

2018

Predictors of Nutritional Counseling Among Adolescents by Physicians in California

Jean Kigozi
Walden University

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Walden University

College of Health Sciences

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Jean Kigozi

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the review committee have been made.

Review Committee

Dr. Richard Jimenez, Committee Chairperson, Public Health Faculty

Dr. Amany Refaat, Committee Member, Public Health Faculty

Dr. Fred Tabung, University Reviewer, Public Health Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2018

Abstract

Predictors of Nutritional Counseling Among Adolescents by Physicians in California

by

Jean Kigozi,

MS Nutrition, University of New Haven, 2000

BS Food Science & Technology, Bristol University, 1990

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

November 2018

Abstract

The prevalence of obesity in the United States was stable at 17% from 2011–2014 among approximately 13 million children and adolescents 12–19 years of age, according to the Centers for Disease Control and Prevention. Nutritional counseling has been recommended, and while most physicians agree that it is necessary, it is not happening consistently. The purpose of this study was to examine the association between dietary intake, physical activity, and body mass index (BMI) characteristics of youth 12–17 years old in California and the receipt of nutritional counseling. Social cognitive theory guided this quantitative cross-sectional analysis of archived data from 814 youth in the California Health Interview Survey (CHIS) 2015–2016. Independent variables included demographics (age, gender, and race), BMI, unhealthy and healthy foods, physical activity and being sedentary; the dependent variable was receipt of nutritional counseling. Findings showed that 73.5% of children who were obese or overweight received counseling. BMI was the strongest predictor of dietary counseling. Independent of diet, physical activity, age, gender, and race, youth who were obese (BMI, kg/m^2 , ≥ 95 th percentile) were almost 100% more likely to talk to their doctor compared to children of normal weight (multivariable-adjusted $OR=1.98$, 95% CI: 1.23, 3.20). The number of cans of sweet fruit/sports drinks was significantly associated with the outcome ($p=0.04$). There was no significant association between fruit and vegetable consumption (adjusted $OR=1.02$, 95% CI: 0.95, 1.10) or physical activity (adjusted $OR=0.99$, 95% CI: 0.71, 1.39) and nutritional counseling. The implications of the study findings for social change include potential improvements in obesity screening and counseling to improve adolescent health outcomes. Addressing weight issues and diet /lifestyle education earlier in life, could reduce chronic disease in the youth.

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Dedication

This work is dedicated to my Mom and Dad Mr. Seth & Mrs. Joyce Kigozi. “Train up a child in the way he should go: And when he is old, he will not depart from it” (Proverbs 22 verse 6). You pushed me to be the best I could be. This one’s for you.

Acknowledgments

I am so thankful for the opportunity for this journey. First, I thank God, without whom this would not be possible. To my husband Ben and children Malaika and Birungi for their patience, endurance and support during this journey. I will not forget the many days we spent in the library together, so I could focus on the task at hand. I am so grateful for my entire committee. To my chair Dr Richard Jimenez, a God send. When I met him at residency, I knew he had what it takes to guide me through this and he has been a strong pillar. I'm extremely thankful for Dr. Refaat who has been guiding and encouraging me along the way. To the meticulous researcher, Dr. Fred Tabung I thank you for your instruction. To my friend and school mate Rachel Masika, you inspired me by completing your doctorate and cheered me on. You have all made this possible and made me a better person. Thank you!

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Section 1

Introduction

Weight management is an issue that spans across all life stages from infancy to old age. (Academy of Nutrition and Dietetics, 2017). Unhealthy weight gain due to poor nutrition and sedentary lifestyle has been attributed to over 300, 000 deaths per year and the cost to society is approximately \$100 billion dollars (American Academy of Child and Adolescent Psychiatry, 2016). Addressing obesity effectively is a major priority in the United States and worldwide (Hoelscher, Kirk, Ritchie, Cunningham-Sabo, & Academy positions committee, 2013). Peart and Crawford suggested that health providers are not discussing weight with their patients and in general, there has been a decline in counseling of patients of all ethnicities and insurance types in California in the period from 2003–2009 as follows: Hispanics from 66.8 % to 53.7%, American Indians/Alaskans 60.7% to 15.1%, Asians 61.7 % to 33.4 %, African Americans 55.8% to 42.9% and whites 60% to 46.2% (Peart & Crawford, 2012). Additionally, for those patients who are receiving weight-related advice from their physicians, it is sometimes based on their personal experiences rather than research. While patients with obesity should receive more thorough counseling, this is not always the case (Kallem, Carroll-Scott, Gilstad-Hayden, Peters, McCaslin, et al., 2013). Inadequate training is a major factor that has been suggested to contribute to the inconsistency of lifestyle counseling. Research has shown that lifestyle modification has numerous benefits in working with chronic diseases such as diabetes (Schauer, Woodruff, Hotz, & Kefler, 2014). In the U.S. Surgeon General's vision for a healthy and fit nation in 2000, he stated that state regulations for nutrition, physical activity and screen time vary in different settings. Thus, standardizing national goals for the youth, specifically about healthy weight,

would be beneficial in the fight against obesity for parents and childcare providers (Office of the Surgeon General, 2010). Physical activity guidelines and dietary guidelines exist; however, they need to be implemented in the public. Physicians have limited time to calculate estimated caloric needs, and this is one aspect of healthy weight management.

Adolescence is a challenging period during which poor lifestyle habits can be introduced and picked up such as tobacco use, alcohol and drug use, consumption of junk food, consumption of sugar sweetened beverages, and physical inactivity. It is generally agreed that unhealthy lifestyles can lead to increased weight and chronic diseases such as metabolic syndrome, Type 2 diabetes and heart diseases (CDC, 2015; Academy of Nutrition & Dietetics, n.d.). Heart disease is the number one cause of death in the United States and other developed countries (CDC, 2017). Therefore, pediatric obesity is a major public health concern and a burden to society, which in part can be preventable.

Physicians are not regularly counseling youth on diet issues and almost half of the teens are not meeting the 2010 U.S. dietary guidelines (Oreskovic, Goodman, Robinson, Perrin, & Perrin, 2014). Oreskovic and his team conducted a study that looked at adolescents' report of lifestyle counseling of 76 adolescents aged 11–14 years, of which 47% of the youth were overweight (Oreskovic et al., 2014). While obese participants received more counsel on diet (β 0.88; SE 0.25; $p = 0.001$) and physical activity (β 0.80; SE 0.28; $p = 0.006$) than healthy youth and were advised to increase exercise frequency, no differences were observed in lifestyle counseling among overweight and healthy subjects (Oreskovic et al., 2014). These are missed intervention opportunities because eating an unhealthy diet long term can increase risk for chronic disease, so intervening earlier is beneficial.

For this study, I analyzed archived data for 840 teens from the California Health Information Survey, to determine the predictors of adolescent counseling by physicians in California. It is important to know which youth get dietary advice and which do not. Determining the characteristics of youth who are or who are not likely to get nutritional counseling can inform health professionals and legislation to ensure that everyone who needs advice is given it, and that it is received appropriately and in a timely manner, to intervene and reduce obesity and chronic disease. From a social change perspective, the results of this study could be used to provide information for targeted outreach or interventions for training doctors, which could result in an increase in dietary counseling to those who are unlikely to receive it or a referral to a registered dietitian, a health professional trained to provide such counsel (US DHHS, 2017).

This section includes an introduction to the topic, the problem statement and purpose of the study. I addressed the questions and hypotheses and the theory used as foundation for the study. This section includes the literature review, definitions, assumptions, scope, and delimitations. Finally, this section includes the summary, conclusion, and the significance of the study.

Problem Statement

There is little doubt that a healthy diet is important to maintaining and improving general health and that unhealthy diets can lead to reduced body function and cause chronic disease (Gee & Agras, 2014). Furthermore, if an individual has a condition such as diabetes, obesity, or high blood pressure, a therapeutic diet and physical activity can result in slower progression of disease.(Gee & Agras, 2014). Per the Academy of Nutrition and Dietetics, diet and lifestyle

choices and obesity are all linked to the development of chronic diseases such as Type 2 diabetes, cardiovascular disease, and certain cancer types (Academy of Nutrition and Dietetics, n.d.). There is documentation to suggest that physical and social environment have influence on people's behaviors. Some of the factors that increase health inequity in acquiring diseases, such as obesity, include race/ethnicity, low socioeconomic status, and low literacy and language limitations. These factors contribute to prevalence and health outcomes (Academy of Nutrition and Dietetics, n.d.).

It is well documented that there is a need for nutritional counseling of youth at an early age to shape healthier diet and lifestyle choices, as well as to prevent chronic disease (Bright Futures/ American Association of Pediatrics, 2015). The problem that I addressed in this study was the concern that childhood obesity could be affected by inadequate dietary counseling. Furthermore, youth are currently not meeting exercise and dietary guidelines in the United States (Gee & Agras, 2014).

There is a gap in the literature in the adolescent population, which shows that not much is known about this age group regarding lifestyle habits. There is growing international consensus that there is a need to gain a better understanding of the youth to improve their health. Determining what prompts physicians to counsel and diagnose some and not others regarding weight status would be beneficial in the fight against obesity.

It is widely known that fast food consumption is increasing in the United States and that it leads to increase in total caloric intake (Powell & Nguyen, 2013). According to the National Health and Nutrition examination survey, half of overweight teens had at least one risk factor for

cardiovascular disease and approximately 25% of the teens were at risk for Type 2 diabetes (Perryman & Sidoti, 2014).

While there have been studies that researched socioeconomic status (SES) and obesity, to date, there were none that included drug and alcohol use, mental health, and missed school days. Many studies have shown that there is an inverse relationship between the weight status and education level of parents, income levels, and neighborhood (Shrewsbury & Wardle, 2008).

The United States Preventive Services taskforce (USPTF) clearly stated that physicians should screen and diagnose obesity and offer behavioral based counseling if it is indicated, screen for depression, and follow up treatment and monitoring (USPTF, 2010; Ham & Allen, 2012). The data that is generated by this study may help to fill a gap in the knowledge base in adolescent health and factors that affect their nutritional status and overall health.

Purpose of the Study

The purpose of this study is to determine the relationship between characteristics of adolescents (aged 12–17 years) such as demographics, body mass index, and mental health in relation to nutritional counseling. In a review of 45 studies, researchers found an inverse association between SES and adiposity in 19 studies (42%), no association in 12 studies (27%) and in 14 studies (31%) a combination of no association or inverse associations. When parental income was the SES indicator, adiposity had an inverse association in 15– 20 studies representing 75% (Shrewsbury & Wardle, 2008). Furthermore, a study in Slovenia showed that doctor's characteristics and practice factors can affect counseling behavior (Petek, Platinovsek, Klemenc-Ketis, & Kersnik, 2013). I investigated adolescents' characteristics such as sociodemographic, physical activity levels, and fast food intake.

In a review on dietary counseling among physicians, the authors stated that even though there have been increases in diet counseling by doctors, the rates of counseling are still low. (Delgado & Ahmed, 2016). Results from this study can add to the body of knowledge since it includes multiple characteristics such as school food environment. Insights will inform health care professionals, particularly pediatricians on who is unlikely to get counseled but needs it and to ensure that they receive counseling. Per Healthy People 2020 goals, improving the health, safety and well-being of adolescents is a public health issue and since nutritional counseling has a role in this (US DHHS, 2017). It is important to explore and possibly to understand who gets it and why. Per the USPSTF guidelines, offering behavioral and nutritional counseling can lead to improvements in obesity and lipid profiles (USPSTF 2010). Additionally, the World Health Organization (WHO) viewed this as an issue of priority and devised the 2017 global accelerated action for the health of adolescents, using evidence-based data to provide guidance to countries on the implementation of programs that address adolescent health needs (WHO, 2017). This in turn, could lead to a reduction in chronic disease in the future, resulting in social change due to the positive impact on society in adolescent health outcomes, reduced loss of productivity, and financial burden worldwide related to treating preventable obesity related conditions.

I employed a quantitative method of inquiry using analysis of archived data. My intent was to predict the characteristics of youth who receive dietary counseling by their physicians in the state of California. The dependent variable was receipt of nutritional counseling while the independent variables/ covariates were demographics (age, gender, and ethnicity/race), BMI, fast food consumption, and mental health (nervousness, hopelessness, depression, worthlessness).

Research Questions and Hypothesis

Research Question 1 (RQ1): What is the association between demographics (age, gender, and race) and receipt of nutritional counseling?

Null Hypothesis (H_01): There is no association between demographics (age, gender, and race) and receipt of nutritional counseling?

Alternative Hypothesis (H_a1): There is an association between demographics (age, gender, and race) and receipt of nutritional counseling?

Research Question 2 (RQ2): What is the association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Null Hypothesis (H_02): There is no association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Alternate Hypothesis (H_a2): There is an association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Research Question 3 (RQ3): What is the association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Null Hypothesis (H_03): There is no association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Alternate Hypothesis (H_a3): There is an association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Research Question 4 (RQ4): What is the association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling?

Null Hypothesis ($H_0 4$): There is no association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling?

Alternate Hypothesis ($H_a 4$): There is an association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling?

Research Question 5 (RQ5): What is the association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Null Hypothesis ($H_0 5$): There is no association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Alternate Hypothesis ($H_a 5$): There is an association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Theoretical Foundation for the Study

I used the social cognitive theory (SCT) to understand the relation between youth characteristics and nutrition counseling (Bandura, 2005). Key constructs of SCT include: environment, situations, behavior capacity, outcome expectations and expectancies, self-control, observational learning, self-efficacy, and emotional coping.

There are multiple types of social support; emotional, instrumental (tangible), appraisal (feedback & affirmation), sharing points of view and informational support (Glanz, Rimer, & Viswanath, 2015).

