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Quality of Life, Physical Activity, and Weight Status for a Sample of Online Students

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Walden University

College of Health Sciences

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Walaa Awad

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Walden University
2020

Abstract

Quality of Life, Physical Activity, and Weight Status for a Sample of Online Students

by

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MS, University Of Michigan, 2011

MD, Tanta University, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

in

Health Education and Promotion

Global Health

Walden University

November 2020

Abstract

Obesity has been identified as a global health problem and a risk factor for many chronic diseases. While previous studies discussed the weight status and factors associated with overweight and obesity among adults enrolled in traditional universities, few studies have yet estimated the obesity rate among adults who choose online education. Guided by the social cognitive theory, this descriptive exploratory quantitative study used a survey to collect primary data from adult online students of three higher educational institution. The survey examined the effect of quality of life and physical activity level on weight status of the participants; taking in consideration the effects of age, race, gender, geographic location, employment status, and program of study on the weight status. The results of the binary logistic regression model indicate that quality of life was a statistically significant predictor of weight status (OR = .429, 95% CI = .200 - .921, p = .030), while physical activity level (OR = .807, 95% CI = .354 – 1.843, p = .612) wasn't statistically significant; holding age, gender, race, employment status, and program of study constant in this sample of adult online students. The results of this study could enrich academic research through better understanding of quality of life, physical activity, and weight status of adults in online education. The findings from this study may support positive social change by providing findings that can promote prevention and promotion programs aimed at empowering online students to practice healthy lifestyles based on their gender, age, ethnicity, employment status, and educational level. Such programs may enhance the adoption of healthy lifestyles and positive behavior change targeting adults in online education.

Quality of Life, Physical Activity, and Weight Status for a Sample of Online Students

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Dedication

I dedicate this dissertation to my children, my family, and my friends for their constant support and unconditional love. The unwavering support of those individuals around me was a motivating force to keep me going when I got weary. I am forever grateful for all of them.

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I thank Allah for granting me the power and blessings to successfully completing this degree. I would like to express my sincere gratitude to my Committee Chair, Dr. Jill Nolan, for her continuous support, guidance, motivation, thorough feedback on my writing, and immense knowledge. Thanks Dr. Nolan; your leadership has helped me in all the time of research and in writing of this dissertation. I would like to thank my dissertation committee members: Dr. Carol Spaulding for her insightful comments, detailed recommendations; I am eternally grateful for Dr. Spaulding patience and support as I was trying to address various research challenges. I also want to thank Dr. David Campbell for his guidance and support.

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Chapter 1

Introduction

This study explored quality of life, physical activity, and weight status among a convenience sample of adult online students registered at three higher education institutions (HEI); as a reference, I used the following abbreviations, HEI 1, HEI 2, HEI 3 to code the three institutions; taking in consideration the effects of age, race, gender, geographic location, employment status, and program of study on the weight status of the participants. While previous studies have discussed weight status and the factors associated with overweight and obesity among adults enrolled in traditional universities, few studies have yet explored weight status among adults in online education. Guided by social cognitive theory (SCT), this descriptive exploratory quantitative study used a survey to collect primary data from adult online students. The study analyzed quality of life and physical activity of the participants to better understand the relationships between the variables and the potential effect of the covariates on weight status. The study aimed for bringing positive social change to adults in online education by designing and implementing health education programs that promote the adoption of positive quality of life and promoting physical activities tailored directly to adults in online education.

This chapter will introduce the research study with an overview for the scope of the study. The first segment of the chapter consists of the study background, problem statement, purpose of the study, research questions and hypothesis. The next segment presents Social Cognitive Theory and its application to the study. The following section contains the nature of the study, definitions, variables, assumptions, study scope, and limitations. The last section of this chapter explains the significance of the study in the advancement of health education knowledge and the contribution to positive social change.

Background

Obesity has been linked to hypertension, coronary heart diseases, some forms of cancer, diabetes, and stroke (Centers for Disease Control and Prevention [CDC], 2016; National Center for Chronic Disease Prevention, 2015; Ndumele et al., 2016; Ogden, Carroll, Kit, & Flegal, 2014). The medical expenditures associated with obesity among adults in the United States (U.S.) have been estimated at 147 billion dollars annually (CDC, 2016). The rapid increases in the obesity rate has become a major global health problem, particularly in the United States (Akushevich et al., 2018; Huang et al., 2015). Globally, there are almost 1 billion people with obesity and another 396 million who are overweight (Hu et al., 2017).

