)	27 (3.3)	
6 to 10 cigarettes/ day	33 (1.2)	8 (0.9)	
11 or more cigarette/ day	31 (0.9)	7 (0.6)	
Total	3552 (100)	765 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<b>0.01</b>
0 days	2227 (64.7)	494 (72.0)	
1 to 5 days	844 (26.4)	177 (22.6)	
6 to 30 days	286 (8.9)	46 (5.4)	
Total	3357 (100)	717 (100)	



<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			<b>0.14</b>
Did not drink/eat during past 7 days	1008 (27.4)	270 (32.9)	
1 to 3 times during past 7 days	1625 (45.3)	327 (43.0)	
4 to 6 times during past 7 days	497 (13.0)	106 (13.5)	
1 time per day	193 (5.7)	45 (5.1)	
2 times per day	192 (4.8)	21 (2.6)	
3 times per day	61 (1.2)	8 (0.6)	
4 or more times per day	107 (2.5)	19 (2.4)	
Total	3683 (100)	796 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.20</b>
Did not eat during past 7 days	2413 (65.4)	560 (71.0)	
1 to 3 times during past 7 days	1010 (27.5)	185 (21.4)	
4 to 6 times during past 7 days	107 (3.5)	27 (3.1)	
1 time per day	79 (1.9)	12 (2.9)	
2 times per day	26 (0.7)	4 (0.3)	
3 times per day	10 (0.3)	1 (0.1)	
4 or more times per day	33 (0.7)	6 (1.1)	
Total	3678 (100)	795 (100)	
<b># of Times Drinking Soda</b>			<b>&lt;0.0001</b>
Did not drink in past 7 days	769 (21.7)	260 (35.5)	
1 to 3 times in past 7 days	1349 (36.5)	269 (33.5)	
4 to 6 times in past 7 days	707 (20.3)	108 (12.1)	
1 time per day	289 (7.5)	57 (7.5)	
2 times per day	236 (6.4)	33 (4.5)	
3 times per day	118 (3.1)	17 (2.0)	
4 or more times per day	185 (4.5)	49 (4.9)	
Total	3653 (100)	793 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			<b>0.001</b>
0 days	508 (13.7)	182 (21.1)	
1 day	303 (7.9)	47 (5.1)	
2 days	372 (9.3)	90 (9.5)	
3 days	420 (10.1)	110 (16.9)	
4 days	388 (11.2)	64 (8.4)	
5 days	548 (15.7)	110 (13.9)	
6 days	244 (7.0)	37 (6.4)	
7 days	854 (25.0)	154 (18.7)	
Total	3637 (100)	794 (100)	

\*Table includes raw counts and weighted frequency percentages.

\*\*Weighted percent may not add up to 100% due to rounding

**Table 5:** Descriptive Statistics Comparing Adolescents Using Video Games/Computer/Social Media (PG) and Not Using Video Games/Computer/Social Media (PG) in Overweight and Obese: YRBS (2015)

	Use PG N (%)	Not Use PG N (%)	P-Value
<b>Age</b>			<b>0.01</b>
14 yrs old & younger	454 (11.1)	71 (8.7)	
15 years old	925 (26.1)	158 (20.5)	
16 years old	992 (25.5)	231 (30.2)	
17 years old	911 (23.2)	212 (23.6)	
18 years old or older	463 (14.1)	119 (17.0)	
Total	3745 (100)	791 (100)	
<b>Sex</b>			<b>&lt;0.0001</b>
Females	1626 (41.7)	443 (57.6)	
Males	2119 (58.3)	348 (42.4)	
Total	3745 (100)	791 (100)	
<b>Grade</b>			0.08
9 <sup>th</sup> grade	1012 (27.8)	157 (21.7)	
10 <sup>th</sup> grade	951 (26.2)	205 (27.7)	
11 <sup>th</sup> grade	974 (24.3)	214 (24.9)	
12 <sup>th</sup> grade/Ungraded	794 (21.7)	212 (25.7)	
Total	3731 (100)	788 (100)	
<b>Race/Ethnicity</b>			0.06
Am Indian/Alaska Native	45 (0.6)	8 (0.3)	
Asian	101 (2.2)	11 (2.0)	
Black/ African Am	379 (13.8)	119 (19.8)	
Native Hawaiian/other	26 (0.6)	5 (0.6)	
White	1569 (52.8)	269 (44.8)	
Hispanic/Latino	635 (11.1)	140 (12.5)	
Multiple-Hispanic/Latino	748 (13.7)	180 (15.6)	
Multiple-Non-Hispanic/Latino	187 (5.2)	39 (4.4)	
Total	3690 (100)	771 (100)	
<b>BMI</b>			<b>0.047</b>
Overweight	1914 (52.3)	451 (59.7)	
Obese	1831 (47.7)	340 (40.3)	
Total	3745 (100)	791 (100)	
<b># of Cigarettes Smoked/ Day</b>			<b>0.002</b>
Did not smoke in the past 30 days	3124 (86.0)	639 (83.0)	
Smoke >1 to 1 cigarettes/day	243 (7.7)	51 (7.2)	
2 to 5 cigarettes/ day	147 (4.6)	34 (6.1)	
6 to 10 cigarettes/ day	27 (0.8)	14 (3.1)	
11 or more cigarette/ day	32 (0.9)	6 (0.5)	
Total	3573 (100)	744 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			0.68
0 days	2275 (66.2)	446 (64.7)	
1 to 5 days	823 (25.8)	198 (25.6)	
6 to 30 days	269 (8.0)	63 (9.8)	
Total	3367 (100)	707 (100)	

<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			0.49
Did not drink/eat during past 7 days	1051 (28.4)	227 (28.4)	
1 to 3 times during past 7 days	1615 (44.4)	337 (46.8)	
4 to 6 times during past 7 days	502 (13.5)	101 (11.4)	
1 time per day	197 (5.9)	41 (4.0)	
2 times per day	169 (4.3)	44 (5.3)	
3 times per day	55 (1.1)	14 (1.2)	
4 or more times per day	101 (2.4)	25 (2.8)	
Total	3690 (100)	789 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			0.26
Did not eat during past 7 days	2427 (65.9)	546 (69.0)	
1 to 3 times during past 7 days	999 (26.8)	196 (24.6)	
4 to 6 times during past 7 days	108 (3.2)	26 (4.6)	
1 time per day	81 (2.3)	10 (1.0)	
2 times per day	26 (0.7)	4 (0.2)	
3 times per day	9 (0.3)	2 (0.2)	
4 or more times per day	34 (0.8)	5 (0.5)	
Total	3684 (100)	789 (100)	
<b># of Times Drinking Soda</b>			<0.0001
Did not drink in past 7 days	777 (21.4)	252 (37.2)	
1 to 3 times in past 7 days	1355 (37.0)	263 (31.2)	
4 to 6 times in past 7 days	696 (19.9)	119 (13.7)	
1 time per day	287 (7.8)	59 (6.2)	
2 times per day	224 (6.1)	45 (5.6)	
3 times per day	121 (3.2)	14 (1.7)	
4 or more times per day	198 (4.6)	36 (4.4)	
Total	3658 (100)	788 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			0.06
0 days	525 (14.2)	165 (18.7)	
1 day	286 (7.6)	64 (6.4)	
2 days	386 (9.5)	76 (8.7)	
3 days	445 (11.0)	85 (13.1)	
4 days	390 (10.8)	62 (10.2)	
5 days	569 (16.2)	89 (11.4)	
6 days	241 (7.4)	40 (4.5)	
7 days	801 (23.3)	207 (26.8)	
Total	3643 (100)	788 (100)	