SCT is an effective theory in assessing relationships between knowledge, behavior, and self-efficacy. It has been used extensively in nutrition education programs (Hall, Chai,

Koszewski, & Albrecht, 2015). Kids can be influenced by doctors, parents, teachers, and others and therefore social support is important to them. (Wilfley, Kass, & Kolko, 2011). Kids can influence other kids via peer pressure or by observation. SCT proposes that behavior is shaped by the interactions of a person and their interaction with their environment. In his study, assumptions were made that the adolescent had the skills or knowledge they needed to perform the behavior, and self-efficacy to adapt behaviors under varying conditions (Miller, n.d.). The researcher assumed that health outcomes will occur because of behavioral changes. However, motivation and control and going through the different stages were not delineated. Self-efficacy is perceived differently by different individuals and adolescents tend to be influenced by peer pressure. (Miller, n.d.).

In their study on predicting childhood obesity prevention behaviors, researchers concluded that SCT is a useful framework for use in designing childhood obesity primary prevention interventions (Murnan, Sharma, & Lin, 2006). The authors studied four major strategies used in obesity prevention namely limiting TV, increasing physical activity, increasing fruit and vegetable consumption, and increasing water consumption in relation to how constructs of SCT predicted these behaviors in Chinese elementary children (Murnan et al., 2006).

Nature of the Study

This study was a retrospective study using secondary analysis of archived data. I obtained data from the California Health Interview Survey (CHIS) which is the largest state health survey in the nation. The analysis was conducted using SPSS v IBM Version 24. The investigation was a quantitative method of inquiry in adolescents 12– 17 years of age. Questionnaire surveys were conducted on adolescents living in California who were attending

school or being home schooled. The adolescent population is considered a special population, because they are undergoing a lot of changes and trying to experiment in many areas (DHHS, 2010). Data on a wide range of topics was collected using telephone surveys through random calling. The CHIS survey is conducted annually in all 58 counties in California to provide health data on the diverse population; it is representative of households in California. The survey is run by the University of California in Los Angeles (UCLA) center for policy research and is used by researchers, health professionals, and the media. It is considered as a comprehensive, credible source of data. I used the data from the 2016 adolescent survey (UCLA Center for Health Policy Research, 2012).

In this study, I analyzed data using regression analysis. The dependent variable was receipt of nutritional counseling, while independent variables included: demographics (age, gender, race), weight/ BMI, diet (healthy and unhealthy diet), physical activity (active and sedentary), and mental health (feelings of hopelessness and drug and alcohol use). Results were tabulated, reported and analyzed. Because the dependent variable (DV) receipt of nutritional counseling was dichotomous, I used binary logistic regression was used for the bivariate analysis and multiple logistic regression for the predictor model.

Foundation of the Study and Literature Review

The literature search was conducted using multiple databases: Thoreau, Cinahl & Medline, ProQuest Nursing & Allied Health Source, Sage premier, ProQuest Central Science Direct, Eric & Google scholar. Keywords used to search were: *adolescents, teens, teenagers, nutrition counseling, diet counseling, nutrition and counseling, diet and counseling, nutrition or dietary advice, consultation, and physician or doctor*. The timeframe used for the search was

2012–2017, exclusion ‘not pregnant’. My search was not limited to peer reviewed, full text articles, it included conferences, seminars and doctoral dissertations. After removal of duplicate articles and sorting for relevance to study topic, the search yielded approximately 120 articles. I used as the basis for the review of literature.

Literature Review Related to Key Study Variables & Concepts

Obesity among Youth in the U.S.

Prevalence of Childhood Obesity in the U.S and California

One in five children in the United States is overweight (or 17%) above the 95th percentile. Per NHANES data from 1963–1970, the prevalence of obesity in the youth in America was 4.2% but increased to 17.7% from 2011–2012. For the 12–19-year olds from 2011-2012, obesity prevalence increased from 4.6% to 20.5% (Obesity Society, 2014). “In 2011–2012, over 1 million adolescents in California were overweight (16%) or obese (17%).” (Wolstein, Baley, & Diamant, 2015). The prevalence of overweight status and obesity among adolescents rose from 31% in 2001 to 32% in 2011–2012, this was not significant, but 7.4 million persons were in the obese category (Wolstein et al., 2015).

Although there have been improvements in obesity prevalence in general, this success has not been duplicated in minorities (CDC, 2017). This poses a significant risk for Type 2 diabetes, heart disease, stroke and some cancers in minorities. Obesity affects ethnic minorities or people of color and the poor disproportionately. (CDC, 2017). Per the CDC, 2011–2014 data

for childhood obesity prevalence shows that it was higher among Hispanics at 21.9% and non-Hispanic blacks at 19.5% compared to 14.7% for non-Hispanic whites (CDC, 2017). Lifestyle, including environmental and socioeconomic factors such as built environment, soda and fast food consumption, access to fresh food, fruit and vegetable consumption, park availability, neighborhood safety, and social cohesion play a role in these statistics (Wolstein et al., 2015). Promotion of healthier eating habits and more physical activity through policy can be instrumental in tackling disparities and curbing obesity (Wolstein et al., 2015).

Causes of Obesity or Factors Associated with Obesity

Food environment. Food environment is particularly relevant to study in youth because it is related to diet related diseases such as obesity, diabetes, and vascular disease, which are the leading causes of premature death and disability in the United States. (U.S.). (Lucan, 2014). The challenge is that youth obtain food and beverages at home, school, and outside these settings too. Type 2 Diabetes, for instance, typically used to manifest in adults but is now being diagnosed earlier due to obesity. Poor exercise and diet habits are major factors of this predicament. There are multiple factors that affect teen eating habits and they include individual, social, and cultural factors. (Lucan, 2014). Per the American Heart Association, data from the Centers for Disease Control show that heart disease is still the number one cause of death in the U.S. (CDC, 2016). Heart disease deaths after a decline previously, increased by 3% from 2011–2014 (American Heart Association News, 2017). The physical environment in which teens get their food and beverages, also known as the food environment, plays a major role. This includes schools, homes, and the community at large (Lucan, 2014). Obesity in children causes short and long-term effects on physical, social, and emotional health. It also increases the risk for health issues

such as asthma, sleep apnea, bone and joint problems, Type 2 diabetes and heart disease. (CDC, 2015). The data from the CHIS study included fast food at school, home, drive thru, carry out, and eaten at the restaurant. It also included fast food served from restaurants like McDonalds, Taco Bell, Burger King, and Pizza Hut.

Mental health. Children with increased weight may experience more bullying and can have more tendencies toward isolation, depression, and low self-esteem in comparison to counterparts (Griffiths, Parsons, & Hill, 2010). Furthermore, long term obesity can lead to obesity as an adult, which correlates with heart disease, Type 2 diabetes, metabolic syndrome, and some cancers (CDC, 2017). There is data that suggest that children with increased BMI tend to miss more school days compared to their peers (CDC, 2017). This can have a negative impact on their academic performance. The CHIS survey looked at aspects of mental health such as worthlessness, suicidal ideation, nervous, and anxiousness. To my knowledge, this is the first-time mental health data for adolescents in California has been gathered for this survey and will be studied in relation to dietary counseling.

The use of drugs and alcohol in 12–18-year olds has been documented to cause changes in the brain structure, function, and neurocognition. This is a public health issue because these behaviors can change brain maturation and development (Squeglia, Jacobus, & Tapert, 2009). Risk factors such as SES, extreme poverty and increased access to drugs and alcohol, being antisocial, parent education level and occupation, laws, cultural norms and advertisements promoting alcohol in teens can all lead to increase in risk of drug and alcohol abuse (Hawkins, Catalano, & Miller, 1992). In my study, I did not evaluate alcohol use, and there were no questions on drug use in adolescent survey.

Per the CDC, changes in children's environments where they spend the most time can be very positive in assisting them in maintaining a healthy body weight through access to healthier choices. (CDC, 2017). Additionally, environments that provide opportunities for 60 minutes of physical activity, reduced screen time, less added sugar beverages and lower fat foods can make the difference (CDC, 2017). Although recommendations exist to counsel patients and Healthy People 2020 included physician nutrition counseling as an indicator, it is still not being done by doctors. (Healthy People, 2020).

Dietary and/or exercise counseling. Researchers agree that about half of teens surveyed are overweight (with BMI over the 95th percentile) and receive lifestyle counseling which includes nutrition and exercise (Saleens & Liu, 2017; Oreskovic et al., 2014; Liang, 2013). There has been an increase in obesity in ethnic minorities and a decline in nutrition and exercise counseling of patients with all insurance types in California (Peart & Crawford, 2012). Treating obesity is difficult and costly (Liang, 2013) and preventing it is a public health issue. However, there is a discrepancy between physician beliefs in counseling role and what they practice. (Delgado & Ahmed, 2016). There are known barriers to counseling such as time, lack of training and lack of reimbursement. There is an argument for nutritional counseling to promote healthier eating and physical activity (Gee & Agras, 2014). Not receiving counseling is not a viable option in trying to improve chronic diseases related to obesity (Delgado & Ahmed, 2015). A plausible solution for nutritional counseling is to refer those that need it to a registered dietitian, because they are trained in this aspect.

In my study, I evaluated current counseling trends of adolescents in California and factors that may prompt counseling. In general, obese teens receive more dietary and exercise

counseling than overweight teens and healthy teens hardly receive any counsel (Oreskovic et al., 2014; Liang, 2013; Kallem et al., 2013). After adjusting BMI for confounders, results showed differences in rates of counseling for racial groups where Hispanics received more counseling than blacks, while blacks received more counseling than their white peers (Kallem et al., 2013). Techniques in counseling include motivational interviewing (MI) which has been found to be effective in modifying youth behaviors (Turnin et al., 2016). The quality and intensity of the discussion matters and that there is a need for training and standardization (Pollack et al., 2009). Counseling empowers youth to make healthier choices at the cafeteria and was found to have a positive impact on BMI (Pollack et al., 2009). The ability to read and interpret food labels and nutrient content of foods is one tool that can be effective in reducing BMI. Information must be presented in a clear and concise manner (Doug, 2015). In tracking children's choices at school cafeterias following nutrition education, there was a positive effect on what they ate which resulted in reduced BMIs (Turnin et al., 2016). Advertising to this age group has shown that media does have an influence children's health. In a study about the effect of beverages shown on adolescent's favorite television shows, the authors found that alcohol was featured the most, followed by milk and juice and then sugar sweetened beverages. The authors concluded that this could have adverse consequences on youth (Eisenberg, Larson, Gollust, & Newmark-Sztainer, 2016).

Lifestyle interventions in schools have been known to work in reducing BMI, and caloric intake significantly as well as improvements in lab outcomes such as decreasing elevated triglycerides from 64 to 35 % in youth and reducing metabolic syndrome. (Elizondo et al., 2014). Early targeted interventions have been recommended (Bonnet et al., 2014) because

students can make healthier choices such as eating fewer processed meats, saturated fats, and sugar beverages while increasing water, fresh fruit, fish, and poultry consumption resulting in healthier BMIs (Elizondo et al., 2014). Predictors of being overweight from adolescence to young adulthood include: personal, behavioral, and socioeconomic factors related to obesity, and height and weight. Prevention programs for being overweight should include plans that include all these factors (Quick, Wall, Larson, Haines, & Newman-Sztainer, 2013). In my study, I evaluated factors like fast food, physical activity, and BMI in addition to confounders such as demographics. Study results may add to the body of knowledge in this area and inform policy and healthcare providers, leading to appropriate interventions. This could improve health outcomes in the adolescent population by impacting the obesity crisis.

Prevention Efforts

In a study that looked qualitatively at weight counseling practices in community health centers conducted at Georgia State University, results showed that there was no standardized methodology on the information that physicians provided on weight counseling and that advice was sometimes based on their personal experience (Schauer et al., 2014). Clinicians mainly addressed weight in patients who had chronic conditions that related to their weight. Advice provided included dietary advice and foods to include and omit from the diet. The authors concluded that clinicians used a variety of methods that were not evidence-based (Schauer et al., 2014). Guidelines of who should receive care exist, but they are not being followed. There needs to be standardization of who gets care and the quality of the advice that is given, should be evidence based.

Many studies have shown that there is an inverse relationship between weight status and education level of parents, household income levels, and the neighborhood they live in. (Shrewsbury & Wardle, 2008). In their study of children's report of lifestyle counseling and BMI status, (Kallem et al, 2013) concluded that although lifestyle counseling is widely recommended, many children reported that they had not received it (Kallem et al., 2013). Furthermore, overweight children reported receiving the same level of counseling as healthy children (Kallem et al., 2013).

Nguyen et al. (2011) conducted a study that looked at the prevalence of obese Mexican Americans who had not received diet advice. 1787 adults with BMI of 30 plus and aged 18 plus participated. They completed self-reported surveys on diet and exercise, including sociodemographic, health, and provider related factors. Researchers conducted analysis using multivariate logistic regression models separately on nutrition or exercise advice (Nguyen et al., 2011). Results showed that 455 of participants had never received advice to increase exercise and 52% had not been counseled on high fat and cholesterol foods. Participants who lived in a home where Spanish was the preferred language and those persons with no comorbidity were less likely to receive advice. The authors concluded that the rate of diet and exercise advice is insufficient in Mexican Americans. Nguyen et al. (2011) concluded that not providing dietary and activity counsel was not beneficial to this population, given the prevalence of obesity and the severity of its consequences. They concurred with other studies in this review (Liang, 2013; AHRQ, 2011, Schauer et al., 2014) that it is vital that providers find ways to effectively counsel and/or treat overweight patients.

Researchers at the Agency for Healthcare Research (AHRQ), studied obesity counseling in 6,911 adolescent girls and 6,970 boys. Results showed that 17% of the boys were overweight and 17 % obese while 14% of the girls were overweight and 11% were obese (Liang, 2013). Doctors gave advice on healthy food to 47% of the girls and 44% of the boys. Obese kids were more likely to receive nutrition and exercise advice than their overweight counterparts (Liang, 2013). More work is needed in this area because there seems to be no goal to counsel the overweight kids. Counseling the kids with normal weight and ensuring that they stay in that category for prevention of chronic disease would be beneficial. From a public health standpoint, prevention of obesity is a positive endeavor, due to its negative short and long-term consequences. It would have been more informative if we knew the intensity and quality of the counseling provided in this study and whether it was evidence based.