While traditional education has been associated with a low risk of obesity (Marmot, 2015), it is unclear whether online education would have the same effect on obesity statistics among adults. This study assessed the quality of life, physical activity, and weight status among a convenience sample of adult online students registered at HEI 1, HEI 2, and HEI 3; taking into consideration the effects of age, race, gender, geographic location, employment status, and program of study on the weight status of the participants.

While many studies have discussed the factors associated with overweight and obesity among students enrolled in traditional universities, few studies have yet estimated the weight status among adults in online education. The study used self-reported height and weight to calculate the Body Mass Index (BMI) of the participants and to assess the weight status among the participants. The study analyzed the reported quality of life and the physical activity of the participants to investigate the significance of online education on weight status. The results of this study explored the quality of life, physical activity level, and weight status of adults in online education. Findings might help health educators to design intervention programs to promote the

adoption of healthy eating habits and physical activity behaviors tailored directly to adults in online education. Prevention of obesity and managing all the negative health consequences associated with high body weight are essential factors for reducing the mortality and morbidity rates related to obesity (Grover et al., 2015). The results from this study could help policymakers and higher educational institutions to develop obesity prevention programs to empower adult online students to practice healthy lifestyles based on their age, race, gender, geographic location, employment status, and program of study; such programs could contribute to the reduction of obesity rates.

Problem Statement

Obesity is a global health problem that threatens the sustainability of healthcare systems worldwide (Ferretti, 2017). According to the Organization of Economic Cooperation and Development (OECD, 2017), there is a steady increase in the global obesity rate, where 47% of the United States (US) population are projected to be obese by 2030. Obesity increases the risk of many chronic diseases, negatively impacts quality of life, increases the cost of the healthcare, and generally adds to the severity of disease seen in the US healthcare system (Centers for Disease Control and Prevention [CDC], 2014).

According to the WHO (2018), the obesity rate has tripled globally since 1975, with more than 1.9 billion (39%) adults around the world (18 years and over) being overweight and more than 600 million (13%) obese. Amiri (2018) defined the association between obesity and Health Related Quality of life (HRQOL) as the individual's subjective evaluation for their overall physical and mental wellbeing. While previous studies have reported an adverse association between obesity and quality of life mainly in the physical domain; Zhang (2019), reported that overweight and obesity were negatively associated with HRQOL, and that there is a need for

targeted interventions conducted mainly for women, to reduce the obesity effects associated with poor HRQOL. According to Sells (2016), despite the evidence that regular physical activity may reduce obesity and its complications, many Americans do not participate in regular physical activity, with an estimated 21%, only, of U.S. adults achieve the recommended physical activity level.

According to the CDC (2016), weight status is affected by educational levels, with higher levels of education associated with lower rates of obesity, with graduate students having optimal Body Mass Index (BMI) compared to undergraduate students. Swanson (2016) stated that the college period is a critical time for obesity and weight gain. In the United States, 89% of the colleges and universities offer online courses, and of those institutions, 58% provide degree programs that are entirely online (Parker, Lenhart & Moore, 2011). Also, Allen & Seaman (2017) stated that registration for online courses in United States significantly increased in 2015, with 29.7% of all students in higher education were taking at least one online education course, representing a 3.9% increase from 2014.

According to Chen, Lambert, & Guidry (2010), the majority of online students are non-traditional learners who are balancing their life and work commitments, and choose to study online for the convenience that online education offers. Also, adult students who choose online education tend to have higher self-efficacy compared to students who choose traditional education (Xie & Huang, 2014), they tend to be more self-determined (Collins, 2014), and have defined future goals (Carr, 2000). Cohen, Rai, Rehkopff, and Abrams (2013) stated that there is a major gap in the literature studying the relationship between online education and weight status.