\*Table includes raw counts and weighted frequency percentages

\*\*Weighted percent may not add up to 100% due to rounding

**Table 6:** Descriptive Statistics Comparing Adolescents Engaging in Watching TV & Using Video Games/Computer/Social Media (PG) & Not Watching TV & Using Video Games/Computer/Social Media (PG) in Underweight/Normal and Overweight/Obese: YRBS (2015)

	Watching TV and PG: N (%)	Not Watching TV and PG: N (%)	P-Value
<b>Age</b>			<b>&lt;0.0001</b>
14 yrs old & younger	1275 (10.9)	469 (8.9)	
15 years old	2728 (27.4)	1089 (23.4)	
16 years old	2728 (24.6)	1305 (26.3)	
17 years old	2514 (22.8)	1319 (25.7)	
18 years old or older	1436 (14.4)	695 (15.7)	
Total	10681 (100)	4877 (100)	
<b>Sex</b>			<b>0.0003</b>
Females	5066 (46.9)	2691 (52.7)	
Males	5587 (53.1)	2162 (47.3)	
Total	10653 (100)	4853 (100)	
<b>Grade</b>			<b>&lt;0.0001</b>
9 <sup>th</sup> grade	2925 (29.1)	1078 (23.1)	
10 <sup>th</sup> grade	2689 (25.3)	1249 (26.5)	
11 <sup>th</sup> grade	2662 (23.6)	1268 (24.5)	
12 <sup>th</sup> grade/Ungraded	2372 (22.0)	1264 (25.8)	
Total	10648 (100)	4859 (100)	
<b>Race/Ethnicity</b>			<b>0.001</b>
Am Indian/Alaska Native	120 (0.7)	43 (0.4)	
Asian	358 (3.1)	269 (5.1)	
Black/ African Am	1155 (13.4)	512 (13.9)	
Native Hawaiian/other	74 (0.7)	26 (0.5)	
White	4783 (55.5)	2066 (52.3)	
Hispanic/Latino	1665 (9.9)	700 (10.0)	
Multiple-Hispanic/Latino	1856 (12.1)	900 (12.8)	
Multiple-Non-Hispanic/Latino	491 (4.5)	248 (4.9)	
Total	10502 (100)	4764 (100)	
<b>BMI</b>			<b>0.28</b>
Underweight/Normal	6714 (69.6)	3108 (71.0)	
Overweight/Obese	3154 (30.4)	1382 (29.0)	
Total	9868 (100)	4490 (100)	
<b># of Cigarettes Smoked/ Day</b>			<b>0.02</b>
Did not smoke in the past 30 days	9015 (88.6)	4163 (90.2)	
Smoke >1 to 1 cigarettes/day	576 (5.8)	215 (4.2)	
2 to 5 cigarettes/ day	370 (3.5)	173 (3.6)	
6 to 10 cigarettes/ day	86 (1.1)	58 (1.3)	
11 or more cigarette/ day	102 (1.0)	39 (0.6)	
Total	10149 (100)	4648 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<b>0.06</b>
0 days	6456 (66.3)	2999 (69.3)	
1 to 5 days	2460 (26.3)	1089 (23.6)	
6 to 30 days	777 (7.4)	333 (7.1)	

Total	9693 (100)	4421 (100)	
<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			<b>0.11</b>
Did not drink/eat during past 7 days	2890 (27.0)	1545 (30.0)	
1 to 3 times during past 7 days	4699 (45.4)	2046 (43.0)	
4 to 6 times during past 7 days	1408 (13.4)	629 (13.2)	
1 time per day	609 (5.9)	270 (6.1)	
2 times per day	453 (4.4)	207 (4.4)	
3 times per day	162 (1.4)	61 (0.9)	
4 or more times per day	292 (2.4)	123 (2.5)	
Total	10513 (100)	4881 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.38</b>
Did not eat during past 7 days	6915 (65.5)	3276 (66.1)	
1 to 3 times during past 7 days	2883 (28.0)	1275 (26.6)	
4 to 6 times during past 7 days	312 (3.1)	174 (4.00)	
1 time per day	207 (1.8)	88 (2.00)	
2 times per day	67 (0.6)	30 (0.4)	
3 times per day	16 (0.2)	13 (0.2)	
4 or more times per day	95 (0.8)	30 (0.7)	
Total	10495 (100)	4886 (100)	
<b># of Times Drinking Soda</b>			<b>&lt;0.0001</b>
Did not drink in past 7 days	2174 (22.4)	1560 (34.2)	
1 to 3 times in past 7 days	3746 (36.2)	1751 (35.4)	
4 to 6 times in past 7 days	1944 (19.4)	704 (13.2)	
1 time per day	854 (7.6)	317 (6.9)	
2 times per day	756 (6.6)	220 (4.6)	
3 times per day	364 (2.9)	125 (2.5)	
4 or more times per day	583 (4.9)	194 (3.2)	
Total	10421 (100)	4871 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			<b>&lt;0.0001</b>
0 days	1427 (13.0)	914 (17.1)	
1 day	761 (6.5)	365 (6.5)	
2 days	994 (8.8)	464 (8.9)	
3 days	1222 (11.5)	523 (11.7)	
4 days	1069 (10.3)	448 (10.0)	
5 days	1525 (15.2)	644 (13.2)	
6 days	713 (7.4)	283 (6.2)	
7 days	2664 (27.3)	1229 (26.4)	
Total	10375 (100)	4870 (100)	

\*Table includes raw counts and weighted frequency percentages

\*\*Weighted percent may not add up to 100% due to rounding

**Table 7:** Descriptive Statistics Comparing Adolescents Engaging in Watching TV and Using Video Games/Computer/ Social Media (PG) and Not Engaging in Watching TV and Not Using Video Games/Computer/Social Media (PG) in Overweight and Obese: YRBS (2015)