Oreskovic, Goodman & Perrin (2014) studied the frequency of lifestyle counseling in 76 normal weight, overweight and obese adolescents 11–14 years and its effect on the youth weight and physical activity. Methodology included self-reported surveys in dietary and exercise counseling, measured height, weight and physical data by accelerometer. Analysis was performed to establish associations using linear models by weight category while adjusting for age, race, gender, parent education level and physical activity (Oreskovic et al., 2014). Results showed that 47% of the participants were overweight or obese and the frequency of counseling varied by BMI, with obese teens reporting they received more counseling than their peers. Furthermore, obese kids reported receiving more of both types of lifestyle advice than normal weight kids, including increasing exercise. No differences were seen in lifestyle counseling rates between overweight and normal weight. The kids that exercised more received less counsel in

this area (Oreskovic et al., 2014). This study concurred with other studies that recommended lifestyle counseling by physicians (Kallem et al., 2013; Schauer et al., 2014; Nguyen et al., 2011). Dietary counseling initiated in infancy and maintained till 20 years of age resulted in improved insulin sensitivity in adolescents. This is good for the management of diabetes outcomes (Oranda, Ruotinen, Niinikoski, Lagstrom, Vikari Raitakar, 2013).

Ham & Allen (2012) reported that 70% of youth have a preventive health visit approximately every 4 years enabling physicians to counsel them on health issues. United States Preventive Services Task Force (USPSTF) recommends screening for obesity and offering behavior counseling if warranted. They recommend that BMI should be screened annually, and interventions implemented as needed, in addition to screening 12–18 year old's for major depression. Since adolescence is a time of cognitive, physical and emotional change, youth tend to pick up new habits during this time such as alcohol and tobacco use, poor diet and inactivity. Only 29% of this age group is physically active for 60 mins or more. (Ham & Allen, 2012). This does not align with physical activity guidelines or a healthy lifestyle and should be of concern, particularly with the amount of texting, television, video games, and internet usage and screen time in general.

The Gap in the Literature and How This Study Will Help Fill the Gap

It is widely documented that physicians fail to discuss risky behaviors or intervene, and this practice is the lowest in the adolescent population. The reasons for this gap in youth care is due to limited evidence for behavior counseling in teens, lack of physician counseling skills and the perceived lack of interest from youth. The teens too, have concerns about privacy and whether staff and their parents will not be told the information they gave the physician in private

(Ogden et al., 2012; Whitlock, Orleans, Pender, & Allan, 2012; Mangione- Smith, DeCristofaro, & Setodji, 2007). Although the adolescent population has not been extensively studied in lifestyle counseling by physicians, for those studies that are available to date, a big proportion of youth and in some cases half or less than half of those sampled with BMIs indicative of excess weight, did not receive lifestyle counseling. For those that received advice, it was mostly not evidence based nor did it have much depth. Arts, Fernandez, & Lofgren (2014) conducted a study that analyzed coronary heart disease risk factors in college age students aged 18-24 years. They reported that more than 50% of the students had at least one coronary heart disease (CHD) risk factor and 25% had advanced atherosclerotic lesions. The authors blamed unhealthy food choices in the college environment and the all you can eat mentality, both facilitated weight gain and dyslipidemia. The researchers recommended early detection to identify those at risk and interventions sooner rather than later. This would prevent further progression of the disease. Sadly, they pointed out that most young adults were unaware that their cookies and fries' diet together with the lack of screening was increasing their risk of heart disease (Arts et al., 2014).

In 2011, 32.6% adults reported discussing their diet with doctors, up from 10% from 2000 (Ahmed, Delgado, & Saxena, 2016). Even though it is widely documented that excess weight in youth increases the risk of obesity in adulthood, and recommendations and guidelines exist to counsel such youth, it is still not being done consistently. From a public health perspective, multiple chronic diseases result from obesity and the cost to society in healthcare and lost productivity is over a hundred billion dollars in 2016 (Delgado & Ahmed, 2016). It would be prudent to address weight and related issues earlier in life. There is a need to better understand this population, along with their concerns and challenges, in order to provide an

environment that promotes healthier lifestyles both at home, school and the community, where the youth spend most of their time. Doctors have limitations in primary care, but dietitians and some nurses are trained in nutrition (Bonnet et al., 2014) stated that early targeted interventions to prevent and treat obesity in the pediatric population are lacking. Therefore, the need to analyze the characteristics of those youth who receive lifestyle counsel and those that do not and make recommendations for policy change and design age specific and relevant interventions, could result in more targeted and effective counseling reducing obesity and its related conditions and this would have a social impact on adolescent healthcare outcomes and aligns with the Healthy People 2020 goals.

Bonnet et al (2014) stated that early targeted interventions to prevent and treat obesity in pediatric populations are lacking. Little is known about implementation of exercise and nutrition in this age group, particularly with the ethnic groups, which have increased risk of obesity (Peart & Crawford, 2012). In a study that targeted African American adolescents, the researchers stated that results from their pilot study showed that motivational interviewing increased healthy eating behaviors and motivation for increased exercise compared to the control group. The authors concluded that further study was warranted (MacDonnell, Brojan, Naar-King, Ellis, & Marshall, 2012). In their systematic review of effectiveness of obesity prevention interventions from 2003–2013, of African American youth, the group that has the highest obesity prevalence in all ethnic groups, the authors concluded that there was a need to develop culturally appropriate interventions for obese African American youth (Lofton, Julion, & McNaughton, 2015). Lofton et al. (2015) also stated that interventions should include parents, African American mentors and work with the youth on increasing their preferred activities.

Dietary habits of adolescents and how they change, is unknown (Banfield, Liu, Davis, Chang, & Frazier-Wood, 2016). Yet poor diets and lifestyles have long been linked to adverse health outcomes (Lofton et al., 2014). It is therefore necessary to understand youth, their eating habits and how they change, best ways to counsel and disseminate lifestyle education, as well as to promote long lasting behavior change in a culturally appropriate manner that is effective and relevant. As part of changing dietary habits, dietary advice is imperative. Therefore, the need for this study arose in trying to understand the present state of counseling in adolescents and the predictors of this population for dietary advice and the recommendations from the knowledge gained.

Studies That Have Used the Same Methodology

Peart & Crawford (2012) conducted trends analysis using secondary data from the CHIS survey of 12 -17-year olds for period 2003-2009. They concluded that counseling is essential for all ethnic groups and races with all insurance types, particularly so for African Americans, American Indian/ Alaska natives as well as the uninsured since all these populations are at high risk for obesity. Other studies that used this data in adolescent population related to our study include: Padilla (2014) on the lack of treatment in $\frac{3}{4}$ of children with mental health needs; (Babey, Wolstein & Diamant) conducted a study in 2011 on food environments near home and school in relation to soda and fast food consumption, adolescent physical education and physical activity in California by Diamant in 2011; trends in the health of young children in California; low income adolescents face more barriers to healthy weight in 2008 and income disparities in obesity trends among California adolescents (Babey et al., 2010). All the studies cited above

used the CHIS survey data which is the same dataset this study will be using to conduct analysis of secondary data on adolescents in California.

Studies reviewed on adolescent health outcomes have used variables such as: age, gender, race/ ethnicity and some included socio- economic factors. A few studies included missed school days, but none had looked at missed school days, mental health and alcohol and drug abuse as predictors for doctor delivered nutritional counseling. This study attempted to look at these characteristics but was unable to, due to constraints. This study did include physical activity and food environment.

Kallem et al. (2013) used multivariate logistic regression analysis as did Saleens & Liu (2007) in analyzing data from a school-based survey and NHANES respectively for adolescents. Multivariate regression analysis was used in the first study. In the latter study, regression methods were also used to analyze the link between physician advice and teen weight status while adjusted for covariates such as reported weight loss, dietary and physical activity behaviors. In this study researchers concluded that physician counseling in adolescents regarding their overweight status is linked positively to attempted weight loss and moderate changes in healthy behaviors (Saleens & Liu, 2007). Body mass index or weight for height for youth for overweight and obesity status can be derived from the CDC guidelines i.e. overweight 85th percentile and obesity at 95th percentile and up.

Definitions

The following key terms will be used in this study:

Adolescent is any person between the age of 10 and 19 (WHO, 2017).

Body Mass Index (BMI) is the measure the study will use to measure obesity. Childhood overweight and obesity is defined as follows: BMI 85th to less than 95th percentile for children and teens of the same age and sex is considered overweight while obesity is defined as BMI at 95th percentile or greater. BMI is calculated by dividing the weight in kg by the height in meters squared (CDC, 2016).

Demographics refers to age, gender, and race/ethnicity, country of birth, citizenship, languages spoken at home and school of attendance (CHIS survey, 2015)

Unhealthy foods refer to the number of times fast food was ordered at school (CHIS survey, 2015). Additionally, fast food ordered at home, carryout, drive thru and eaten at fast food restaurants. It includes sugary beverages like soda, Gatorade and red bull (CHIS survey, 2015).

Healthy foods is the number of servings of fruits and vegetables consumed daily. Citation

Physical activity is the number of days that participant received 60 mins of physical activity. Sedentary/ no physical activity refers to screen time hours and time spent sitting down (CHIS survey, 2015).

Mental health refers to feelings of nervousness, hopelessness, depression and worthlessness).

Dietary counseling provides individualized nutritional care for encouraging the modification of eating habits. It may also assist in prevention or treatment of nutrition-related illnesses such as cardiovascular disease, cancer, obesity, diabetes, and hyperlipidemia (encyclopedia.com).

Assumptions and Limitations

This study was a retrospective correlational study where I analyzed secondary data. The method of inquiry was quantitative in nature using adolescent population in California ages 12–17 years old. The survey data was collected in 2015. The dependent variable was dichotomous, and the statistical tests included binary logistic regression in bivariate analysis and multiple logistic regression in adjusted analyses. Assumptions are necessary to ensure accuracy of statistical tests and will be described in the statistical section.

The variables addressed in this study were: Demographics (Age (12–17), Gender (male, female), Race (Whites, Asian, Other and ‘more than one race’), Body Mass Index (BMI), food (unhealthy- fast food and sugary beverages or healthy- fresh fruit and vegetables), physical activity (number of days received 60 mins) and sedentary (sitting and screen time) and mental health (feelings of nervousness, hopelessness, depression, worthlessness).

All variables were tabulated, plotted, and descriptive statistics generated and presented. All but the gender and race demographic variables were coded as yes/no or using a Likert scale. This made quantitative analysis possible. Details on specific tests that were used for specific questions have been provided in the data analysis section. All assumptions rendering these tests applicable are statistical tests and all results of merit shall be reported.

Assumptions were made in the study for those things that were out of researcher’s control:

The dataset used was secondary data and therefore was not collected for me for purposes of my study. As such, I used what data was available to answer my research questions. For example, in the healthy foods question participants were asked about consumption of fruits

and vegetables but serving sizes were not defined. Height and weights were reported by the participants, so an assumption is made that they provided accurate information. BMI was calculated from the heights and weights and if inaccurate, this can have an impact on the study.

There are sample size limitations; I can only use what is available. Since the age group was youth aged 11-18 in California households, results can only be generalized to the same age group in households and not institutions. This data has been used in other studies for county, regional and state level obesity prevalence per the national academies press. Income levels of parents were not easily accessible, so this variable was not assessed in relation to nutritional counseling. An assumption was made that participants answered all questions honestly and therefore data collected was accurate. Accuracy of the data is very important for the internal validity of the study.

I made an assumption that obesity is a complex multifactorial issue which includes genetics and the environment. There are cultural norms in society as well as personal beliefs of parents, family members and teachers and characteristics of both adolescents and healthcare providers all interacting together. Providers may have their individual biases regarding weight (Sakalik, 2015). Since the causes of obesity are complex, plausible solutions ought to be multi-level to address this epidemic at biological, behavioral and environmental levels. There is much more research that needs to be done to fully understand the interactions and how all the factors work together

The food we eat has an impact on our nutritional status, body mass index, exposure to allergies, food borne pathogens, food security, mental health, pesticides, hormones, and other contaminants in addition to the risk of chronic diseases among other outcomes. Furthermore, our

food choices are influenced by multiple factors such as ethnicity, culture, politics, economics, built and natural environments. There are complex interactions between social, economic, biological, and psychological in relation to obesity (Magowicz et al., 2016). However, in this study I was able to examine only a few of the factors related to obesity. Therefore, in interpreting results, it is important to understand that it will be done within the context of this complexity. There remains a lot to be done to understand the dietary behaviors of teens, how they change and how all these complex factors are interrelated (Saleens & Liu, 2007). There is a lack of understanding of how the risk factors for obesity interact with each other (Hruby & Hu, 2015). Obesity simply put, is a result of excess calories from energy imbalance between intake and expenditure. This imbalance is connected to social and economic levels at individual and other levels such as community (Hruby & Hu, 2015). Furthermore, not everyone that lives in a country such as the U.S. experiences obesity. Therefore, maintaining a healthy weight is complex and involves personal beliefs and behaviors, genetics, environmental and socioeconomic factors (Hruby & Hu, 2015). Therefore, when interpreting the study results, it is important to remember that the study did not look at all these factors and therefore interpretation will refer to this concept since obesity is far more complex.

The data is of high quality since CHIS data was voted one of the top 50 data sources. The data collection was guided by survey methodology as described by Groves (2009) and has addressed multiple quality threats mainly non-response bias and non-coverage bias for declining telephone survey response rates through sampling and weighting techniques. The level of response for 2015–2016 has been documented in the results section. Various strategies employed to ensure high quality data include: Inclusion of households that speak other languages not

usually represented, mailing letters before calls are made, incentives for participants, toll free helpline and informative website during survey period, maximum calls made to reach respondents, interviewers are well trained, certificate of confidentiality from National Institute of Health (NIH) to protect participants' confidentiality. There are protocols for subject's recruitment, collection and use of data and the storage of the data, all governed by UCLA office of protection of research subjects, the California committee for the protection of human subjects and the federal office of management and budget (UCLA Center for Health Policy Research, 2012).