With the significant rise of online education, it is essential to explore the quality of life, physical activity level, and weight status for adults in online education. Also, considering the

importance of health education programs in targeting the global obesity problem, there is a need to understand the extent of the problem among adults who choose online education. The study provided a statistically significant result for bridging the gap in literature by exploring the predictor effect of quality of life and physical activity on the weight status of adults in online education; considering online educational institutions as channels that may help in delivering obesity prevention programs and promoting positive quality of life. Finally, the results of the research may open the door for future researchers to develop hypotheses for more studies and intervention programs targeting the health outcomes of adult online students

Purpose of the Study

The purpose of this descriptive, exploratory, quantitative study was to 1) explore the weight status among sample of adult online students; based on self-reported body weight and height, 2) describe the relationship between the participants' demographics (age, race, gender, geographic location, employment status, and program of study) and the weight status of the participants, 3) explore the relationship between the Health-Related Quality of Life and the weight status of the participants, and 4) explore the relationship between physical activity level and the weight status/BMI of the participants.

The constructs of the SCT served as a theoretical framework for understanding quality of life, physical activity level, and weight status of the participants. The study used an online survey to collect data from participants who were defined as adults (18 years and older), currently enrolled in an online graduate or undergraduate education program at HEI 1, HEI 2, and HEI 3. The researcher completed the IRB applications for HEI 1and HEI 3, and also completed the Human Subject Review Board (HSRB) for of HEI 2.

This study used an online survey (questionnaire) to collect data from a convenience sample of participants who were identified as adult online students at HEI 1, HEI 2, and HEI 3. The dependent variable for this study was weight status, calculated using self-reported height and weight. The independent (predictor) variables were the health-related quality of life and physical activity levels. The covariate variables were age, race, gender, geographic location, employment status, and program of study.

The statistical analysis that was most appropriate to answer the research question was Binary Logistic Regression. While descriptive research is designed to provide a snapshot of the problem, Binary Logistic Regression is designed to make prediction in the dichotomous outcome variable (Warner, 2013), which allow researchers to determine the odds of membership in the dependent variable based on predictor variables (Warner, 2013). Therefore, the overall significance of using this analysis was to explore the weight status of online students and its relationship with quality of life and physical activity.

Research Question and Hypothesis

In this descriptive exploratory quantitative research, the researcher used binary logistic regression analysis to assess whether the independent variables predict the dependent dichotomous outcome variable (weight Status). The following research question and hypotheses were the guide for this research study:

RQ: Are Health-Related Quality of Life (HRQOL) and physical activity significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students?

H01: Health-Related Quality of Life (HRQOL) and physical activity are not significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students.

Ha1: Health-Related quality of life (HRQOL) and physical activity are significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students.

Theoretical Framework for the Study

The role of theory in research studies is to explain and simplify the underlying principles that explain particular human actions in life (McKenzie et al., 2009). The theoretical framework for this study was Bandura's (1977) Social Cognitive Theory, which evolved from the social learning theory. According to Bandura (1986), SCT is a learning theory that addresses the reciprocal relationship and interaction among individual's characteristics, behaviors, and environment, while emphasizing on the active role of each individual (Bandura, 2001. PP1-26). According to Reisi et al. (2016), individuals are more motivated to engage in positive behaviors if they believe they would benefit from those behaviors. Using the constructs of the SCT to frame this study was helpful in predicting the social origin of the obesity problem among adults who choose online education and might be effective for estimating the influence of the individual experiences (the online education) on obesity. Also, the SCT could be used as a framework for planning health education programs, which engage health educators actively in addressing the obesity prevalence, as the theory considering the person's experiences (online education) and any associated behaviors (quality of life and exercise habits) that may contribute to obesity.

Nature of the Study

The researcher used a quantitative approach to examine the relationship between HRQOL, physical activity levels, and weight status among a convenience sample of adult online students. A quantitative study uses or collects numerical data for analysis using statistical methods (Creswell, 2009). This method was applied because it enabled the identification of all factors that might be contributing to the escalating obesity problem among adults. This study was a descriptive, exploratory, quantitative research that used a survey (questionnaire) to collect data from a convenience sample of participants who identified as undergraduates and graduate online college students at HEI 1, HEI 2, and HEI 3. The choice of the study to be quantitative was to provide a chance to collect data that might be useful for future research and to understand the extent of the obesity problem among the target population.