	Watching TV and PG N (%)	Not Watching TV and PG N (%)	P-Value
<b>Age</b>			<b>0.14</b>
14 yrs old & younger	380 (10.7)	145 (10.8)	
15 years old	781 (26.5)	302 (22.1)	
16 years old	836 (25.8)	387 (27.5)	
17 years old	769 (23.3)	354 (23.1)	
18 years old or older	388 (13.7)	194 (16.4)	
Total	3154 (100)	1382 (100)	
<b>Sex</b>			<b>0.01</b>
Females	1376 (42.1)	693 (49.6)	
Males	1778 (57.9)	689 (50.4)	
Total	3154 (100)	1382 (100)	
<b>Grade</b>			<b>0.06</b>
9 <sup>th</sup> grade	865 (28.1)	304 (23.7)	
10 <sup>th</sup> grade	787 (25.9)	369 (27.7)	
11 <sup>th</sup> grade	834 (24.8)	354 (23.5)	
12 <sup>th</sup> grade/Ungraded	655 (21.2)	351 (25.2)	
Total	3141 (100)	1378 (100)	
<b>Race/Ethnicity</b>			<b>0.10</b>
Am Indian/Alaska Native	41 (0.7)	12 (0.3)	
Asian	66 (1.8)	46 (3.0)	
Black/ African Am	328 (14.0)	170 (16.6)	
Native Hawaiian/other	24 (0.6)	7 (0.5)	
White	1328 (52.7)	510 (48.7)	
Hispanic/Latino	537 (11.1)	238 (11.9)	
Multiple-Hispanic/Latino	619 (13.6)	309 (15.0)	
Multiple-Non-Hispanic/Latino	166 (5.5)	60 (4.1)	
Total	3109 (100)	1352 (100)	
<b>BMI</b>			<b>0.02</b>
Overweight	1602 (51.4)	763 (58.4)	
Obese	1552 (48.6)	619 (41.6)	
Total	3154 (100)	1382 (100)	
<b># of Cigarettes Smoked/ Day</b>			<b>0.02</b>
Did not smoke in the past 30 days	2614 (85.2)	1149 (86.2)	
Smoke >1 to 1 cigarettes/day	210 (8.2)	84 (6.3)	
2 to 5 cigarettes/ day	129 (4.9)	52 (4.9)	
6 to 10 cigarettes/ day	23 (0.8)	18 (2.0)	
11 or more cigarette/ day	27 (1.0)	11 (0.5)	
Total	3003 (100)	1314 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<b>0.33</b>
0 days	1890 (64.9)	831 (68.3)	
1 to 5 days	698 (26.4)	323 (24.3)	

6 to 30 days	239 (8.7)	93 (7.4)	
Total	2827 (100)	1247 (100)	
<b># of Times Eating Fruits/ or 100% Fruit Juice in the Past 7 Days</b>			<b>0.82</b>
Did not drink/eat during past 7 days	864 (27.7)	414 (29.9)	
1 to 3 times during past 7 days	1359 (44.7)	593 (45.1)	
4 to 6 times during past 7 days	424 (13.3)	179 (12.6)	
1 time per day	160 (5.9)	78 (4.8)	
2 times per day	151 (4.5)	62 (4.3)	
3 times per day	50 (1.2)	19 (0.9)	
4 or more times per day	92 (2.5)	34 (2.4)	
Total	3100 (100)	1379 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.30</b>
Did not eat during past 7 days	2019 (64.9)	954 (69.9)	
1 to 3 times during past 7 days	856 (27.8)	339 (23.3)	
4 to 6 times during past 7 days	87 (3.4)	47 (3.6)	
1 time per day	73 (2.2)	18 (1.9)	
2 times per day	22 (0.7)	8 (0.3)	
3 times per day	8 (0.3)	3 (0.2)	
4 or more times per day	30 (0.7)	9 (0.8)	
Total	3095 (100)	1378 (100)	
<b># of Times Drinking Soda</b>			<b>&lt;0.0001</b>
Did not drink in past 7 days	608 (19.9)	421 (33.7)	
1 to 3 times in past 7 days	1144 (36.9)	474 (33.8)	
4 to 6 times in past 7 days	606 (21.2)	209 (13.5)	
1 time per day	244 (7.7)	102 (7.1)	
2 times per day	200 (6.3)	69 (5.4)	
3 times per day	106 (3.3)	29 (2.1)	
4 or more times per day	163 (4.7)	71 (4.4)	
Total	3071 (100)	1375 (100)	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>			<b>0.009</b>
0 days	416 (13.5)	274 (18.5)	
1 day	250 (8.0)	100 (6.2)	
2 days	312 (9.3)	150 (9.5)	
3 days	357 (10.1)	173 (14.1)	
4 days	334 (10.9)	118 (10.4)	
5 days	478 (16.3)	180 (13.3)	
6 days	211 (7.4)	70 (5.8)	
7 days	697 (24.6)	311 (22.3)	
Total	3055 (100)	1376 (100)	

\*Table includes raw counts and weighted frequency percentages

\*\*Weighted percent may not add up to 100% due to rounding

**Table 8:** Demographic Characteristics of Study Population, stratified by BMI in Underweight/Normal and Overweight/Obese Adolescents (TV, PG, TV & PG): YRBS 2015

Variables	Underweight/ Normal N (%)	Overweight/Obese N (%)	P-Value
<b>Age</b>			0.37
14 yrs old & younger	1041 (9.8)	525 (10.7)	
15 years old	2441 (26.5)	1083 (25.2)	
16 years old	2524 (24.7)	1223 (26.3)	
17 years old	2440 (24.2)	1123 (23.2)	
18 years old or older	1376 (14.9)	582 (14.5)	
Total	9822 (100)	4536 (100)	
<b>Sex</b>			<b>0.002</b>
Females	5076 (50.4)	2069 (44.4)	
Males	4746 (49.6)	2467 (55.6)	
Total	9822 (100)	4536 (100)	
<b>Grade</b>			0.65
9 <sup>th</sup> grade	2473 (26.9)	1169 (26.8)	
10 <sup>th</sup> grade	2486 (25.5)	1156 (26.5)	
11 <sup>th</sup> grade	2471 (23.9)	1188 (24.4)	
12 <sup>th</sup> grade/Ungraded	2365 (23.8)	1006 (22.4)	
Total	9795 (100)	4519 (100)	
<b>Race/Ethnicity</b>			<b>&lt;0.0001</b>
Am Indian/Alaska Native	97 (0.6)	53 (0.6)	
Asian	471 (4.3)	112 (2.1)	
Black/ African Am	986 (12.3)	498 (14.8)	
Native Hawaiian/other	53 (0.6)	31 (0.6)	
White	4638 (57.6)	1838 (51.5)	
Hispanic/Latino	1340 (8.8)	775 (11.3)	
Multiple-Hispanic/Latino	1618 (11.5)	928 (14.0)	
Multiple-Non-Hispanic/Latino	462 (4.4)	226 (5.1)	
Total	9665 (100)	4461 (100)	
<b>TV Usage During A School Day</b>			0.40
Watch TV	7995 (81.4)	3738 (82.4)	
Not Watch TV	1827 (18.6)	798 (17.6)	
Total	9822 (100)	4536 (100)	
<b>PG Usage During A School Day</b>			<b>&lt;0.0001</b>
Use PG	8050 (82.6)	3745 (82.9)	
Not Use PG	1772 (17.4)	791 (17.1)	
Total	9822 (100)	4536 (100)	
<b>TV &amp; PG Usage During A School Day</b>			0.28
Use TV and PG Usage	6714 (68.4)	3154 (69.8)	
Not Use TV and PG Usage	3108 (31.6)	1382 (30.2)	
Total	9822 (100)	4536 (100)	
<b># of Cigarettes Smoked/ Day</b>			<b>&lt;0.0001</b>
Did not smoke in the past 30 days	8422 (90.8)	3763 (85.5)	
Smoke >1 to 1 cigarettes/day	451 (4.4)	294 (7.6)	
2 to 5 cigarettes/ day	329 (3.2)	181 (4.9)	
6 to 10 cigarettes/ day	89 (1.1)	41 (1.2)	