Scope and Delimitations

In this study, I analyzed and measured the receipt of counseling reported by normal, overweight and obese youth and some of the factors that potentially predict dietary counseling such as BMI, fast food consumption, or feelings relating to mental health. The data also showed if there are differences in ethnicities in the participant's rates of counseling. There are issues and questions related to the problem that are important but beyond the scope of the study. These include: the lack of data on the quality and intensity of the dietary counseling, standardization or the differences in the counseling, cultural appropriateness of the counseling, evidence based, parent's education and income level. Physicians were not categorized as pediatricians or family physicians, but this study did not analyze physician characteristics.

Due to the complex nature of obesity and interrelated factors, there is a limitation on how much can be understood of the problem. Because obesity is complex, it requires multiple systems intervention and therefore there is a need to further research this area. There are factors that

pertain to genetics, environment, food quality, food availability, geographic location, physician characteristics, teen characteristics, engagement, quality and length of counseling, insurance types, built and natural environment and the list goes on. I was able to study only a few of these factors. The socioeconomic model below demonstrates the different levels and multiple factors that can influence personal behaviors that affect diet and physical activity and body weight (Davison & Birch, 2001).

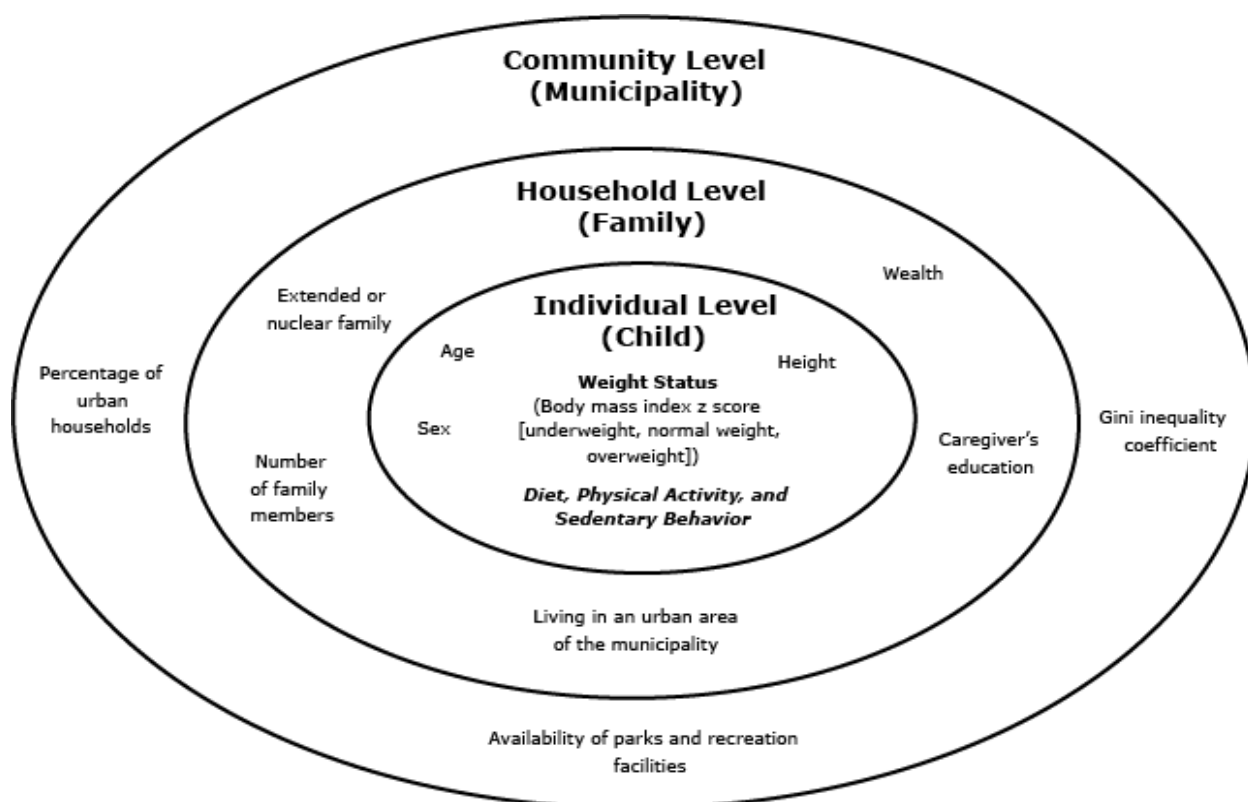


Figure 1. Socio economic model for obesity – Image from the Centers for Disease Control:

Model image was adopted from ecological model of childhood obesity from Davison & Birch (2001). Childhood overweight: a contextual model and recommendations for future research. *Obes Rev*; 2(3):159–71. CrossRefPubMed and was used in Columbia study by Ines- Gonzalez -Casanova (2014).

Significance, Summary and Conclusions

The purpose of this study was to explore some of the characteristics of adolescents (aged 12 to 17 years) who received nutritional counseling, and those that did not, and to ascertain if there are predictors of who receives it and who does not. Data generated from this study could inform policy to ensure that physicians are adequately trained, in order to provide culturally appropriate and concise dietary advice to those youth that need it.

In a review on dietary counseling by physicians Delgado & Ahmed (2016), stated that even though there have been increases in diet counseling by doctors, the rates of counseling are still about 50%. A review of the literature strongly supports counseling of adolescents that require it and including less advantaged and those from other ethnicities (Peart & Crawford, 2012). The adolescent population faces challenges because they are understudied, are harder to reach and are undergoing physiological and biological challenges. Furthermore, this age group is prone to peer pressure.

Potential contributions from the results of this proposed study can add to the body of knowledge since it includes a correlation of characteristics including school food environment. Insights from the study will inform health care professionals, particularly pediatricians on which youth are unlikely to get counseled yet may need it, based on BMI and risks for obesity and chronic disease, and guidelines for pediatric counseling (USPSTF, 2010) and to ensure that they receive the advice they need. Gaining a better understanding of the issue in our adolescent population, will help to contribute to targeted interventions for doctors in primary care,

particularly for those youth not receiving it. This could reduce obesity, cardiovascular and diabetes prevalence in adolescents, in addition to improvements in overall health in this population (Ham & Allen, 2012).

Per Healthy People 2020 goals and the World Health Organization (WHO), improving the health, safety and well-being of adolescents is a public health issue (US DHHS, 2017; WHO, 2017). Per the USPSTF guidelines, offering behavioral and nutritional counseling can lead to improvements in obesity and lipid profiles (USPSTF, 2010). This study could lead to reduction in chronic disease in the future, resulting in social change, due to the positive impact on society in adolescent health outcomes, reduced loss of productivity and financial burden worldwide, related to treating preventable obesity related conditions. Therefore, it is important to study and understand this population, its changing needs and habits, to address the issues appropriately and effectively, to prevent future health issues. This would be of public health significance and contribute positively to adolescent health outcomes well into their adulthood. Chapter 2 will cover the study research design methodology and data collection.

Section 2: Research Design and Data Collection

Introduction

This study design was retrospective, and the quantitative method of inquiry was used. The purpose of the study was to explore characteristics of adolescents in California who receive dietary counseling by their physicians. In this chapter, I will provide a detailed overview of sampling, recruitment, participation data collection, and the operationalization of constructs. I will provide information on data analysis, threats to internal and external validity and ethical considerations.

Research Design and Rationale

The study design was correlational in nature. The dependent variable was receipt of nutritional counseling by adolescents from their physicians. Independent variables included: age, gender, race, BMI, fast food consumption, sugary drinks, physical activity, sedentarism, and mental health.

The focus of the study was to explore and observe relationships among the variables without intervention. In this study, I conducted a secondary analysis of primary data compiled by the California Health Information Survey, UCLA in 2015–2016. This type of study can be fast, efficient and effective since because the data is already in existence. I sought to test hypotheses about a phenomenon. The data was suited for a quantitative method of inquiry since the analysis involved quantification of associations between the variables of interest. (Creswell, 2013). Data were gathered by well trained staff and it was quantifiable. My research design was highly structured in advance of the study and the results were documented. Therefore, quantitative design is appropriate since this study explains, predicts and examines relationships (Creswell,

2013). By providing answers to the research questions, this would add to the knowledge base in this area hopefully improving public health outcomes of adolescents. In their study on obesity stigma published in the American Journal of Public Health, the researchers emphasized the stigma and discrimination faced by people who are obese, and its effects on psychological and physical health are well documented (Puhl & Heuer, 2010). Ensuring that weight issues are addressed earlier in childhood by health professionals may prevent individuals from experiencing the negative health consequences of obesity and contribute positively to the practice and discipline of public health (Puhl & Heuer, 2010).

Methodology

Population

The target population for this study was adolescents of age 12–17 years old in the State of California, residing in households and attending school. 840 teens were surveyed directly by trained staff from RTI, a company that has a contract with University of California, Los Angeles (UCLA) for the survey methodology for the 2015–2016 teen survey. The initial study sample consisted of 840 participants, 453 of whom were males and 383 were females. 26 participants (3.1%) were excluded due to missing data and 814 participants were included in the analysis. More than half of the participants (55.2%) were White, 11.4% were Asian, and 24.6% were ‘other single race’ while 8.7% were ‘more than one race.’

Sampling Procedures

The original survey study and design entailed a telephone survey using a dual frame random digit dialing technique (RDD). Both cell phones, landlines and a supplemental surname list were used to ensure representation of Korean and Vietnamese households. Survey staff used

in 58 California counties with 44 geographic sampling strata and 14 substrata of the most populous counties. Residential numbers were dialed using random selection. Following adult consent, an adolescent was recruited.

The sample criterion was age 12–17 years old. Following obtaining parental consent, interviews were conducted. The child had to be the legal child of the parent; foster children were excluded because their biological parents still had parental rights. Adolescents were surveyed directly by trained RTI staff in an interview that lasted about 23 minutes. They conducted interviews in six different languages: English, Spanish, Chinese, Vietnamese, Korean, and Tagalog. Monetary incentives (\$2) were sent to all participants prior to survey in a letter to encourage participation in the survey. I gained access to the dataset through the UCLA website, and registered to request access to login to the public use files.

Instrumentation and Operationalization of Constructs

The CHIS survey has been conducted since 2001. It is the primary archived data set from which I conducted secondary new analysis. UCLA contracted with RTI methodology to use their survey. In 2015/2016 survey, some additional questions were added pertaining to mental health, alcohol use, and missed school days due to health reasons. For my study, I used the latest data set from the 2015/2016 questionnaire survey. It is a set of questions on different topics that relate to adolescent health outcomes and is therefore appropriate for the current study. The survey questions were obtained from other surveys and some were developed, all were validated and tested using studies and have been used since 2001 and are continuously improved. New questions were added in 2015 (UCLA Center for Health Policy Research, 2012).

UCLA strives to provide high quality data and regularly assesses their methods with advisory panels and at research conferences. Multiple studies have been conducted to validate the CHIS data. CHIS interviewed 21,269 households in 2016 which included 840 teens. One study was conducted regarding cell phone usage trend using landlines and cell phones. The authors determined that there was a decline in landline use and emphasized the need for telephone surveys such as CHIS and the Behavioral Risk Factor Surveillance survey (BRFSS) to explore ways to supplement landline samples with other methods (Lee & Grant, 2008). Another study compared Medicaid estimates from CHIS with other data sources such as national health interview survey (NHIS) and the current population survey (CPS). Findings showed that CHIS estimates matched administrative data, while NHIS and CPS estimates fell below actual Medicaid enrollment (UCLA Center for Health Policy Research, 2012).

In a study that that was conducted to evaluate non-response bias in 2007, estimates for over 40 health related indicators of respondents and non-respondents (who later attended in person interview). Results showed no significant differences between the two groups. (CHIS, 2007). The CHIS data quality is guided by the data quality objectives of the total survey error perspective by Groves and Lyberg (2010), which addresses multiple threats to data quality such as declining telephone response rates and increased used of cell phones and non-response bias. Increased cell phone use was matched to households. Noncoverage bias was addressed to get accurate representation of the population (Groves et al., 2010) by sampling methods that included weighting to include hard to reach minorities. The data sample from the CHIS survey is representative of California households (Lee & Grant, 2008).

Reliability & Consistency

The CHIS survey has been in effect since 2001 and is a collaboration of three agencies: the UCLA Center for Health Policy Research, the California Department of Health Care Services, and the California Department of Public Health. The questionnaire comprises various topics, including mental health. The Kessler psychological Distress Scale (K6) was included in the questionnaire for mental health and drug abuse. Validation of K6 scale is best achieved using a minimum of 50 people who have a positive K score (Harvard Medical School, 2003). In their study on the validity of K6, researchers calculated Cronbach's alpha of 0.89, (>0.7 is considered good) for consistency and reliability. Researchers conducted a study in which they analyzed data from the CHIS 2007 adult survey with $N=168$ (Prochaska, Sung, Max, Shi, & Ong, 2012). The purpose of this study was to determine the use of prescription drugs or receipt of mental health help from a health professional. They did validity tests to examine the associations between mental health distress and access to care. They did a comparison of the prevalence of unhealthy lifestyle behaviors and obesity status was done for the different mental distress groups (Prochaska et al., 2012). The study researchers assessed the validity of this issue by comparing 50,880 adult participants from the 2007 CHIS data. Moderate and severe mental distresses were determined based on relevant clinical, impairment, and risk behavior measures and they analyzed the data. (Prochaska et al, 2012). "Receiver operating characteristic curve analysis identified $K6 \geq 5$ as the optimal lower threshold cut-point indicative of moderate mental distress."(Prochaska et al, 2012). Based on the K6 scale, 8.6% of California adults had serious mental distress while 27.9% had moderate mental distress. (Prochaska et al, 2012). Moderate and serious mental distress were found to be similar. Respondents with moderate mental distress were found to have

lower rates of utilization of mental health care, impairment, substance use and other risks compared to those with serious mental distress and greater than respondents with none or low mental distress (Prochaska et al., 2012). They concluded that the K6 scale could be used to quantify correlates of moderate mental distress and this was clinically relevant. Prochaska et al. (2012) also noted that more research is needed in this area because participants with mental health issues had increased risks for unhealthy lifestyles including obesity and drug and alcohol abuse (Prochaska et al., 2012).