The survey asked the participants to self-report their height and weight. All metrics were accepted, and the BMI was manually calculated. The BMI calculator of the CDC which includes both English and Metric options for accurate calculation of the BMI was used. Participants were also asked to report some demographics (age, race, gender, geographic location, employment status, and program of study), physical activity levels and their health-related quality of life. The quantitative design used a binary logistic regression to determine whether a statistically significant relationship exists between the dichotomous dependent variable (weight status) and the independent variables (HRQOL, Physical Activity), when accounting for covariates variables (age, race, gender, geographic location, employment status, and program of study). Binary logistic regression was useful for this study because two or more independent variables were used to predict dichotomized dependent variable (weight status). A full clarification on how the variables were dichotomized and the types of analysis used is discussed in detail in chapter three.

Weight status was dichotomized into two categories (BMI <18.5-24.9 {underweight, normal weight}, and BMI> 25{Overweight, obesity}). Unhealthy days were dichotomized to (0) no unhealthy days per month vs. (1) reporting of one or more unhealthy days (1–30) per month. Finally, the physical activity levels were categorized into low level, moderate level, and high level.

Definitions

Terms related to the research were defined as follows:

Body mass index (BMI): A person's weight in kilograms divided by the square of height in meters, it is used as a relative measure for body weight. (CDC, 2015).

College: "An independent higher learning institution leading to a bachelor's degree, by offering a course of general studies" (College, 2015).

Health-related Quality of Life (HRQL): An instrument or scale that encompasses different aspects of overall quality of life that can be clearly affect health—either physical or mental (CDC, 2011).

Health promotion: any combination of previously planned educational, regulatory, or organizational mechanisms that promote health among individuals, groups, or populations (McKenzie et al., 2009, p. 4).

Higher education: Education associated with community college, college, or university courses or programs post-secondary education (Adams & Brynteson, 1995)

IPAQ: The International Physical Activity Questionnaire assessed physical activity associated behaviors for the past week and has been validated for use in adults aged 18-64 in the United States and internationally (Craig, Marshall, Sjostrom, & Bauman, 2003).

Lifestyle: Individuals' habits and behaviors, such as smoking, diet, exercise, and alcohol use (Fahey, Insel, & Roth, 2015).

Obesity: Body weight that is higher than what is considered as a healthy weight for a given height, it is a BMI of 30.0 or higher (CDC, 2017).

Overweight: Body weight that is higher than what is considered as a healthy weight for a given height, with a BMI range from 25.0 to <30.0 (CDC, 2017)).

Physical Activity: any body movement produced by skeletal muscles and requiring energy expenditure. Includes and not limited to walking, cycling, sports and recreation, which can be done at any level of skill and for enjoyment (WHO, 2020).

Assumptions

This study investigated quality of life, physical activity, and weight status of participants who were identified as adult online students. The proposed study provided insight for understanding the role of online education in controlling the obesity prevalence and it may open the door for future researchers to develop hypotheses for more studies and intervention programs targeting adults in online education. According to the research problem and the purpose of the study, the appropriate population was selected and the research question was clearly written. The following were the assumptions for the study:

- BMI is lower in males compared to females in the sample of adult online students. According to the WHO (2019), in 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight, compared to 11% of men and 15% of women were obese. Therefore, assumption for the results of this study that males have healthier weight status compared to females.

- There is a significant relationship between quality of life, physical activity, and weight status among the participants.

Scope and Delimitations

This study investigated quality of life, physical activity, and weight status of the participants who were identified as adult online students. The proposed study may provide vital information for bridging the gap in understanding factors related to obesity prevalence in a sample of online students and may open the door for future researchers to develop hypotheses for more studies and intervention programs targeting adults in online education. Based on the research problem and the purpose of the study, adult students in online education programs were selected. Students in traditional classroom settings were not included in this research. The researcher assumed that the participants provided honest and complete responses to the survey questions.

The purpose of the study was to explore the weight status among adults in online education. The scope of this study was limited to adults, 18 years of age and older, who were identified as online students at HEI 1, HEI 2, and HEI 3. The weight status of the participants was unknown prior to the study, and a convenience sample of the participants recruited to complete the survey for the purpose of this research study, only. The findings of this research study add to the growing body of literature on global obesity rates and the environmental factors contributing to this problem