11 or more cigarette/ day	59 (0.5)	38 (0.9)	
Total	9350 (100)	4317 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			<b>0.17</b>
0 days	5976 (67.3)	2721 (66.0)	
1 to 5 days	2309 (25.8)	1021 (25.8)	
6 to 30 days	688 (6.9)	332 (8.3)	
Total	8973 (100)	4074 (100)	
<b># of Times Eating Fruits/ 100% Fruit Juice</b>			<b>0.86</b>
Did not drink/eat during past 7 days	2743 (27.3)	1278 (28.4)	
1 to 3 times during past 7 days	4332 (45.1)	1952 (44.8)	
4 to 6 times during past 7 days	1285 (13.6)	603 (13.1)	
1 time per day	568 (6.2)	238 (5.6)	
2 times per day	405 (4.4)	213 (4.4)	
3 times per day	135 (1.2)	69 (1.1)	
4 or more times per day	236 (2.1)	126 (2.5)	
Total	9704 (100)	4479 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			<b>0.41</b>
Did not eat during past 7 days	6414 (65.1)	2973 (66.4)	
1 to 3 times during past 7 days	2666 (28.4)	1195 (26.4)	
4 to 6 times during past 7 days	310 (3.4)	134 (3.5)	
1 time per day	175 (1.7)	91 (2.1)	
2 times per day	55 (0.5)	30 (0.6)	
3 times per day	16 (0.2)	11 (0.3)	
4 or more times per day	60 (0.7)	39 (0.8)	
Total	9696 (100)	4473 (100)	
<b># of Times Drinking Soda</b>			<b>0.06</b>
Did not drink in past 7 days	2401 (27.2)	1029 (24.1)	
1 to 3 times in past 7 days	3477 (35.9)	1618 (36.0)	
4 to 6 times in past 7 days	1634 (16.9)	815 (18.8)	
1 time per day	751 (7.4)	346 (7.5)	
2 times per day	631 (6.1)	269 (6.1)	
3 times per day	306 (2.6)	135 (2.9)	
4 or more times per day	449 (3.9)	234 (4.6)	
Total	9649 (100)	4446 (100)	
<b># of Days Physically Active for At least 60m</b>			<b>0.0002</b>
0 days in past 7 days	1363 (13.0)	690 (15.0)	
1 day in past 7 days	686 (6.2)	350 (7.4)	
2 days in past 7 days	884 (8.4)	462 (9.4)	
3 days in past 7 days	1059 (11.4)	530 (11.3)	
4 days in past 7 days	954 (9.9)	452 (10.7)	
5 days in past 7 days	1377 (14.5)	658 (15.3)	
6 days in past 7 days	664 (7.3)	281 (6.9)	
7 days in past 7 days	2640 (29.2)	1008 (23.9)	
Total	9627 (100)	4431 (100)	

\*Table includes raw counts and weighted frequency percentages.

\*\*Weighted percent may not add up to 100% due to rounding

**Table 9:** Demographic Characteristics of Study Population, stratified by BMI in Overweight and Obese Adolescents (TV, PG, TV & PG): YRBS 2015

Variables	Overweight N (%)	Obese N (%)	P-Value
<b>Age</b>			0.67
14 yrs old & younger	281 (11.3)	244 (10.0)	
15 years old	595 (25.5)	488 (24.7)	
16 years old	625 (25.1)	598 (27.8)	
17 years old	578 (22.9)	545 (23.6)	
18 years old or older	286 (15.1)	296 (13.9)	
Total	2365 (100)	2171 (100)	
<b>Sex</b>			<0.0001
Females	1217 (50.1)	852 (37.8)	
Males	1148 (49.9)	1319 (62.2)	
Total	2365 (100)	2171 (100)	
<b>Grade</b>			0.21
9 <sup>th</sup> grade	629 (28.1)	540 (25.2)	
10 <sup>th</sup> grade	611 (25.0)	545 (28.2)	
11 <sup>th</sup> grade	604 (23.8)	584 (25.1)	
12 <sup>th</sup> grade/Ungraded	514 (23.2)	492 (21.5)	
Total	2358 (100)	2161 (100)	
<b>Race/Ethnicity</b>			0.047
Am Indian/Alaska Native	30 (0.5)	23 (0.7)	
Asian	68 (2.7)	44 (1.5)	
Black/ African Am	242 (14.0)	256 (15.7)	
Native Hawaiian/other	14 (0.4)	17 (0.8)	
White	982 (52.9)	856 (49.8)	
Hispanic/Latino	386 (10.9)	389 (11.9)	
Multiple-Hispanic/Latino	484 (14.1)	444 (13.9)	
Multiple-Non-Hispanic/Latino	119 (4.4)	107 (5.8)	
Total	2325 (100)	2136 (100)	
<b>TV Usage During A School Day</b>			0.04
Watch TV	1931 (80.5)	1807 (84.7)	
Not Watch TV	434 (19.5)	364 (15.3)	
Total	2365 (100)	2171 (100)	
<b>PG Usage During A School Day</b>			0.047
Use PG	1914 (81.0)	1831 (85.2)	
Not Use PG	451 (19.0)	340 (14.8)	
Total	2365 (100)	2171 (100)	
<b>TV &amp; PG Usage A During School Day</b>			0.02
Use TV and PG Usage	1602 (67.0)	1552 (73.0)	
Not Use TV and PG Usage	763 (33.0)	619 (27.0)	
Total	2365 (100)	2171 (100)	
<b># of Cigarettes Smoked/ Day</b>			0.69
Did not smoke in past 30 days	1988 (86.2)	1775 (84.7)	
Smoke >1 to 1 cigarettes/day	148 (7.0)	146 (8.3)	
2 to 5 cigarettes/ day	85 (4.7)	96 (5.1)	
6 to 10 cigarettes/ day	21 (1.3)	20 (1.0)	
11 or more cigarette/ day	18 (0.7)	20 (1.0)	

Total	2260 (100)	2057 (100)	
<b># of Days Drinking At Least One Drink of Alcohol</b>			0.58
0 days	1403 (65.0)	1318 (67.1)	
1 to 5 days	543 (26.5)	478 (24.9)	
6 to 30 days	180 (8.5)	152 (8.0)	
Total	2126 (100)	1948 (100)	
<b># of Times Eating Fruits/ 100% Fruit Juice</b>			0.16
Did not drink/eat during past 7 days	648 (26.9)	630 (30.2)	
1 to 3 times during past 7 days	1035 (45.1)	917 (44.6)	
4 to 6 times during past 7 days	324 (14.2)	279 (11.9)	
1 time per day	109 (5.1)	129 (6.2)	
2 times per day	119 (4.9)	94 (3.9)	
3 times per day	39 (1.4)	30 (0.9)	
4 or more times per day	65 (2.5)	61 (2.5)	
Total	2339 (100)	2140 (100)	
<b># of Times Eating Green Salad/ Carrots/ or Other Vegetables</b>			0.32
Did not eat during past 7 days	1547 (65.7)	1426 (67.2)	
1 to 3 times during past 7 days	637 (27.6)	558 (25.1)	
4 to 6 times during past 7 days	59 (2.8)	75 (4.2)	
1 time per day	54 (2.3)	37 (1.9)	
2 times per day	14 (0.5)	16 (0.7)	
3 times per day	6 (0.2)	5 (0.3)	
4 or more times per day	18 (0.8)	21 (0.7)	
Total	2335 (100)	2138 (100)	
<b># of Times Drinking Soda</b>			0.38
Did not drink in past 7 days	575 (25.6)	454 (22.4)	
1 to 3 times in past 7 days	841 (35.6)	777 (36.4)	
4 to 6 times in past 7 days	426 (19.3)	389 (18.3)	
1 time per day	162 (6.4)	184 (8.8)	
2 times per day	135 (5.8)	134 (6.4)	
3 times per day	70 (3.0)	65 (2.8)	
4 or more times per day	115 (4.4)	119 (4.8)	
Total	2324 (100)	2122 (100)	
<b># of Days Physically Active for at least 60m</b>			0.71
0 days in past 7 days	333 (14.6)	357 (15.5)	
1 day in past 7 days	186 (6.9)	164 (8.0)	
2 days in past 7 days	243 (9.9)	219 (8.8)	
3 days in past 7 days	253 (10.6)	277 (12.2)	
4 days in past 7 days	240 (10.7)	212 (10.7)	
5 days in past 7 days	351 (15.2)	307 (15.4)	
6 days in past 7 days	157 (7.5)	124 (6.1)	
7 days in past 7 days	544 (24.4)	464 (23.3)	
Total	2307 (100)	2124 (100)	

\*Table includes raw counts and weighted frequency percentages.