Sampling for the Secondary Analysis Study

For this study, I used the entire available sample ($N=814$) to ensure adequate power of the study. Based on the power calculation for binary/multiple regression shown on pages 55, sample size is more than met with the original study sample size. I used all the available data for the adolescents sampled in the original survey.

Operationalization of Variables

In general, I used the same definitions in my study as the original survey study.

Age was the actual number of years of the adolescent participant (CHIS survey, 2015).

Body mass Index (BMI) was calculated from the adolescents reported weight and height (CHIS survey, 2015). BMI is the measure the study used to measure and classify obesity.

Childhood overweight and obesity was defined as follows: BMI 85th to less than 95th percentile for children and teens of the same age and sex was considered overweight while obesity was

defined as BMI at 95th percentile or greater. BMI was calculated by dividing the weight in kg by the height in meters squared (CDC, 2016).

Dietary counseling provides individualized nutritional care for encouraging the modification of eating habits. It may also assist in prevention or treatment of nutrition-related illnesses such as cardiovascular disease, cancer, obesity, diabetes, and hyperlipidemia (encyclopedia.com). For this study, if the doctor discussed nutrition during the annual physical, that was defined as nutritional or dietary counseling (CHIS survey, 2015).

Fast food consumption referred to the number of times fast food was ordered at school or in the cafeteria in the last 7 days from restaurants like McDonalds, Taco Bell, Burger King, Pizza Hut and the like. It included fast food from drive thru, carry out or eaten in a fast food restaurant (CHIS survey, 2015).

Gender referred to male or female participant (CHIS survey, 2015).

Mental health referred to various feelings. I had planned to use feelings of hopelessness which was rated on the following scale to determine how often: 1=all the time 2=most of the time 3=sometimes 4=a little, 5=none, 7=refused and 8=I don't know (CHIS survey, 2015).

Physical activity was described as the number of days participants received 60 mins of exercise excluding school physical education (CHIS survey, 2015).

Race/ethnicity referred to the group of people the adolescents identified with the most (UCLA Center for Health Policy Research, 2012).

Table 1

Variable Operationalization

<u>Research Questions</u>	<u>Variables</u>	<u>Scales</u>	<u>Categories</u>
1. Demographics	Age	Numerical	Continuous Binary: Male, Female
	Gender	Nominal	
	Race	Nominal	1-White 2-Asian 3-Other 4-More than one race
2. Body mass index (BMI)	BMI in kg/m ² , percentile per CDC BMI for age in children	Ordinal	Underweight < 5 th percentile Healthy weight = 5 th to <85 th percentile Overweight =85 th to 95 th percentile Obese = > or = 95 th percentile
3. Consumption of unhealthy and healthy foods	Unhealthy foods - fast foods and sugary beverages	Categorical	Number of cans of sodas with sugar drunk yesterday -0, 1, 2, 3+ Number of cans of sweet fruit/ sport drank yesterday- 0, 1, 2, 3+ Number of times ate fast food during past week – 0, 1, 2, 3, 4, 5+
	Healthy foods - servings of fruits and vegetables	Categorical	Eats 5 + servings of fruits and vegetables

Table 1 (continued)			
4. Physical activity and sedentarism	Physical activity- number of days received 60 minutes of physical activity	Numerical	Continuous
	Sedentary- screen time and sitting activities	Numerical	Continuous
5. Mental health	Nervousness	Likert scale	Ordinal All-1, most-2, some-3, a little-4, none-5,
	Hopelessness		
	Depression		
	Worthlessness		
6. Nutritional counseling	Receipt of counseling	Dichotomous	Nominal (yes-1, no-2)
	Outcome variable		

Variable Measures in the Original Dataset

Demographics participants were asked their dates of birth and age was measured in number of years. Gender was recorded from the participant based on their answer as to whether they were male or female. The question on race asked whether participants were Latino, Hispanic, American Indian, Alaska Native, Black or African American or White. There were follow up questions on tribal heritage and ethnic groups within races.

Body mass index (BMI) was calculated based on stated heights and weights, age and gender adjusted by the adolescents, from which calculations were done based on percentiles per CDC. BMI is measured in kg/meter squared. There were 4 levels of BMI categorized by percentiles- underweight, normal (healthy), overweight and obese.

Healthy food consumption was the number of fruits and vegetables servings excluding fried potatoes. Portion sizes were not defined and left up to participant to determine what they considered a serving.

Unhealthy food consumption comprised of fast food, sports drinks and sugary drinks such as juice and soda.

Physical activity was based on the stated number of days participants were active for a minimum of 60 minutes on weekends and weekdays excluding physical education.

Being sedentary was the time spent on a typical weekday and weekend watching television, playing computer games or talking with friends or any sitting activities.

Mental health there were several questions on mental health and it was computed based on nervousness, hopelessness, depression and worthlessness.

Data Management Plan

Data Cleaning and Preparation

The data was generated by UCLA Center for Health Policy from the CHIS survey and missing data was mitigated using imputation method. A teen data file was also provided with imputation for the missing cases. As such, I exported the files that I needed to SPSS to start the analysis. SPSS for IBM version 24 was used to perform statistical tests to investigate the hypotheses.

The data was available in SPSS format, so it was downloaded into SPSS 24 and a subset of data with the variables that I required for the analysis was created. The variables addressed in this study are: Nutritional Counselling (outcome variable), Demographics (Age (12–17), Gender

(female, male), Race (White, Asian, Other, and ‘more than one race’), Body Mass Index (BMI), consumption of unhealthy foods, consumption of nutritional foods, physical activity, being sedentary and mental health status.

Research Questions by Statistical Analyses

Research Question 1 (RQ1): What is the association between demographics (age, gender, and race) and receipt of nutritional counseling?

Null Hypothesis (H_0): There is no association between demographics (age, gender, and race) and receipt of nutritional counseling?

Alternative Hypothesis (H_a): There is an association between demographics (age, gender, and race) and receipt of nutritional counseling?

Analysis for RQ1: Chi squared tests were used to determine how receipt of nutritional counseling was distributed in groups of gender and race. A Mann-Whitney U test was also used to determine whether age varied across receipt of nutritional counselling. Multivariate-adjusted logistic regression analysis was used to examine how nutritional counseling (dependent variable) was associated with age, gender, and race; adjusting for eats 5+ servings of fruits and vegetables daily (yes, no), no. of cans of soda with sugar drank yesterday, no. of cans of sweet fruit/sport drink drunk yesterday, no. of times per week ate fast food during past week, no. of days in a typical week the participant is physically active for 60+ minutes, and time doing sitting activities after school and during weekends. From the multivariable regression model, I calculated odds ratios of the association of demographic variables and nutritional counseling, including associated 95% confidence intervals around the OR.

Research Question 2 (RQ2): What is the association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Null Hypothesis (H_0): There is no association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Alternate Hypothesis (H_a): There is an association between healthy weight BMI and unhealthy weight and receipt of nutritional counseling?

Analysis for RQ2: The relationship between BMI categories (main predictor of interest) and nutritional counseling (dependent variable) was analyzed using bivariate regression. Chi squared test was performed to assess whether BMI (categorical variable) varied according to receipt of nutritional counselling. Further, a multivariable-adjusted logistic regression model was fitted with nutrition counseling as dependent variable and BMI (underweight, normal/healthy, overweight, obese) as the main predictor variable of interest, adjusting for age, gender, race, eats 5+ servings of fruits and vegetables daily (yes, no), no. of cans of soda with sugar drank yesterday, no. of cans of sweet fruit/sport drink drunk yesterday, no. of times per week ate fast food during past week, no. of days in a typical week the participant is physically active for 60+ minutes, and time doing sitting activities after school and during weekends. The normal BMI category (5th to <85th percentile) was used as the reference group to calculate OR for the other 3 categories. I also calculated the associated 95% confidence intervals around the OR.

Research Question 3 (RQ3): What is the association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Null Hypothesis ($H_0 3$): There is no association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Alternate Hypothesis (H_a3): There is an association between unhealthy foods (fast food and sugary beverages) and healthy foods (fruit and vegetable servings) and receipt of nutritional counseling?

Analysis for RQ3: Chi-squared tests were performed to assess whether consumption of healthy foods (eats 5+ servings of fruits and vegetables daily) and unhealthy foods (no. of cans of soda with sugar, no. of cans of sweet fruit/sports drinks drank yesterday, and no. of times ate fast food during the past week) vary according to whether nutritional counselling was received. A multivariable-adjusted logistic regression model was fit with nutrition counseling as dependent variable and each of these variables as the main predictor variable of interest, adjusting for each other, as well as age, gender, race, BMI, no. of days in a typical week the participant is physically active for 60+ minutes, and time doing sitting activities after school and during weekends. I also calculated the associated 95% confidence intervals around the OR.

Research Question 4 (RQ4): What is the association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling?

Null Hypothesis ($H_0 4$): There is no association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling?

Alternate Hypothesis (H_a4): There is an association between physical activity (no of days received 60 mins) and being sedentary (sitting time) and receipt of nutritional counseling

Analysis for RQ4: A Mann -Whitney U test were performed to assess whether physical activity (number of days engaged in 60 minutes of exercise) and being sedentary (time doing sitting activities after school and during weekend's television or screen time or sitting) vary according to whether nutritional counselling was received. Further, a multivariable-adjusted logistic regression model was fitted with nutrition counseling as dependent variable and each of these variables as the main predictor variables of interest, adjusting for each other, as well as age, gender, race, BMI, no. of days in a typical week the participant is physically active for 60+ minutes, and time doing sitting activities after school and during weekends. I also calculated the associated 95% confidence intervals around the OR.

Research Question 5 (RQ5): What is the association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Null Hypothesis ($H_0 5$): There is no association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Alternate Hypothesis ($H_a 5$): There is an association between mental health (nervousness, hopelessness, depression, worthlessness) and receipt of nutritional counseling?

Analysis for RQ5: The relationship between the variables comprising mental health (nervousness, hopelessness, depression, worthlessness) was not analyzed. Chi squared test was to be used to test association relating to mental health and nutritional counseling Further, a multivariable-adjusted logistic regression model was going to be fit with nutrition counseling as dependent variable and mental health as the main predictor variable of interest, adjusting for each of the mental health components (nervousness, hopelessness, depression, worthlessness) when examining each one, and additionally adjusting for age, gender, race, BMI and diet to

derive the odds ratio to test the association of mental health with nutrition counseling. I was also going to calculate the associated 95% confidence intervals around the OR. However, the data was not readily accessible.

Statistical Assumptions

For *t*-tests, the dependent variable should be normally distributed, and there should be equal variances between the two independent groups being compared. Normality of continuous data was assessed by visually inspecting histograms.

For chi-squared tests, it is assumed that the expected counts within each cell should be at least five (Gerstman, 2008). Assumptions were not met for all variables, and in the case where they were not met, non-parametric tests such as chi square and Mann Whitney U tests were used. These variables included; age, number of days in a typical week teen was active and the time spent doing sitting activities.

The advantage of binary logistic regression analysis is that it does not have many restrictive assumptions compared to linear regression. Linearity, normality of errors, homogeneity of variances is not assumed. Requirements include: (1) the dependent variable should be binary; (2) observations should be independent of one another; (3) absence of multicollinearity among the independent variables, (4) a large sample size; and (5) a linear relationship between log odds and the independent variable (East Carolina University, n.d; Gerstman, 2008; Intellectus Statistics, 2018).

Model diagnostics included conducting the Hosmer and Lemeshow goodness-of-fit test, which tests whether the data has significant deviations from the model fit.

Study Power

G power version 3.1.9.2 was used to calculate the sample size for the multivariate regression model. A graph was generated using the y axis as sample size. Corresponding 80% min power equated to a sample of 275. Therefore, in general, the sample size (N=814) used in this study had more than sufficient power.

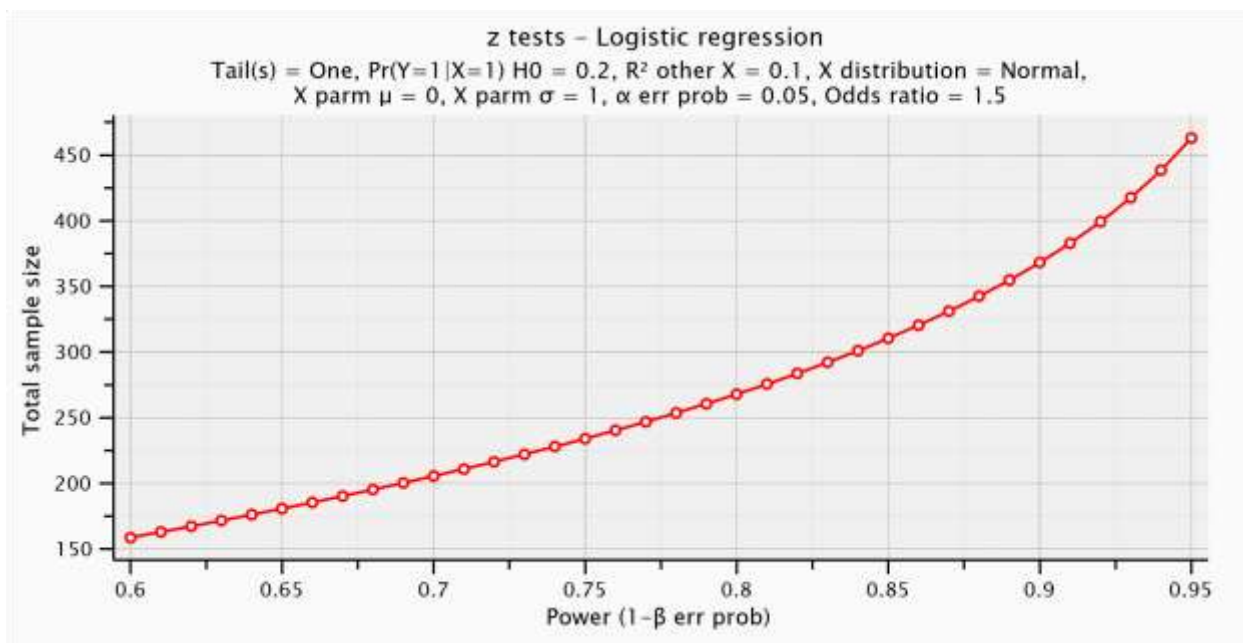


Figure 2. Graph of Sample size vs Power

Program written by Franz Faul, Universitat Kiel, Germany

Threats to Validity

There are multiple threats to validity in any research study. Even when the greatest care is taken by researchers to limit threats, there are some that still exist. No causal conclusions can be made using observational data. This was secondary data analysis. During analysis, statistical tests were done to limit confounding factors. These can affect validity. There's controversy about the degree of validity of BMI levels assigned partially arbitrarily by the Centers for Disease

Control which can affect construct validity. With the issue of external validity, there is limitation to how much generalization can be done. The sample is from youth going to school in Northern California and characteristics can differ from Southern California. It can be generalized to 12–19 year old's in school in similar urban areas with similar demographics (CMU statistics, n.d.).