Limitations

This study used self-reported data from a convenience sample recruited through the Participant Pool of HEI 1 and through invitation letters sent to students enrolled at HEI 2 and HEI 3. While this methodology was appropriate to explore this research question, there were

some limitations. Convenience sampling could lead to a non-representative sample (Frankfort-Nachmias & Nachmias, 2008). While most of these students were taking online classes, it was assumed that they would be capable of reading and responding to an online survey, however questions about weight and height could be sensitive information that may have led to issues with social desirability bias (Ivaz, Griffin, & Duñabeitia, 2019). Additionally, while BMI is commonly used to measure weight status, it is not the most ideal measurement to assess the weight status (Ghosh-Dastidar, 2016)

Internal Validity

Internal validity refers to the factors that may threaten internal validity of experiments including history and selection of subjects (Hagstromer, Oja & Sjostrom, 2005). Since the study was descriptive, exploratory, and non-experimental; there was minimal potential threats to internal validity. Convenience sampling technique used to recruit participants and convenience samples may yield threats because the researcher would have no way for estimating how representative the population is in the sample (Frankfort-Nachmias & Nachmias, 2008). In addition, using online surveys is a significant limitation for quantitative research due to limited response rates and increased risk of biases including selective memory and exaggeration biases. Because cross sectional research studies explore specific variables at specific moment in time, it is difficult to generalize the results to the whole population (Rahman, 2017). The unhealthy days summary measured ranges from 0–30 days, and the study might have lost statistical power by using only two categories to collapse the recorded days. Since participants were self-selected by agreeing to participate, this could be a potential threat to the internal validity. Such problems were addressed by recruiting students from three different higher education institutions, by using statistical techniques to determine if variables were distributed normally and finally by selecting

a sample size large enough to provide the power needed to detect any significant differences among the participants.

External Validity

For this study, the selection of study participants and survey design was controlled by certain criteria; however, participants might have answered the survey questions incorrectly to indicate better weight status or improved levels of physical activity which might in turn influence the data they provided on the survey. Using BMI as a standard to determine obesity has limitations; in fact, self-reported height and weight may have caused systemic bias; while some participants might not know their exact height and weight, others might intentionally misreport to fit the social norms (Ghosh-Dastidar, 2016). My assumption is that the participants were honest in filling out the survey questions. Finally, speaking more than one language could be served as an emotional buffer that might made bilinguals feel uncomfortable when dealing with sensitive and emotional topics (Ivaz, Griffin, & Duñabeitia, 2019). Since, the study administered in English, participants whom English is not the first language might felt uncomfortable sharing their personal information.

Significance

The significance of the study was to build upon the knowledge base for the relationships between quality of life, physical activity levels, and weight status, for adults who choose online education. As available studies provided insufficient data on weight status and obesity among adults in online education, this study was intended to bring out data on the weight status of adults in online education, in relation to quality of life and physical activity level. The study aimed to promote awareness to the growing problem of obesity with the rapid evolution of technology, internet, and online education. The principles of positive social change guide health educators in

planning and applying health promotion programs to assist consumers in self-regulation without compromising their self-knowledge, identities, and interests (Cronin, 2014). Therefore, the results from this study may help policy makers and higher educational institutions develop obesity prevention programs aimed at empowering online students to practice healthy lifestyles based on their gender, age, ethnicity, social status, and educational level. Such programs may enhance the adoption of obesity-reducing lifestyles and consistent positive behavior change targeting adults in online education.

As Positive Social Change (PSC) is defined as the process of positively transforming thoughts, behaviors, institutions, and social structure to generate beneficial outcomes for individuals, communities, societies, and the environment (Stephan & Patterson, 2016); the results from this research study could help explore the health of online students, and identify the at-risk groups within the online education environment. A better understanding of the associated variables in the study and the roles they play to cause obesity may guide the development of interventions that use the results of this study to promote healthy weight status among online adult students. Walden University believes that positive social change occurs when individuals are firmly committed to make a difference and to act for change (PR, 2013). Exploring the relationship between students' weight status and online education could provide a better understanding of the relationship between the available resources, the students' needs, and the possible actions to achieve better health outcomes for all adults who chose online education.