\*\*Weighted percent may not add up to 100% due to rounding

**Table 10:** Univariate and Multivariate Analysis of Association of Independent Variables (TV, PG) in Overweight/Obese Adolescents: YRSB 2015

Variable	<u>Univariate Regression Analysis</u>			<u>Multivariate Regression Analysis</u>		
	Crude OR	Crude OR CI 95%	Crude OR P-Value	Adjusted OR	Adjusted OR CI 95%	Adjusted OR P-Value
<b>Age</b>						
14 years old & younger	Referent					
<b>15 years old</b>	0.9	(0.7,1.02)	0.08	0.8	(0.6, 0.9)	0.006
16 years old	1.0	(0.8, 1.2)	0.79	0.8	(0.6, 1.1)	0.19
<b>17 years old</b>	0.9	(0.7, 1.1)	0.15	0.7	(0.5, 0.98)	0.04
18 years old or older	0.9	(0.7, 1.1)	0.31	0.8	(0.5, 1.2)	0.23
<b>Sex</b>						
<b>Female</b>	0.8	(0.7,0.9)	0.003	0.7	(0.6, 0.9)	0.0001
Male	Referent					
<b>Grade</b>						
9 <sup>th</sup> grade	1.1	(0.9, 1.2)	0.47	0.9	(0.7, 1.2)	0.55
10 <sup>th</sup> grade	1.1	(0.9, 1.3)	0.28	1.1	(0.8, 1.3)	0.64
11 <sup>th</sup> grade	1.1	(0.9, 1.3)	0.32	1.0	(0.8, 1.3)	0.68
12 <sup>th</sup> grade/Ungraded	Referent					
<b>Race/Ethnicity</b>						
Am Indian/Alaska Native	1.1	(0.5, 2.4)	0.90	1.2	(0.5, 2.7)	0.68
<b>Asian</b>	0.6	(0.4, 0.7)	<0.0001	0.5	(0.4, 0.7)	<0.0001
<b>Black/ African Am</b>	1.3	(1.1, 1.7)	0.006	1.3	(1.03, 1.7)	0.03
Native Hawaiian/other	1.2	(0.5, 2.6)	0.70	1.3	(0.6, 3.0)	0.51
White	Referent					
<b>Hispanic/Latino</b>	1.4	(1.3, 1.7)	<0.0001	1.3	(1.2, 1.6)	<0.0001
<b>Multiple-Hispanic/Latino</b>	1.4	(1.1, 1.6)	0.0009	1.4	(1.1, 1.6)	0.002
Multiple-Non-Hispanic/Latino	1.3	(0.9, 1.8)	0.11	1.3	(0.9, 1.3)	0.13
<b>TV Usage During A School Day</b>						
Watch TV	1.1	(0.9, 1.3)	0.41	1.1	(0.9, 1.2)	0.41
Not Watch TV	Referent					
<b>PG Usage During A School Day</b>						
Use PG	1.0	(0.9, 1.2)	0.75	1.03	(0.9, 1.2)	0.75
Not Use PG	Referent					
<b># of Cigarettes Smoked/ Day</b>						
Did not smoke in the past 30 days	Referent					
<b>Smoke &gt;1 to 1 cigarettes/day</b>	1.8	(1.5, 2.2)	<0.0001	1.7	(1.4, 2.2)	<0.0001
<b>2 to 5 cigarettes/ day</b>	1.7	(1.2, 2.3)	0.0023	1.8	(1.3, 2.6)	0.0005
6 to 10 cigarettes/ day	1.1	(0.7, 1.9)	0.70	1.2	(0.7, 1.9)	0.54
11 or more cigarette/ day	1.8	(0.9, 3.5)	0.09	1.9	(0.9, 4.3)	0.11
<b># of Days Drinking At Least One Drink of Alcohol</b>						
0 days	Referent					
1 to 5 days	1.0	(0.9, 1.2)	0.77	1.0	(0.8, 1.1)	0.55
6 to 30 days	1.2	(0.97, 1.6)	0.09	1.1	(0.8, 1.5)	0.74

<b># of Times Eating Fruits/ 100% Fruit Juice in the Past 7 Days</b>						
Did not drink/eat during past 7 days	Referent					
1 to 3 times during past 7 days	1.0	(0.8, 1.1)	0.51	1.0	(0.8, 1.1)	0.60
4 to 6 times during past 7 days	0.9	(0.8, 1.1)	0.43	0.9	(0.7, 1.1)	0.36
1 time per day	0.9	(0.7, 1.2)	0.32	0.9	(0.7, 1.2)	0.35
2 times per day	1.0	(0.7, 1.3)	0.83	0.9	(0.7, 1.3)	0.62
3 times per day	0.9	(0.6, 1.4)	0.57	0.8	(0.5, 1.4)	0.47
4 or more times per day	1.1	(0.8, 1.5)	0.52	0.8	(0.6, 1.2)	0.36
<b># of Times Eating Green Salad/ Carrots/Other Vegetables</b>						
Did not eat during past 7 days	Referent					
1 to 3 times during past 7 days	0.9	(0.8, 1.03)	0.14	1.0	(0.9, 1.2)	0.88
4 to 6 times during past 7 days	1.0	(0.8, 1.2)	0.93	1.1	(0.9, 1.3)	0.51
1 time per day	1.2	(0.8, 1.7)	0.33	1.5	(0.95, 2.3)	0.08
2 times per day	1.3	(0.7, 2.3)	0.44	1.6	(0.8, 3.1)	0.18
3 times per day	1.6	(0.7, 3.8)	0.28	1.2	(0.4, 3.3)	0.77
4 or more times per day	1.1	(0.5, 2.1)	0.84	1.4	(0.6, 3.2)	0.37
<b># of Times Drinking Soda</b>						
Did not drink in past 7 days	Referent					
1 to 3 times in past 7 days	1.1	(0.97, 1.3)	0.10	1.1	(0.9, 1.3)	0.28
4 to 6 times in past 7 days	1.3	(1.1, 1.5)	0.003	1.1	(0.9, 1.3)	0.30
1 time per day	1.1	(0.9, 1.5)	0.26	1.0	(0.8, 1.3)	0.92
2 times per day	1.1	(0.9, 1.5)	0.37	1.0	(0.7, 1.3)	0.70
3 times per day	1.3	(0.9, 1.7)	0.13	0.9	(0.7, 1.3)	0.59
4 or more times per day	1.3	(1.02, 1.7)	0.04	1.0	(0.7, 1.3)	0.99
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>						
0 days	Referent					
1 day	1.0	(0.8, 1.3)	0.67	1.0	(0.8, 1.3)	0.79
2 days	1.0	(0.8, 1.1)	0.62	0.9	(0.7, 1.1)	0.22
3 days	0.9	(0.7, 1.1)	0.20	0.9	(0.7, 1.1)	0.19
4 days	0.9	(0.7, 1.2)	0.58	0.9	(0.8, 1.2)	0.60
5 days	0.9	(0.8, 1.1)	0.31	0.9	(0.8, 1.04)	0.14
<b>6 days</b>	0.8	(0.7, 1.0)	0.06	0.8	(0.6, 0.97)	0.02
<b>7 days</b>	0.7	(0.6, 0.9)	0.003	0.6	(0.5, 0.8)	<0.0001