Validity

Construct validity is concerned with ensuring that the instrument is measuring what it was intended to measure. The CHIS survey uses methodology derived from Groves & Lyberg (2010) as a guide to ensure that the main concerns of non-response bias, coverage and sampling bias are addressed (UCLA Center for Research Policy, 2012) using multiple studies to test the validity of the data and they have been described in detail at the CHIS data website. The staff at UCLA has high confidence in their data and continue to improve it every year since 2001. (<http://healthpolicy.ucla.edu/chis/design/Pages/data-quality.aspx>).

Threats to external validity are those that factors that may limit generalizability of the study results. These can include biases such as: selection biases, constructs, methods, real world effects, history effects and maturation (Laerd Statistics, 2012). In the secondary dataset that was used for this study, oversampling strategies were used to ensure that the sample was representative of households in California (UCLA Center for Research Policy, 2012). With the random selection of households, selection bias was minimized. Using quality standards, biases that are known to occur using the random digit dialing method, were addressed to produce quality data.

Internal validity is important to enable the researcher to draw valid conclusions. Drawing the right conclusions from the available data is critical. In the quantitative method of inquiry,

internal validity can be affected by many factors including: research design, maturation, history effects, instrumentation, statistical regression, selection bias, and compensation and subject effects (Laerd dissertation, 2012).

Over time, strength in construct validity increases. The CHIS survey has been conducted since 2001, so as the years went by improvements were made to streamline the process (UCLA Center for Research Policy, 2012). Constructs are building blocks of theories to explain phenomena and therefore threats to construct validity include defining constructs improperly. Therefore, as a study continues to use the same methodology over decades, constructs continue to be refined resulting in improving validity over time (UCLA Center for Research Policy, 2012).

Based on the literature survey, variables grouped into five categories were selected for the study. There were potential confounding variables in the multivariable adjusted model for the association of nutrition counseling such as age, gender, race, mental health status, type of diet and physical activity. All the independent variables can be potential confounders when examining other research questions. Confounding variables need to be adjusted for to maximize internal validity. Data on parents such as household income was not available in teen public use file. Poverty levels were provided in the teen data.

The variables addressed in this study were: demographics (age (12-17), gender (male, female), race, consumption of unhealthy food and healthy fruits and vegetables, physical activity and sedentarism, Body Mass Index (BMI), and mental health status.

All variables were tabulated, plotted, and descriptive statistics generated and presented. All but the gender and race demographic variables are coded as yes/no or using a Likert scale.

Variables were described in more detail in the table above on page 43. Quantitative analysis was appropriate. For continuous data, I assessed normality by visually inspecting histograms. For categorical data, I checked if the expected counts for any cell were five or less. Specific tests will be discussed below in the section on statistical analyses.

Results were interpreted by how well they correlated with receiving nutritional counseling. Interpreting results was able to address whether the hypotheses were supported or not supported. A 95% Confidence Interval (CI) for an odds ratio (OR) was statistically significant if it did not include the null value (1.00). The 95% (CI) assisted in determining significance of results while making a comparison to past literature and the chosen theory may have also helped to explain the results.

Threats to validity were included and their effect on the results. These included threats introduced by survey instrument, confounders and selection bias. Survey instruments are continuously improved based on known methodology (Groves et al., 2010). For example, confounding variables were adjusted for, to maximize internal validity. All the independent variables could be confounding and therefore there were tested statistically using tests like Chi square for significance. Other threats could include interviewer bias and selection bias; however, this was minimized since in house staff were trained. Selection bias was addressed through weighting methods that included hard to reach ethnicities like Native Indians (UCLA Center for Research Policy, 2012). UCLA researchers were confident that multiple threats were addressed. Lastly, I made some recommendations for the adolescent population and potential future research (Creswell, 2014).

Ethical Considerations

Originators of the dataset-maintained ethics while gathering the data by receiving parental consent and adolescents' assent per Institute Research Board (IRB) guidelines. Participants' data privacy and integrity was observed since the CHIS survey had to follow stringent UCLA IRB, State of California OIRB and the Committee for protection of Human Subjects. Several attempts were made to contact parents and adolescents for participation and some calls were made prior to remind them of survey. Children are a vulnerable population and therefore they need to be communicated with at the appropriate grade level. Similarly, instrumentation was age appropriate while maintaining confidentiality.

Data access was only permitted following registration online and once granted, a username and password were obtained and used to permit access the data. Highly sensitive information was excluded from public use files (PUF) such as sexual behavior. Data are confidential, anonymous to public in the public use files and the confidential data require extra steps for application submission for review by the data disclosure committee and the principal investigator. Data is kept online until funding runs out. Since the data is a collaboration between multiple agencies, ethical issues were addressed by adhering to the multiple IRBs and guidelines. Since the data is anonymous, I used it in my office and this did not affect privacy. My study adhered to those ethics since I had to follow instructions to retrieve the data. I also followed ethics in children research guidelines set by the Walden University Institute research board (IRB). I kept my user name and password safe and provided instructions to my committee members on how to register to access the data in case they needed it.

Power of differential, which refers to difference in power between mentor and mentee and their ability to make ethical decisions, was taken into consideration by ensuring high ethical standards and adhering to university ethics guidelines. In a qualitative study, however, researchers found that the relation between powers in academia and ethical situations in research could be a complex issue that warrants further research (Gibson, Medeiros, Giorgini, Meca...Munford, 2014). It is important to declare any conflicts of interests in research and conduct ourselves in an ethical manner. For this study, I followed the following ethical considerations for sampling and data analysis. I submitted my proposal plan to the Walden University IRB for permission to analyze the data. I worked with only de identified data and store it on the computer, requiring sign in access. For any data that was printed, it was stored it in a safe place. Anyone who needed access to the data had to register and attest to obtain it, per CHIS guidelines for the survey.

Summary

In summary of Chapter 2, I identified that obesity among youth is still a concern. During their physician visits, the issue is either not being addressed at all or inadequately addressed. The negative consequences of obesity in youth and later as adults have been documented. I conducted a secondary analysis of archived data generated from the California Health Information Survey 2015/2016 in the adolescent population. Data analysis included the use of SPSS to conduct descriptive and inferential statistics to include bivariable and multivariable analysis to answer all the research questions. I submitted the proposal to the Walden University IRB to ensure that the study was ethical. The positive social change implication of the study is that it has the potential to address weight issues thereby improve adolescent health. The study will contribute to the

Public health discipline by improving health outcomes of adolescents since excess weight has both physical and psychological consequences (Puhl & Heuer, 2010) and to the Public Health Practice by reducing obesity and chronic disease in childhood and later in adulthood.

In the next chapter, I provide a brief introduction with the study purpose, research questions and hypotheses, followed by the data collection of the secondary dataset, descriptive and inferential statistics, and post hoc analysis and include figures and tables pertaining to the data analysis.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of the study was to explore the association between predictors of nutritional counseling by doctors in the adolescent population and characteristics of the youth. It is important to find out who is likely to receive counselling and the characteristics that may determine this. Five research questions were used to investigate this phenomenon. The research questions were designed to explore the associations between the dependent variable, receipt of dietary counseling, and the independent variables. These were demographics (age, race and gender), healthy and unhealthy weight BMI, healthy and unhealthy food consumption, physical activity and being sedentary and mental health, which was measured by hopelessness, nervousness, depression and worthlessness.

This section contains the results from the data analyses. A report of statistical tests that were conducted includes descriptive statistics, inferential analysis (bivariate and multivariate regression), assumptions, and probabilities.

Data Collection for the Original Data Set

UCLA trained staff collected data from 2015 to 2016 by telephone survey using random digit dialing of landline and cellular telephones using a computer assisted telephone interviewing (CATI) system. Special effort was made to target sparsely populated communities. CHIS 2015 data were obtained between May 2015 and mid-February 2016 while 2016 CHIS data were from January to December 2016. Response rates were obtained by composites of screener completion rate of participant and completion of interview. The study population was composed of

adolescents aged 12-17 years living in Northern California households. They were attending school or being home schooled. They were excluded if they were in institutions.

Response rates differed across the age groups: the 2015 adolescent response rate for landline/list sample was 17.1% for interviews, while it was 17.9% in 2016. This rate includes parental permission, which was required for the data gathering procedure. For the cellular sample, the response rate was 17.4% in 2015 increasing to 21.6% in 2016. Low response rates can be attributed to more cell phone use compared to landlines. According to the Pew research center, it is challenging to reach adolescents on the phone. Researchers must speak with two individuals in each household since youth are a protected population. Interviewing two people complicates matters since they both may not be reached at the same time requiring more phone calls and messages. This is time consuming and costly (Lenhart, 2014). These rates are not dissimilar to other surveys (UCLA Center for Health Policy Research, 2012). Low response rates do not necessary mean survey bias. The CHIS survey staff conducted a study that assessed nonresponse bias and compared characteristics of neighborhood between those that responded and those that did not. Results showed little to no substantial difference between the two groups (UCLA Center for Health Policy Research, 2012).

Weighting of the sample was done to reflect the noninstitutionalized population for each sampling stratum throughout the state. This compensated for probabilities of selection of phone numbers or households, reduced biases such as non-response bias, adjusted for under estimation in sampling, and reduced the variance of estimates using supporting information (healthpolicy.ucla.edu)

In Section 2, I indicated that I had planned to analyze the association between mental health and receipt of nutritional counseling for RQ5. However, mental health attributes of nervousness, hopelessness, depression, and worthlessness were stored in the confidential data not in the public use file. Due to the cost and time factor for accessing the dataset, RQ5 was dropped because it was prohibitive. As such, I was unable to conduct analysis completed for the mental health variable.

Based on the State of California Department of Education, ethnic breakdown in general for students from grades K through 12 was Whites (23%), Hispanic (54%), Asian (8.98%), American Indian (0.54%), African American (5.62%) and ‘two or more races’ (3.33%). The study population for the CHIS survey was 12–17 years (middle to high school) only, while the data above is for kindergarten through high school public schools. In my study population, Whites were over 50% majority and ‘Hispanic’ was not a race. I could not find recent information on the race demographics of youth 12–17 years. The CHIS study demographics may not be representative of K–12 in the whole state of California. Per UCLA CHIS survey data, sampling techniques were deliberate in including all ethnicities and ensuring that the sample was representative of the Northern California population (healthpolicy.ucla.edu).

Results

Descriptive Statistical Analysis

Study Sample

The initial study sample consisted of 840 participants, 453 of whom were males and 383 were females. Twenty-six cases (3.1%) were excluded due to missing data while 814 participants were included in the analysis, comprising 54% males and 46% females. The minimum age was 12 years and the maximum age was 17 years, with a median of 15 years. More than half of the participants (55.2%) were White, 11.4% were Asian, and 24.6% were 'other single race' while 8.7% were 'more than one race'.

Univariate Analysis

Participants spent about 3.71 days being physically active in 1 week on average. Approximately 3 hours (188 mins) were spent on sitting activities on average. Results showed that 71% of adolescents in the study ate five or fewer arbitrarily defined servings of fruits and vegetables while 65.6% of participants reported that they did not drink soda or sugary drinks. Approximately one third (34%) of the youth in the study were overweight or obese while most of them (62%) were of normal BMI weight category (Table 3).

Table 2

Descriptive Statistics for Key Study Variables, N=814

Variables	Min	Max	Mean	Std. Dev
Age	12	17	14.55	1.69
#of days active 60 +min	0	7	3.71	2.19
Time doing sitting activities after school (mins)	0	2400	188.14	234.94
Time doing sitting activities at weekends (mins)	0	1440	255.31	199.18

	Frequencies of Predictor Variables N=814	Frequency	%Frequency
Number of Servings of fruit ate yesterday (PUF 1 yr recode)	0 Servings	105	13.5
	1 Servings	208	25.6
	2 Servings	263	31.9
	3 Servings	144	17.7
	4 Servings	62	7.5
	5 Or more	32	3.8
Number of times ate fast food during past week (PUF 1 yr recode)	0 Times	187	23.0
	1 Time	264	31.8
	2 Times	168	20.7
	3 Times	109	13.6
	4 Times	37	4.9
	5+ Times	49	6.1
Number of cans of sweet fruit/sport drunk yesterday (PUF 1 yr recode)	0 Cans	544	66.7
	1 Can	177	21.9
	2 Cans	67	8.1
	3+Cans	26	3.3
Number of cans of soda with sugar drunk yesterday (PUF 1 yr recode)	0 Cans	534	65.6
	1 Can	194	23.8
	2 Cans	61	7.3

Table 2 (continued)

	3+ Cans	25	3.3
Race - Census 2000 Définition (PUF 1 YR recode)	Asian	93	11.4
	White	449	55.2
	Other single race	199	24.6
	More than one race	73	8.7
Self-reported gender	Male	437	53.9
	Female	377	46.1
5+fruits/vegs per day	Eat 5 or more servings fruit/vegetables daily	238	29.0
	Eat less than 5 servings fruit/vegetables daily	576	71.0
BMI	Normal weight	503	61.79
	Under weight	32	3.93
	Over weight	148	18.18
	Obese	131	16.09

Bivariable Analysis

There were no significant differences in age, gender, or race between those who talked to their doctor about nutrition and those who did not ($p>0.05$). There was a statistically significant difference in BMI levels between those that talked to their doctor about nutrition than those who did not talk to their doctor about nutrition ($p=0.032$). There were no statistically significant differences between those who talked to their doctor about nutrition and those who did not for the following variables: eats 5+ servings of fruits daily, number of cans of soda drank yesterday, number of cans of sweet fruit and sports drinks drank yesterday, number of times ate fast food in the past week, number of days in a typical week the participant is physically active for

60+minutes and time doing sitting activities after school and during weekends ($p>0.05$; Table 3 below).