Summary

In Chapter 1, I have discussed the background of the study, the problem statement, the purpose of the research, and nature of the study. Additionally, I have outlined the research question, the significance of the study, and the theoretical framework. With the global increase in

obesity rates especially among adults, there is a lack of understanding the effect of online education on the determinants of health that may cause obesity among adults who choose online education. Understanding the magnitude of the problem of obesity and exploring the obesogenic factors is important in working towards controlling this health problem. Although with this study, the focus is on adults in online education, exploring and understanding the weight status of the study population may add to the public health knowledge for obesity prevention. Positive social change can be achieved in the form of improving the quality of life, and promoting physical activity to reduce the prevalence of obesity. The findings may inform public health professionals and policy makers with a better understanding of how to design programs to enhance positive outcomes for the target population. In addition, the study contributes to the knowledge of obesity, HRQOL, and physical activity among online adult students and provides a better understanding of the existing literature in a different population, time, and location to reduce obesity rates, control chronic disease, and improve the health outcomes of adults.

Chapter 2 provides a comprehensive review of the previous and current peer-reviewed research related to adults' obesity, online education, level of physical activity, and quality of life. Also, the SCT is explored to better understand the motives and the determinants related to activity levels and eating habits among adults. Chapter 3 presents a description of the methods and analysis tools associated with this study. Chapter 4 details the results of the study and chapter 5 discusses those results within the context of the review of literature and makes suggestions for further studies.

Chapter 2

Introduction

The purpose of this chapter is to present a synopsis of the Social Cognitive Theory (SCT), in addition to an extensive literature review. The chapter contains four sections. The first section provides a summary for the strategy used for literature review. The second section describes the SCT and the rationale for using the theory as a foundation for the study. The third section examines previous and current peer-reviewed literature discussed adults' obesity, online education, level of physical activity, and health related quality of life. The fourth section summarizes the correlations between literature sections, identifies gap in the literature, and presents a transition into Chapter 3.

Literature Search Strategy

The search strategy utilized for the literature review was adopted from the Boolean system (Whitesitt, 1961); that uses keywords and phrases to search and obtain data. The literature review involved a search of peer-reviewed articles published in English between 2015 and 2019. However, a few older sources were used, as needed, for their valuable information. All searches were conducted electronically and I expanded the search to date beyond 5 years to access more literature related to the study.

The keywords and phrases used included obesity, global obesity, online education, social change, physical activity, university/college health education, college physical education, HRQOL, IPAQ, and Social Cognitive Theory. I have performed literature searches using four databases which are the online library of Walden University, EBSCO, PubMed, and Google Scholar. In addition, the CDC, Department of Health and Human Services, and the WHO sites were also extensively searched. I have also contacted Dr. Shelley Armstrong from Walden

University to receive a copy from her approved study on the health services provided to online students. Most of the articles collected and used in literature review were in regard to the obesity statistics nationally and globally, the value of health education in promoting better health outcomes among adults in traditional education, the need of increasing physical activity and improving eating habits among adult students. A noticeable gap was observed in regarding the obesity rate among adults who choose online education, this includes statistics on their physical activities, eating habits, and any health education services offered to them.

Theoretical Foundation

Social Cognitive Theory (SCT)

Social cognitive theory (SCT) proposes that individual's behaviors, personal and environmental factors work to impact the behavior outcomes (Boyle et al., 2011). As a result, anticipation of the behavioral outcomes might be achieved by learning, observation, and developing confidence in self- efficacy in order to adjust personal behavior (Boyle et al., 2011). According to Rovniak, Anderson, Winett, & Stephens, (2002), there is a positive relationship exists between the constructs of the SCT and physical activity levels, with self-efficacy showing the strongest correlation with performing physical activity.

Although the number of programs promoting physical activities in higher education has decreased over the last few decades, several college/university-based interventions that do exist are generally based on the SCT (Boyle et. al, 2011). In addition, intervention programs utilizing health educators who may provide a source of social support, has shown to be effective in small groups where the interaction is more evident (Boyle et. al, 2011).

According to Bandura (1998), an individual's beliefs in their ability to regulate their motivation and personal behavior influences plays a critical role in developing and maintaining a

level of personal health. This includes the ability to recognize and execute an action necessary to produce a particular degree of attainment which acts on determinants in regulating personal behavior (Bandura, 1998). According to Bandura (1998), personal efficacy plays a crucial role in determining if a person would even consider changing their health habits, practice motivation, and if they decide to maintain changes that they have achieved. Personal efficacy influences individual's health in two ways, at the most fundamental level is a person's beliefs in their readiness to cope with stressors that regulate health and influence disease; thus, SCT observes stress responses. The second level of self-efficacy is having a feeling of direct control over personal habits related to health and biological aging (Bandura, 1998). Therefore, "the stronger the instilled perceived self-efficacy, the more likely are people to enlist and maintain the effort needed to adopt and sustain health-promoting behavior" (Bandura, 1998, p. 628).