**Table 11:** Univariate and Multivariate Analysis of Association of Independent Variables (TV, PG) in Obese Adolescents: YRSB 2015

Variable	<u>Univariate Regression Analysis</u>			<u>Multivariate Regression Analysis</u>		
	Crude OR	Crude OR CI 95%	Crude OR P-Value	Adjusted OR	Adjusted OR CI 95%	Adjusted OR P-Value
<b>Age</b>						
14 years old & younger	Referent					
15 years old	1.1	(0.8, 1.6)	0.64	0.9	(0.6, 1.3)	0.58
16 years old	1.2	(0.9, 1.7)	0.13	1.0	(0.6, 1.6)	0.91
17 years old	1.2	(0.9, 1.5)	0.31	0.8	(0.5, 1.5)	0.58
18 years old or older	1.0	(0.7, 1.5)	0.89	0.8	(0.4, 1.5)	0.42
<b>Sex</b>						
Female	0.6	(0.5, 0.7)	<0.001	0.5	(0.4, 0.7)	<0.0001
Male	Referent					
<b>Grade</b>						
9 <sup>th</sup> grade	1.0	(0.7, 1.3)	0.85	0.8	(0.4, 1.3)	0.33
10 <sup>th</sup> grade	1.2	(0.9, 1.6)	0.15	1.1	(0.7, 1.6)	0.70
11 <sup>th</sup> grade	1.1	(0.9, 1.5)	0.35	1.0	(0.7, 1.3)	0.90
12 <sup>th</sup> grade/Ungraded	Referent					
<b>Race/Ethnicity</b>						
Am Indian/Alaska Native	1.5	(0.8, 2.8)	0.15	1.6	(0.8, 3.2)	0.22
Asian	0.6	(0.3, 1.02)	0.06	0.4	(0.2, 0.8)	0.01
Black/ African Am	1.2	(0.9, 1.5)	0.14	1.3	(0.97, 1.7)	0.08
Native Hawaiian/other	1.9	(0.8, 4.6)	0.16	1.6	(0.5, 5.0)	0.43
White	Referent					
Hispanic/Latino	1.2	(0.9, 1.5)	0.23	1.2	(0.96, 1.6)	0.11
Multiple-Hispanic/Latino	1.0	(0.8, 1.4)	0.72	1.0	(0.8, 1.3)	0.74
Multiple-Non-Hispanic/Latino	1.4	(0.9, 2.1)	0.12	1.3	(0.9, 1.9)	0.20
<b>TV Usage During A School Day</b>						
Watch TV	1.3	(1.002, 1.8)	0.049	1.2	(0.9, 1.7)	0.15
Not Watch TV	Referent					
<b>PG Usage During A School Day</b>						
Use PG	1.3	(0.99, 1.8)	0.06	1.3	(0.9, 1.8)	0.13
Not Use PG	Referent					
<b># of Cigarettes Smoked/ Day</b>						
Did not smoke in the past 30 days	Referent					
Smoke >1 to 1 cigarettes/day	1.2	(0.9, 1.7)	0.28	1.4	(0.96, 2.0)	0.08
2 to 5 cigarettes/ day	1.1	(0.8, 1.6)	0.61	1.1	(0.7, 1.8)	0.61
6 to 10 cigarettes/ day	0.7	(0.3, 1.7)	0.46	1.1	(0.6, 2.2)	0.74
11 or more cigarette/ day	1.4	(0.4, 4.8)	0.58	1.4	(0.3, 5.7)	0.63
<b># of Days Drinking At Least One Drink of Alcohol</b>						
0 days	Referent					
1 to 5 days	0.9	(0.7, 1.1)	0.42	0.9	(0.7, 1.1)	0.46
6 to 30 days	0.9	(0.7, 1.2)	0.49	0.8	(0.6, 1.2)	0.29

<b># of Times Eating Fruits/ 100% Fruit Juice in the Past 7 Days</b>							
Did not drink/eat during past 7 days	Referent						
1 to 3 times during past 7 days	0.9	(0.7, 1.1)	0.21	1.0	(0.8, 1.2)	0.76	
4 to 6 times during past 7 days	0.7	(0.6, 0.98)	0.03	0.7	(0.6, 1.01)	0.06	
1 time per day	1.1	(0.7, 1.7)	0.71	1.1	(0.7, 1.8)	0.66	
2 times per day	0.7	(0.5, 1.01)	0.06	0.8	(0.5, 1.2)	0.23	
<b>3 times per day</b>	0.6	(0.3, 1.1)	0.09	0.4	(0.2, 0.9)	0.01	
4 or more times per day	0.9	(0.5, 1.4)	0.57	0.6	(0.4, 1.2)	0.14	
<b># of Times Eating Green Salad/ Carrots/Other Vegetables</b>							
Did not eat during past 7 days	Referent						
1 to 3 times during past 7 days	0.9	(0.7, 1.1)	0.20	1.0	(0.8, 1.3)	0.88	
4 to 6 times during past 7 days	1.5	(0.9, 2.4)	0.14	1.5	(0.9, 2.6)	0.12	
1 time per day	0.8	(0.4, 1.4)	0.43	0.9	(0.4, 1.7)	0.70	
2 times per day	1.2	(0.7, 2.1)	0.57	1.6	(0.7, 3.8)	0.30	
3 times per day	1.7	(0.4, 8.4)	0.48	1.9	(0.2, 21.2)	0.61	
4 or more times per day	0.9	(0.3, 2.3)	0.80	0.8	(0.2, 3.4)	0.80	
<b># of Times Drinking Soda</b>							
Did not drink in past 7 days	Referent						
1 to 3 times in past 7 days	1.2	(0.9, 1.5)	0.25	1.1	(0.9, 1.5)	0.39	
4 to 6 times in past 7 days	1.1	(0.8, 1.6)	0.66	1.0	(0.7, 1.4)	0.97	
1 time per day	1.6	(1.1, 2.3)	0.02	1.3	(0.95, 1.8)	0.09	
2 times per day	1.3	(0.9, 1.8)	0.23	1.1	(0.7, 1.6)	0.82	
3 times per day	1.1	(0.7, 1.8)	0.70	1.2	(0.7, 2.0)	0.55	
4 or more times per day	1.3	(0.8, 2.0)	0.36	1.1	(0.7, 1.8)	0.70	
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>							
0 days	Referent						
1 day	1.1	(0.8, 1.6)	0.63	1.1	(0.7, 1.6)	0.78	
2 days	0.8	(0.6, 1.2)	0.27	0.9	(0.6, 1.2)	0.37	
3 days	1.1	(0.7, 1.6)	0.69	1.2	(0.9, 1.8)	0.20	
4 days	0.9	(0.7, 1.3)	0.69	0.9	(0.6, 1.3)	0.65	
5 days	1.0	(0.7, 1.3)	0.76	1.0	(0.7, 1.2)	0.78	
6 days	0.8	(0.5, 1.3)	0.29	0.7	(0.4, 1.1)	0.09	
7 days	0.9	(0.7, 1.2)	0.40	0.8	(0.6, 1.1)	0.19	