Table 3

Demographic characteristics and distribution of independent variables in the study sample, stratified by receipt of nutritional counseling (yes/no) (N = 814)

Characteristic	Talked to Doctor about Nutrition during Last Physical Exam				Total	P-Value*
	Yes (N=558)		No (N=256)			
Age (Median, IQR), years	15 (3)		14 (3)		15 (3)	0.42
Gender						0.81
Male	298	(53.41%)	139	54.30%)	437	
Female	260	(46.59%)	117	45.70%)	377	
Race						0.09
White	299	53.58%)	150	58.59%)	449	
Other	139	24.91%)	60	23.44%)	199	
Asian	61	10.93%)	32	12.50%)	93	
More than one race	59	10.57%)	14	5.47%)	73	
Body Mass Index						0.03
Normal	332	59.50%)	171	66.80%)	503	
Underweight	21	3.76%)	11	4.30%)	32	
Overweight	101	18.10%)	47	18.36%)	148	
Obese	104	18.64%)	27	10.55%)	131	
Eats 5+ Servings of Fruits and Vegetables Daily						0.98
Yes	463	82.97%)	75	29.30%)	538	
No	395	70.79%)	181	70.70%)	576	
Number of cans of soda w/sugar drunk yesterday						0.66
0	171	30.65%)	363	141.80%)	534	
1	63	11.29%)	131	51.17%)	194	
2	16	2.87%)	45	17.58%)	61	
3+	6	1.08%)	19	7.42%)	25	

Table 3 (continued)					
Number of cans of sweet fruit/sport drunk yesterday					0.31
0	182	32.62%)	362	141.41%)	544
1	51	9.14%)	126	49.22%)	177
2	16	2.87%)	51	19.92%)	67
3+	7	1.25%)	19	7.42%)	26
Number of times ate fast food during past week					0.18
0	61	10.93%)	126	49.22%)	187
1	76	13.62%)	188	73.44%)	264
2	55	9.86%)	113	44.14%)	168
3	29	5.20%)	80	31.25%)	109
4	18	3.23%)	19	7.42%)	37
5+	17	3.05%)	32	12.50%)	49
Number of days in a typical week the participant is physically active for 60+ min (Median, IQR)					0.80
Time (min) Doing Sitting Activities (Median, IQR)					
After School	120	(120)	120	(180)	120 (180) 0.14
Weekends	180	(180)	180	(180)	180 (180) 0.28

Note. *Differences between those who talked to doctor about nutrition and those who did not were tested using Independent Samples Mann-Whitney U test for continuous variables or Pearson's chi-squared test for categorical variables.

BMI and Number of Cans Fit as Continuous variables

Table 3 continued

Variable	Unadjusted OR (95% CI)	P(trend)	Adjusted OR (95% CI)	P(trend)
BMI	1.04 (1.01-1.08)	0.0063	1.04 (1.01-1.08)	0.0119
Number of cans of sweet fruit/sports drink	1.20 (0.98-1.46)	0.0764	1.24 (1.01-1.53)	0.0453

Multivariable Analysis

Results from multiple regression analysis showed that there was a statistically significant difference between receipt of nutritional counseling and BMI category ($p=0.01$) and number of cans of sweet fruit or sports drink drank the previous day ($p=0.04$). There were no significant differences in the number of times fast food was eaten in relation to nutritional counseling (Table 4).

I performed additional analyses to explore the effect on categorizing the no. of days in a typical week the participant is physically active for 60+ min into above or below median, and splitting the time doing sitting activities after school and during weekends into quartiles in relation to nutrition counseling. Results showed that no significance before and after adjustment for covariates (Table 3). Hypothesis tested for P trend was as follows: Null hypothesis, H_0 : there is no difference in receiving nutritional counseling when BMI increases or drinking more cans of sweet fruit/sport drink or physical activity increases, age, time spent doing sitting activities, cans of soda, cans of sweet fruit/ sports drink and no of times ate fast food. Extended Mantel-Haenszel chi square statistic was calculated to test linear trend of odds ratios. Results showed that number of cans of sweet fruit/ sports drink drank the previous day and BMI were significantly associated with receipt of counseling (Table 4). Furthermore, I conducted analysis with a model that fit BMI and number of cans as continuous variables and results showed a positive linear trend for p values for BMI and number of cans of sweet fruit ($p=0.01$, $p=0.04$) respectively.

Table 4

Results from the Multiple Logistic Regression Testing the Association Between Receipt of Nutritional Counseling and Demographic Variables, Diet, Physical Activity, and Time Spent Sitting (N=814)

Characteristic	Unadjusted OR (95% CI)	Ptrend	Adjusted OR (95% CI)	Ptrend
Age	1.04 (0.95-1.13)		1.06 (0.96-1.16)	
Gender (n counselling. Yes/no)				
Male (yes=298/no=139)	1.00 (ref)		1.00 (ref)	
Female (yes=260/no=117)	1.04 (0.77-1.40)		1.10 (0.80-1.51)	
Race				
White (yes=299/no=150)	1.00 (ref)		1.00 (ref)	
Asian (yes=61/no=32)	0.96 (0.60-1.53)		1.09 (0.67-1.77)	
Other (yes=139/no=60)	1.16 (0.81-1.67)		1.10 (0.75-1.60)	
More than one race (y=59/n=14)	2.11 (1.14-3.91)		2.24 (1.20-4.21)	
Body Mass Index		0.01		0.01
Normal (yes=332/no=171)	1.00 (ref)		1.00 (ref)	
Underweight (y=21/n=11)	0.98 (0.46-2.09)		0.94 (0.43-2.05)	
Overweight (y=101/n=47)	1.11 (0.75-1.64)		1.08 (0.72-1.62)	
Obese (y=104/n=27)	1.98 (1.25-3.15)		1.98 (1.23-3.20)	
Eats 5+ Servings of Fruits and Vegetables Daily				
Yes (y=163/n=75)	1.00 (ref)		1.00 (ref)	
No (y=395/n=181)	1.00 (0.73-1.39)		0.99 (0.71-1.39)	
No of cans of soda w/sugar drunk yesterday		0.33		0.36
0 (y=363/n=171)	1.00 (ref)		1.00 (ref)	
1 (y=131/n=63)	0.98 (0.69-1.39)		0.97 (0.67-1.41)	
2 (y=45/n=16)	1.33 (0.73-2.41)		1.36 (0.72-2.57)	
3+ (y=19/n=6)	1.49 (0.59-3.80)		1.48 (0.55-3.95)	
No. of cans of sweet fruit/sport drink drank yesterday		0.08		0.04
0 (y=362/n=182)	1.00 (ref)		1.00 (ref)	
1 (y=126/n=51)	0.73 (0.30-1.78)		1.24 (0.85-1.82)	
2 (y=51/n=16)	0.91 (0.36-2.30)		1.73 (0.93-3.21)	
3+ (y=19/n=7)	1.17 (0.42-3.30)		1.61 (0.64-4.07)	
No. of times ate fast food during past week		0.42		0.13
0 (y=126/n=61)	1.00 (ref)		1.00 (ref)	
1 (y=188/n=76)	1.10 (0.57-2.13)		1.17 (0.77-1.77)	

2 (y=113/n=55)	1.31 (0.69-2.51)	0.88 (0.55-1.41)
3 (y=80/n=29)	1.09 (0.56-2.14)	1.19 (0.69-2.05)
4 (y=19/n=18)	1.47 (0.71-3.03)	0.42 (0.20-0.89)
5+ (y=32/n=17)	0.56 (0.23-1.34)	0.73 (0.36-1.50)
No. of days in a typical week the participant is physically active for 60+ min	1.01 (0.95-1.09)	1.02 (0.95-1.10)
Time (min) Doing Sitting Activities		
After School	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Weekends	1.00 (0.99-1.00)	1.0 (0.99-1.00)

Note * Extended Mantel-Haenszel Chi square static was calculated to test linear trend of Odds Ratios. (Ref) is the reference group or category used.

Evaluation of statistical assumptions

Analysis was done using histograms for the continuous data and expected counts for cells. The histograms revealed some variables with distribution curves that were deviating from normal and violating the Mann-Whitney test. For these variables, descriptive statistics were done using medians and interquartile ranges (IQR). They were then categorized e.g. age median was 15 years, so it was categorized 12–14 years and 15–17 years. The number of days in a typical week when the participant was physically active for 60+ min, and time spent doing sitting activities after school and during weekends were divided into quartiles.

Report of Findings by Research Questions

Multiple regression analysis was employed to test whether each independent variable was a statistically significant predictor of observing the outcome. A logistic regression model was run with the outcome and with each independent variable individually to estimate unadjusted odds ratios (ORs), and a multiple logistic regression model with the outcome and all independent variables was used to estimate adjusted ORs (Table 5). Results were as follows:

RQ1: What is the association between demographics - age, race, gender and nutritional counseling? After adjusting for all other covariates, age and gender were not predictors of nutritional counseling while 'More than one race' both adjusted and unadjusted was significant predictor and were more likely to discuss nutrition. Unadjusted $OR=2.11$, (95% CI: 1.14, 3.91); Adjusted $OR=2.24$, (95% CI: 1.20, 4.21). The reference group was Whites. I rejected the null hypothesis for the association between demographics and receipt of nutritional counseling.

RQ2: What is the association between BMI and nutritional counseling?

In the 4 levels of BMI with healthy or normal weight as reference, obese adolescents were almost twice as likely to receive counseling as those who were of normal weight. Unadjusted $OR = 1.98$, (95% CI: 1.25, 3.15); adjusted $OR=1.98$, (95% CI: 1.23, 3.20). In addition, there was a statistically significant trend of increasing odds of outcome with obese BMI categories ($p=0.01$), after adjusting for all other covariates. BMI levels used were underweight, normal/healthy, overweight and obese levels. I also fit BMI as a continuous variable and found a linear association ($p=0.01$): Unadjusted $OR=1.04$, (95% CI 1.01-1.08); adjusted $OR = 1.04$ ($p=0.01$), (95% CI: 1.01-1.08, $p=0.01$);

I rejected the null hypothesis for the association between BMI and receipt of nutritional counseling, there is a strong association.

RQ3: Healthy and unhealthy foods

There were no significant differences in odds of outcome between those that ate healthy (ate 5+ servings of fruit and vegetables) and those that ate less than 5 serving of fruits and vegetables, after adjusting for all other covariates Unadjusted $OR = 1.00$, (95% CI: 0.73, 1.39);

adjusted $OR=0.99$, (95% CI: 0.71, 1.39). I did not reject the null hypothesis for the association between number of fruits and vegetables consumed and receipt of nutrition counseling.

For unhealthy eating habits, there was no significant association between the number of cans of soda with sugar drank yesterday and receipt of nutritional counseling ($p=0.36$), after adjusting for all other covariates.

Stratum-specific ORs for the relationship between number of cans of sweet fruit or sports drinks drank in the previous day and the outcome were non-significant. However, there was a statistically significant trend of increasing odds of receipt of nutritional counseling with increasing number of cans drank yesterday ($p=0.04$), after adjusting for all other covariates. Furthermore, number of cans of sweet fruit/sports drink was tested as continuous variable and results were statistically with outcome Unadjusted $OR=1.20$, (95% CI: 0.98, 1.46, $p=0.08$); adjusted $OR = 1.24$, (95% CI: 1.01, 1.53, $p=0.04$).

Lastly, there was no association between receipt of nutritional counseling and number of times the participant ate fast food during the past week ($p=0.13$), after adjusting for all covariates. I reject the null hypothesis for the association between unhealthy foods and nutritional counseling since there is an association between cans drank yesterday and nutritional counseling.

RQ4: Physical activity and Sedentarism

No significant associations were seen between receipt of nutritional counseling and number of days in a typical week spent doing physical activity for 60+ mins. Unadjusted $OR = 1.01$, (95% CI:0.95, 1.09); adjusted $OR=1.02$, (95% CI: 0.95, 1.10) and sedentary activities (sitting time) after school Unadjusted $OR = 1.00$, (95% C1:1.00, 1.00); adjusted $OR=1.00$, (95% CI: 1.00,

1.00) or on weekends Unadjusted $OR = 1.00$, (95% CI: 0.99, 1.00); adjusted $OR=1.00$, (95% CI: 0.99, 1.00), after adjusting for all other covariates. I did not reject the null hypothesis for the association between physical activity and receipt of nutritional counseling.

Post Hoc Analysis

Hosmer & Lemeshow goodness of fit test was done to evaluate the model fit. There was no significant deviation from model fit ($p=0.073$). Variables included were; age, gender, race, BMI, number of cans of soda with sugar, cans of sweet fruit, number of times ate fast food, number of servings of fruits and vegetables, number of days typical week teen was physically active, time spent doing sitting activities and number of times consumed 5+ fruits and vegetables.

Additional analyses were performed by categorizing the continuous variables (age into above/below median, physical activity and sedentarism variables into quartiles), but the associations between these and the outcome were also non-significant after adjusting for all other covariates (Table 4).