According to Bandura (1998), personal beliefs regarding personal efficacy can be developed by four primary sources of influence: 1) Mastery of the experience by overcoming any obstacles to perform certain action through effort and perseverance; 2) Vicarious experiences produced and shaped by observation of people around us, especially those whom we consider as social and role models; 3) Social persuasion through being influenced by individuals in our lives that can strengthen our beliefs and strengthen the self-capabilities to master certain actions; and 4) Reduction in stress reactions and practicing positive attitudes to strengthen emotions and boost self confidence in any performed skills. While the online education platform could have some relationship or influence with obesity, it could also potentially be used to develop programming to influence personal beliefs about efficacy.

Literature Review Related to Key Variables

Obesity is a Global Health Problem

Obesity is a global health problem that threatens the sustainability of healthcare systems worldwide (Ferretti, 2017). The expectations of the Organization of Economic Cooperation and Development (OECD, 2017) shows a steady increase in the obesity rates, where 47% of the United States population are projected to be obese by 2030. Obesity is a major risk factor for many chronic diseases, such as diabetes, heart disease, stroke and certain cancers. Obesity also has a negative effect on labor market outcomes, in term of both lower wages and difficult employment, particularly for women (Cawley, 2004; Brunello et al., 2006).

Lifestyle including eating habits, frequency of physical exercise, and work style are among the most important causes for the high morbidity and mortality associated with obesity. In the United States (US), approximately two-thirds of the adults over the age of 18 are either categorized as overweight or obese (National Center for Health Statistics, [NCHS], 2013). As Body Mass Index (BMI) increases, the risk of chronic diseases increases (U.S. Department of Health and Human Services, 2013; World Health Organization [WHO], 2013), which negatively impacts quality of life, increases the healthcare costs, and generally adds to the complexity seen in the healthcare system today (Centers for Disease Control and Prevention [CDC], 2014). BMI is analyzed in several ways such as a categorical, continuous, or dichotomous measure.

Obesity increases the risk of chronic diseases; according to statistics from the US Department of Health and Human Services (2013) and the World Health Organization [WHO] (2013), obesity negatively impacts quality of life, increases the cost of the healthcare, and generally adds to the severity of conditions seen in the United States health care system. According to the World Health Organization, obesity has tripled globally since 1975; as of 2016,

there were about 650 million cases of obesity among adults and 41 million cases among children and adolescents aged 5 to 19 years globally (Hales et al., 2017). Unfortunately, this dramatic increase in obesity, caused a profound impairment in the lifestyle of individuals, societies, and negatively impacted the economic productivity.

In high-income developed countries, overweight and obesity rates are more likely to be prevalent among citizens with lower income, low education status, and social class (Conklin, Forouhi, Brunner, & Monsivais, 2014), with minority groups facing different barriers that contribute to their high obesity rates (The State of Obesity, 2014a). Low socioeconomic status is strongly associated with obesity among minority groups, with lower cost foods being less nutritious and have more calories compared to more expensive-healthier foods (The State of Obesity, 2014a). From an income prospective, research has shown that African-American families earn $1 for every $2 earned by White families in the past 30 years (The State of Obesity, 2014a).

According to The State of Obesity (2014a), children in unsafe cities and in neighborhood areas without parks and playgrounds had a 20-45% risk of becoming overweight due to lack of physical activities. In addition, language, culture, family size, and immigration status have significantly impacted the obesity rates within the Hispanic population in particular (The State of Obesity, 2014b). Within the minority groups, African Americans with higher incomes were more likely to be obese, and women with higher incomes were less likely to be obese (CDC, 2016). No significant difference was found in regard to obese men and education level; however, studies have shown that women with college degrees are less likely to be obese than those with lower education (CDC, 2016).