**Table 12:** Univariate and Multivariate Analysis of Association of Independent Variables in Overweight/Obese Adolescents Watching TV and PG: YRSB 2015

Variable	<u>Univariate Regression Analysis</u>			<u>Multivariate Regression Analysis</u>		
	Crude OR	Crude OR CI 95%	Crude OR P-Value	Adjusted OR	Adjusted OR CI 95%	Adjusted OR P-Value
<b>Age</b>						
14 years old & younger	Referent					
<b>15 years old</b>	0.9	(0.7,1.02)	0.08	0.8	(0.6, 0.9)	0.006
16 years old	1.0	(0.8, 1.2)	0.79	0.8	(0.6, 1.1)	0.19
<b>17 years old</b>	0.9	(0.7, 1.1)	0.15	0.7	(0.5, 0.98)	0.04
18 years old or older	0.9	(0.7, 1.1)	0.31	0.8	(0.5, 1.2)	0.23
<b>Sex</b>						
<b>Female</b>	0.8	(0.7,0.9)	0.003	0.7	(0.6, 0.9)	0.0002
Male	Referent					
<b>Grade</b>						
9 <sup>th</sup> grade	1.1	(0.9, 1.2)	0.47	0.9	(0.7, 1.2)	0.56
10 <sup>th</sup> grade	1.1	(0.9, 1.3)	0.28	1.1	(0.8, 1.3)	0.64
11 <sup>th</sup> grade	1.1	(0.9, 1.3)	0.32	1.0	(0.8, 1.3)	0.68
12 <sup>th</sup> grade/Ungraded	Referent					
<b>Race/Ethnicity</b>						
Am Indian/Alaska Native	1.1	(0.5, 2.4)	0.90	1.2	(0.5, 2.7)	0.68
<b>Asian</b>	0.6	(0.4, 0.7)	<0.0001	0.5	(0.4, 0.7)	<0.0001
<b>Black/ African Am</b>	1.3	(1.1, 1.7)	0.006	1.3	(1.03, 1.7)	0.03
Native Hawaiian/other	1.2	(0.5, 2.6)	0.70	1.3	(0.6, 3.1)	0.51
White	Referent					
<b>Hispanic/Latino</b>	1.4	(1.3, 1.7)	<0.0001	1.4	(1.2, 1.6)	<0.0001
<b>Multiple-Hispanic/Latino</b>	1.4	(1.1, 1.6)	0.0009	1.3	(1.1, 1.6)	0.002
Multiple-Non-Hispanic/Latino	1.3	(0.9, 1.8)	0.11	1.3	(0.9, 1.8)	0.14
<b>TV&amp;PG Usage During A School Day</b>						
Use TV and PG Usage	1.0	(0.9, 1.0)	0.55	1.1	(0.9, 1.2)	0.44
Not Use TV and PG Usage	Referent					
<b># of Cigarettes Smoked/ Day</b>						
Did not smoke in the past 30 days	Referent					
<b>Smoke &gt;1 to 1 cigarettes/day</b>	1.8	(1.5, 2.2)	<0.0001	1.7	(1.4, 2.2)	<0.0001
<b>2 to 5 cigarettes/ day</b>	1.7	(1.2, 2.3)	0.0023	1.8	(1.3, 2.6)	0.0005
6 to 10 cigarettes/ day	1.1	(0.7, 1.9)	0.70	1.2	(0.7, 1.9)	0.5316
11 or more cigarette/ day	1.8	(0.9, 3.5)	0.09	1.9	(0.8, 4.3)	0.1108
<b># of Days Drinking At Least One Drink of Alcohol</b>						
0 days	Referent					
1 to 5 days	1.0	(0.9, 1.2)	0.77	1.0	(0.8, 1.1)	0.56
6 to 30 days	1.2	(0.97, 1.6)	0.09	1.1	(0.8, 1.5)	0.74
<b># of Times Eating Fruits/ 100% Fruit Juice in the Past 7 Days</b>						
Did not drink/eat during past 7 days	Referent					



1 to 3 times during past 7 days	1.0	(0.8, 1.1)	0.51	1.0	(0.8, 1.1)	0.61
4 to 6 times during past 7 days	0.9	(0.8, 1.1)	0.43	0.9	(0.7, 1.1)	0.36
1 time per day	0.9	(0.7, 1.2)	0.32	0.9	(0.7, 1.2)	0.36
2 times per day	1.0	(0.7, 1.3)	0.83	0.9	(0.7, 1.3)	0.64
3 times per day	0.9	(0.6, 1.4)	0.57	0.8	(0.5, 1.4)	0.47
4 or more times per day	1.1	(0.8, 1.5)	0.52	0.8	(0.6, 1.2)	0.36
<b># of Times Eating Green Salad/ Carrots/Other Vegetables</b>						
Did not eat during past 7 days	Referent					
1 to 3 times during past 7 days	0.9	(0.8, 1.03)	0.14	1.0	(0.9, 1.2)	0.88
4 to 6 times during past 7 days	1.0	(0.8, 1.2)	0.93	1.1	(0.9, 1.3)	0.52
1 time per day	1.2	(0.8, 1.7)	0.33	1.5	(0.95, 2.3)	0.08
2 times per day	1.3	(0.7, 2.3)	0.44	1.6	(0.8, 3.1)	0.18
3 times per day	1.6	(0.7, 3.8)	0.28	1.2	(0.4, 3.4)	0.77
4 or more times per day	1.1	(0.5, 2.1)	0.84	1.4	(0.6, 3.2)	0.38
<b># of Times Drinking Soda</b>						
Did not drink in past 7 days	Referent					
1 to 3 times in past 7 days	1.1	(0.97, 1.3)	0.10	1.1	(0.9, 1.3)	0.27
4 to 6 times in past 7 days	1.3	(1.1, 1.5)	0.003	1.1	(0.9, 1.3)	0.27
1 time per day	1.1	(0.9, 1.5)	0.26	1.0	(0.8, 1.3)	0.93
2 times per day	1.1	(0.9, 1.5)	0.37	1.0	(0.7, 1.2)	0.72
3 times per day	1.3	(0.9, 1.7)	0.13	0.9	(0.7, 1.3)	0.60
4 or more times per day	1.3	(1.02, 1.7)	0.041	1.0	(0.7, 1.3)	0.99
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>						
0 days	Referent					
1 day	1.0	(0.8, 1.3)	0.67	1.0	(0.8, 1.3)	0.78
2 days	1.0	(0.8, 1.1)	0.62	0.9	(0.7, 1.1)	0.23
3 days	0.9	(0.7, 1.1)	0.20	0.9	(0.7, 1.1)	0.20
4 days	0.9	(0.7, 1.2)	0.58	0.9	(0.8, 1.2)	0.63
5 days	0.9	(0.8, 1.1)	0.31	0.9	(0.8, 1.04)	0.14
<b>6 days</b>	0.8	(0.7, 1.0)	0.06	0.8	(0.6, 0.97)	0.03
<b>7 days</b>	0.7	(0.6, 0.9)	0.003	0.7	(0.5, 0.8)	<0.0001