Summary

After adjusting for all the covariates (age, gender, race, diet type and exercise levels), BMI was statistically significantly associated with 'receipt of nutritional counseling.' Those adolescents that were obese were almost twice as likely as those with normal weight BMI to receive counseling. There were no significant associations between the outcome and fruit and vegetable consumption, number of cans of soda, or number of times teens ate fast food in the past week, after adjusting for all other covariates namely age, gender, race, BMI, no. of days in a

typical week the participant is physically active for 60+ minutes, and time doing sitting activities after school and during weekends.

In the adolescent population in California, those with more than one race were more likely than whites to talk to a doctor about nutrition. California is a very diverse state. Perhaps being of mixed ethnicities could predispose you to more diseases than being one race and hence may have caused more likelihood of counseling than those who are White. In a study by Investigacion de Desarallo, researchers analyzed study participants DNA and found that genetic variations in mixed race populations predisposed them for a greater prevalence for metabolic syndrome (Investigacion de Desarrollo, 2013).

Those with increased BMI were more likely to talk to their doctor, particularly obese adolescents (independent of their diet, physical activity, age, gender and race). BMI was the strongest predictor of nutritional counseling. From a dietary perspective, only number of cans of sweet fruit/ sports drinks was significantly associated with outcome: other covariates were not. For this population, there was no relationship between physical activity and nutritional counseling.

Results from the study will be used to make recommendations for future interventions for adolescents in middle and high school. There are multiple levels that affect obesity such as community including school, parents, siblings, environment including advertising and marketing. The results of this study could lead to positive social change in this population.

Section 4: Applications to Professional Practice and Implications for Social Change

Introduction

The purpose of the study was to explore the association between selected demographics (age, gender, and race), diet, physical activity and mental health in relation to receipt of nutritional counseling (DV) in adolescent population. I investigated which youth were more likely to receive counseling based on selected independent variables. It was important to ascertain whether counseling was improving or declining and which of the selected predictors were significant for adolescents receiving counseling in this age group. I conducted a retrospective correlational study on 12–17 year old's analyzed predictors of nutritional counseling by their physicians at their annual physical exam.

In the adolescent population studied in California, those with 'more than one race' were more likely than Whites to talk to a doctor about nutrition. It is unclear whether the youth or doctor brought up the topic. Those with higher BMI were more likely to receive dietary advice, particularly obese youth ($\text{BMI, kg/m}^2 \geq 95\text{th percentile}$) independent of their diet, physical activity, age, gender and race.

BMI was the strongest predictor for receiving nutritional counseling. From the variables related to diet (fast food, sugary drinks, fruits, and vegetables), 'only number of cans of sweet fruit/ sports drinks' was significantly associated with outcome; other covariates were not. In this study, I found no relationship between physical activity and nutritional counseling.

Interpretation of Findings relating to Theory/Concept

Although it is generally agreed by professionals in healthcare that physicians need to discuss obesity with their adolescent patients, the current study showed that that is not happening

100% of the time. (Wolstein, Babey, & Diamant, 2015). This observation aligns with other research in the literature review that suggests that dietary counseling is not happening all the time. Research also suggests that diets higher in fruits and vegetables are healthier while those higher in fast food and sugary drinks are less healthy (Wolstein, Babey, & Diamant, 2015). This study however, showed no significant differences in counseling by physicians on the variables related to dietary aspects except for the number of cans of sweet fruit or sports drinks, which was found to be a significant predictor of nutritional counseling. BMI was found to be the strongest predictor of counseling; however, this was only the case for obese individuals when compared with normal, underweight or overweight BMI category levels. Using constructs from the social cognitive theory (SCT), I can hypothesize that parents provide modelling for their children and that is one way they could learn. It is important for parents to model and involve the children in healthy lifestyle practices. Teachers and schools could provide modeling by encouraging activity during recess and offering opportunities for physical activity within the curriculum. Schools have provided modeling for reducing sugary drinks by removing soda vending machines from schools and instructing parents not to send kids to school with juice and soda (Bandura, 1998; Bandura, 1998).

I can also hypothesize that physicians may provide modelling for their staff and peers by appropriately diagnosing obesity and providing the necessary dietary counseling or referrals. If other physicians and staff saw successful behavior, per SCT they could complete the same behavior successfully through observational learning. The Social cognitive theory has been used in many nutrition educational programs to promote healthy eating and physical activity in youth. (Rolling & Hong, 2016). Documentation suggests there are multiple factors including behavioral,

cognitive, and environmental factors that can influence children's eating behaviors. (Rolling & Hong, 2016). SCT can help researchers understand those factors that play key roles in influencing healthier behaviors, increasing nutrition knowledge, and making healthier choices (Rolling & Hong, 2016). For my study, SCT could help to understand how to better prepare physicians in promoting healthy habits in adolescents.

Limitations

The variables relating to fast food, soda, and sugary drinks were all responses from one 24-hour dietary recall. This method relied on the accurate memory of intake and the reliability of the person who was responding to avoid under or misreporting and the ability to estimate portion sizes. Recall bias can negatively affect study validity. The interviewer can use prompts to assist participants and, in this study, interviewers were trained to use prompts and clarified the meaning of the portions during interview. However, the main limitation was that consumption for a single day is rarely a good representation of a person's daily intake. This could impact the findings by underreporting caloric intake.

Strengths of the food recall include: low respondent burden, can be done via phone and is suitable for large scale surveys. Weaknesses of this method include portion size estimation, relying heavily on memory, a single observation may not be representative of diet, bias in recording good or bad foods. Multiple pass dietary recall method was designed in the United States in surveys such as NHANES. It may be more accurate since it assesses 24-hour recall over 3–5 days compared to a single 24-hour food recall. Food frequency questionnaires and household food surveys all have their limitations (CDC, food.gov.uk). Adolescents tend to underreport dietary intake like adults, with large biases (Forrestal, 2010). Results from dietary intake can

affect internal validity. It is also possible that some of the predictors of counseling such as diet and physical activity could be mediated through BMI.

Temporality is the timing of information about cause and effect. It refers to the exposure of the possible cause prior to the occurrence of the disease. In this study, the information was gathered at the time of the annual physical. It is not clear whether the information was gathered by survey staff from that one visit. In this case, it is unclear if the outcome (nutritional counseling) happened before or after the risk factor obesity. The study was cross-sectional; therefore, I could not determine cause and effect.

Other limitations of the study include: no data on the quality, intensity, standardization or differences in the counseling, cultural relevance, evidence based, and parent's education and income level. Physicians were not categorized as pediatricians or family physicians, but this study did not analyze physician characteristics. In the case of the counseling outcome variable, it is unclear whether the doctor or the patient brought up the subject of nutrition (UCLA Center for Health Policy Research, 2017).

For the scope of this study, there were multiple factors. There were factors that pertained to genetics, environment, food quality, food availability, geographic location, physician characteristics, teen characteristics, engagement, quality and length of counseling, type of insurance, built or natural environment and the list goes on. I was able to study only a few of these factors.

Sample size and population were predetermined since I analyzed secondary data. Based on power calculations, sample size was adequate for power. However, it is unclear if the sample is representative of California high school population. This can limit generalizability.

Recommendations

Based on my findings, I recommend that professionals in primary care practice such as physicians, dietitians, health educators and nurses provide counseling for all overweight and obese youth. Furthermore, normal weight youth would benefit from counseling and reinforcement of healthy behaviors, as well as coaching on unhealthy behaviors to prevent them from becoming overweight or obese. It is well documented that advancing age is associated with decreases in lean body mass and increase in body fat as well as other changes in body composition (Evans & Cur-Campbell, 1997).

Interventions that train physicians in correctly diagnosing obesity and discussing it comfortably with their patients would be beneficial. Other factors that predict counseling should include mental health attributes, type, quality, appropriateness and effectiveness of counseling, insurance, and drug and alcohol abuse, willingness of adolescent to discuss weight. I recommend a controlled study that looks at nutritional counseling and BMI and other health outcomes and wellbeing of adolescents in relation to these factors. Exploring physician characteristics as well as the adolescent's attitudes and barriers, would be informative. There are very about 10 randomized control trials in this area of study, I recommend more well designed randomized controlled trials to further understand adolescent's health issues and how lifestyle habits change during this period of 12-17 years.

Additionally, I planned to explore the mental health aspect and childhood obesity. There is a gap between mental health and nutrition and in teens particularly body health image issues related to weight. I wanted to explore if there was an association between those kids that had mental health issues and receipt of dietary counseling. Additionally, kids who are under or

overweight may suffer from body image issues. In their article published by the American Counseling association, Myroie a clinical professor in the Department of Counseling and special populations at Lamar university and Whitaker, the program director for the clinical mental health and school counseling at the university of Houston (Myroie & Whitaker, 2018). The authors stated that there is a gap in information on how to promote wellness and nutrition with regard to social and emotional health. They discussed portion sizes and the cultural shift encouraging body type acceptance. They went on to say that school counselors should intervene in the schools, but they are missing the connection between the brain, nutrition, body image issues and children's wellbeing. They recommended an exploration of the disconnect between childhood obesity, nutrition and mental health and that a good place to focus on was at the schools, since children spend majority of their time there. They wrote about the role of parental and caregiver support in the after-school hours. They further stated that education of school counselors and advocacy for changes in school nutrition is important in this fight. Furthermore, obesity is a difficult topic for schools to discuss (Myroie & Whitaker, 2018).

Implications for Professional Practice and Social Change

Childhood obesity problems are extremely important since they have consequences in both childhood and adulthood. BMI was found to be the strongest multivariable predictor of dietary counseling. However, there were missed opportunities with prevention in counseling youth in general, since about a third (26.5%) of the study population with overweight and obese BMI was not counselled. Underweight teens could benefit from dietary advice to facilitate meaningful healthy weight gain. Overweight, obese and underweight teens may have psychological consequences stemming from body image issues. Although I was not able to

analyze mental health variable, due to data access constraints, further research is warranted in this area. Mental health, nutrition and the brain have a connection which is often overlooked (Myroie & Whitaker, 2018).

Implications for professional practice indicate that there is still a great deal of work to be done in physician training and educating our youth, to move the needle further. There are huge costs associated with not addressing the issue of diagnosing and counseling obesity. As public health professionals, we should do more in advocacy and policy change. Further studies need to be done to assess school counselors and doctor training in adolescent counseling proficiency and cultural competency.

With results from this study, not providing counseling to all obese and overweight youth is not helpful in the fight against obesity. As expected, BMI was an important predictor for physicians in counseling their adolescent patients. It is puzzling why a discussion would not happen between doctor and patient when this is the time to make an impact on lifestyle and healthy choices. The data on physical activity was consistent with current literature. Adolescents are not getting the recommended 60 mins a day of activity (Oreskovic et al., 2016). There is not much data on fast food and nutrition counseling in this population. In a study done in India, the authors looked at the effect of nutrition counseling on junk food consumption in adolescent girls (Singla & Sachdeva, 2012). They concluded that with increased intake of junk foods, inadequate intake of fiber in the diet resulted in increased incidence of obesity. They went on to say that if all the participants were given proper guidance and counseling regarding food choice and lifestyle modifications, this could help in maintaining weight since nutrition counseling helps in improving eating habits of adolescents (Singla & Sachdeva, 2012).

There is a potential implication for social change to improve pediatric population health by addressing weight issues and increasing diet education earlier and helping them to understand how it affects weight and chronic disease risk. There is literature to suggest that it improves obesity or lipid profiles (Elizondo et al., 2014; Williams & Wilson, 2016). At the individual level, this would lead to improved BMI or maintaining a healthy weight. Families would benefit from healthier habits as they would need to model some of the healthier behaviors. This can positively affect risk of diabetes and cardio vascular disease. At organizational level, design and implementation of appropriate youth targeted interventions and research will help improve counseling rates, quality of counseling and behavior change. At the policy level, regulations to improve diagnosis and counseling of obesity could be put in place. This would contribute to the public health discipline by improving health outcomes of teens since increased BMI leads to psychological and physical consequences (Puhl & Heuer, 2010). Furthermore, it would impact the public health practice by possibly contributing to a reduction in obesity and chronic disease related to increased weight in childhood and later in adulthood. Treating obesity is costly; preventing it is a public health concern requiring screening, education, empowerment and awareness earlier in life.

Conclusion

In the current study, I found that about one quarter of overweight and obese children (26.5%) sampled in Northern California did not report receipt of nutritional counseling as they should. It is undisputed that pediatric obesity is still a major concern. The association between child BMI and receiving dietary counseling by physician confirms the need to target prevention

and intervention programs. Sugary drinks are one of the predictors of dietary counseling. These results may or may not be generalized to other similar populations outside of CA.

There is an opportunity for doctors and other trained healthcare professionals to improve nutrition counseling in overweight and obese kids as a priority and secondly in healthy weight kids for prevention. Due to the complexity of obesity, parents, teachers, educators, community members and society, are all stakeholders in pediatric obesity. Physician training in diagnosing and addressing overweight and obesity, effective adolescent and culturally appropriate counseling techniques and educating children are key factors. To improve pediatric obesity outcomes and prevent childhood and adulthood complications to obesity or overweight, it is important to have these discussions earlier on in life.

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Appendix: Statistical Tests

Statistical Tests

Research Question	Variables	Statistical tests
1. Demographics	Age Gender Race	T-test Chi-Squared test Multivariate logistic regression
2. BMI	Underweight BMI Healthy BMI Overweight BMI Obese BMI	Chi-Squared test Multivariate logistic regression
3. Healthy vs unhealthy foods	Healthy- no of fruits and vegetables consumed Unhealthy- no of times fast food and sugary beverages consumed	Chi-Squared test Multivariate logistic regression
4. Physical activity	No of days physically active > 60 min Sedentary time (sitting time)	T-test Multivariate logistic regression
5. Mental health	Nervousness Hopelessness Depression Worthlessness	Non –parametric Correlation (Spearman rank-order) Bivariate regression non –parametric t-tests (Wilcoxon-Mann-Whitney) Multivariate logistic regression