**Table 13:** Univariate and Multivariate Analysis of Association of Independent Variables in Obese Adolescents Watching TV and PG: YRSB 2015

Variable	<u>Univariate Regression Analysis</u>			<u>Multivariate Regression Analysis</u>		
	Crude OR	Crude OR CI 95%	Crude OR P-Value	Adjusted OR	Adjusted OR CI 95%	Adjusted OR P-Value
<b>Age</b>						
14 years old & younger	Referent					
15 years old	1.1	(0.8, 1.6)	0.64	0.9	(0.6, 1.3)	0.58
16 years old	1.2	(0.9, 1.7)	0.13	1.0	(0.6, 1.6)	0.91
17 years old	1.2	(0.9, 1.5)	0.31	0.8	(0.5, 1.5)	0.58
18 years old or older	1.0	(0.7, 1.5)	0.89	0.8	(0.4, 1.5)	0.42
<b>Sex</b>						
<b>Female</b>	0.6	(0.5, 0.7)	<0.0001	0.5	(0.4, 0.6)	<0.0001
Male	Referent					
<b>Grade</b>						
9 <sup>th</sup> grade	1.0	(0.7, 1.3)	0.85	0.8	(0.4, 1.3)	0.34
10 <sup>th</sup> grade	1.2	(0.9, 1.6)	0.15	1.1	(0.7, 1.6)	0.66
11 <sup>th</sup> grade	1.1	(0.9, 1.5)	0.35	1.0	(0.7, 1.3)	0.93
12 <sup>th</sup> grade/Ungraded	Referent					
<b>Race/Ethnicity</b>						
Am Indian/Alaska Native	1.5	(0.8, 2.8)	0.15	1.5	(0.8, 3.1)	0.23
<b>Asian</b>	0.6	(0.3, 1.02)	0.06	0.5	(0.2, 0.9)	0.01
Black/ African Am	1.2	(0.9, 1.5)	0.14	1.3	(0.97, 1.7)	0.08
Native Hawaiian/other	1.9	(0.8, 4.6)	0.16	1.6	(0.5, 5.0)	0.42
White	Referent	(0.9, 1.5)				
Hispanic/Latino	1.2	(0.8, 1.4)	0.23	1.2	(0.95, 1.5)	0.12
Multiple-Hispanic/Latino	1.0	(0.9, 2.1)	0.72	1.0	(0.8, 1.3)	0.76
Multiple-Non-Hispanic/Latino	1.4		0.12	1.3	(0.9, 1.9)	0.21
<b>TV&amp;PG Usage A During School Day</b>						
<b>Use TV and PG Usage</b>	1.3	(0.99, 1.8)	0.06	1.3	(1.04, 1.6)	0.02
Not Use TV and PG Usage	Referent					
<b># of Cigarettes Smoked/ Day</b>						
Did not smoke in the past 30 days	Referent					
Smoke >1 to 1 cigarettes/day	1.2	(0.9, 1.7)	0.28	1.4	(0.97, 2.0)	0.07
2 to 5 cigarettes/ day	1.1	(0.8, 1.6)	0.61	1.1	(0.7, 1.8)	0.61
6 to 10 cigarettes/ day	0.7	(0.3, 1.7)	0.46	1.1	(0.6, 2.1)	0.73
11 or more cigarette/ day	1.4	(0.4, 4.8)	0.58	1.4	(0.3, 5.7)	0.64
<b># of Days Drinking At Least One Drink of Alcohol</b>						
0 days	Referent					
1 to 5 days	0.9	(0.7, 1.1)	0.42	0.9	(0.7, 1.1)	0.46
6 to 30 days	0.9	(0.7, 1.2)	0.49	0.8	(0.6, 1.1)	0.28
<b># of Times Eating Fruits/ 100% Fruit Juice in the Past 7 Days</b>						
Did not drink/eat during past 7 days	Referent					

1 to 3 times during past 7 days	0.9	(0.7, 1.1)	0.21	1.0	(0.9, 1.2)	0.78
4 to 6 times during past 7 days	0.7	(0.6, 0.98)	0.03	0.7	(0.6, 1.01)	0.06
1 time per day	1.1	(0.7, 1.7)	0.71	1.1	(0.7, 1.8)	0.64
2 times per day	0.7	(0.5, 1.01)	0.06	0.8	(0.5, 1.2)	0.24
<b>3 times per day</b>	0.6	(0.3, 1.1)	0.09	0.4	(0.2, 0.9)	0.01
4 or more times per day	0.9	(0.5, 1.4)	0.57	0.6	(0.4, 1.2)	0.14
<b># of Times Eating Green Salad/ Carrots/Other Vegetables</b>						
Did not eat during past 7 days	Referent					
1 to 3 times during past 7 days	0.9	(0.7, 1.1)	0.20	1.0	(0.8, 1.3)	0.88
4 to 6 times during past 7 days	1.5	(0.9, 2.4)	0.14	1.5	(0.9, 2.6)	0.13
1 time per day	0.8	(0.4, 1.4)	0.43	0.9	(0.4, 1.7)	0.72
2 times per day	1.2	(0.7, 2.1)	0.57	1.6	(0.7, 3.8)	0.29
3 times per day	1.7	(0.4, 8.4)	0.48	1.9	(0.2, 21.4)	0.61
4 or more times per day	0.9	(0.3, 2.3)	0.80	0.8	(0.2, 3.4)	0.81
<b># of Times Drinking Soda</b>						
Did not drink in past 7 days	Referent					
1 to 3 times in past 7 days	1.2	(0.9, 1.5)	0.25	1.1	(0.9, 1.5)	0.34
4 to 6 times in past 7 days	1.1	(0.8, 1.6)	0.66	1.0	(0.7, 1.4)	0.99
1 time per day	1.6	(1.1, 2.3)	0.02	1.3	(0.97, 1.9)	0.08
2 times per day	1.3	(0.9, 1.8)	0.23	1.1	(0.7, 1.6)	0.76
3 times per day	1.1	(0.7, 1.8)	0.70	1.2	(0.7, 2.0)	0.52
4 or more times per day	1.3	(0.8, 2.0)	0.36	1.1	(0.7, 1.8)	0.68
<b># of Days Physically Active for At Least 60 Mins in past 7 days</b>						
0 days	Referent					
1 day	1.1	(0.8, 1.6)	0.63	1.1	(0.7, 1.6)	0.73
2 days	0.8	(0.6, 1.2)	0.27	0.9	(0.7, 1.2)	0.42
3 days	1.1	(0.7, 1.6)	0.69	1.3	(0.9, 1.8)	0.19
4 days	0.9	(0.7, 1.3)	0.69	0.9	(0.7, 1.3)	0.71
5 days	1.0	(0.7, 1.3)	0.76	1.0	(0.7, 1.3)	0.83
6 days	0.8	(0.5, 1.3)	0.29	0.7	(0.4, 1.1)	0.09
7 days	0.9	(0.7, 1.2)	0.40	0.8	(0.6, 1.1)	0.20