College students face weight management obstacles (Das & Evans, 2014) and some of the challenges include difficulty with self-direction, stress, access to healthy food, and regulation of competing demands (Swanson, 2016). Therefore, college students might benefit from receiving intervention programs directed primarily to increase their awareness about the complications of obesity. Health education strategies in the US are directed to promote a philosophical stance regarding the dimensions of health (physical, emotional, social, spiritual, intellectual, occupational, and environmental) (Hoeger & Hoeger, 2015). Therefore, it is clear that the same obesity related factors, including physical activity levels and eating habits are interrelated when it comes to obesity programming among adult students.

Variables affecting Increasing Obesity Rates

The fundamental cause of global obesity and overweight is the energy imbalance between total calories consumed and calories expended (WHO, 2019). Globally, there has been an increased intake of foods that are high in fat and an increase in physical inactivity due to the sedentary nature of many forms of transportation, work, and increasing urbanization (WHO, 2019). According to Pampel, Krueger, & Denney (2014), socioeconomic status, geographic location, age, education level, and ethnicity are core factors that may increase the risk for obesity.

Although obesity is preventable (WHO, 2019), there are more than 1.9 billion adults aged 18 years and older were overweight in 2016, of these 650 million adults were obese. In addition, in 2016 about 13% of the global adult population (11% of men and 15% of women) were obese, and the worldwide prevalence of obesity nearly tripled between 1975 and 2016 (WHO, 2019). Moreover; in future decades, cases of obesity are likely to increase due to urbanization across the world (Hruby & Hu, 2015). As a result, obesity in the developing world is thus likely to emerge

in the future thus further increasing the numbers of obese individuals worldwide. Since Walden University has an international presence with many students from countries outside the U.S., then conducting this study would be beneficial in understanding the variables affecting the weight status for adults in online education.

Obesity and Age. Age presents a more significant disparity in the rates of obesity among adults. According to data from the NCHS of CDC (2018), in 2015–2016, the prevalence of obesity among adults was 39.8% compared to 18.5% in youth, with middle-aged adults have an obesity rates of (42.8%) compared to (35.7%) in younger adults. From 1999–2000 through 2015–2016, a significant increase in obesity rates was observed in both adults and youth (CDC, 2018). In addition, young adults aged 20 to 39 years recorded obesity rate of 35.7% compared to 42.8% among middle-aged adults aged 40 to 59 years, and 41.0% among adults aged 60 and older (CDC, 2018).

Obesity and Gender. According to the CDC (2017), in the U.S. there are more obese women than obese men, with 40.8% of men aged 40 – 59 are obese compared to 44.7% for women aged 40-59; and 34.8% of men aged 20 – 39 are obese compared to 36.7% of women aged 20 – 39. The previous statistics not only noting that women are more likely to be obese compared to men, but also the obesity rates increase with age, with women being more obese compared to men.

A longitudinal dataset of mean BMI that covers 190 countries from 1980 to 2008, found that economic development, including women's empowerment and urbanization, but not globalization, robustly predicts higher BMI in men and women in both high- and low/middle income countries (Fox, 2019). Therefore, global obesity research should pay closer attention to the local factors that contribute to rising obesity rates internationally (Fox, 2019). In addition,

obese women face a social bias due to their body weight, which can help explain the significant gap between men and women in market place (Sari & Acan, 2018).

The majority of the obesity research has indicated an inconsistent positive association between women and high obesity rates, especially with minority women, while less research has been conducted on men (Hernandez, Reesor & Murillo, 2017). Between 2005 and 2014, there was an increase in the prevalence of obesity among women, but not among men in the U.S. (Robinson, 2015). In addition, women were found to be less active than men, and women with high BMI were the most functionally impaired, regardless of the weight status (Gretebeck, 2017). Because the prevention and control of obesity are important strategies for reducing the mortality and the morbidity rates caused by the associated chronic diseases, it is essential to search continuously, study, and investigate all the factors associated with high weight status among adults. In the US, women, and men don't have a significant difference in obesity prevalence when compared across all the races. However, for most of the regions across the world, women tend to have a higher obesity prevalence compared to men. The discussed factors above are some of the reasons the trends in the world show that more women are obese compared to men in most countries (Kanter & Caballero, 2012). However, it is also important to consider that the trends worldwide show a narrow gap between men and women (Kengn et al., 2013). Obesity is, therefore, a problem that affects both genders. Healthcare providers and health educators need to look for permanent solutions to manage the global obesity rates and its associated health problems.

Even though obesity prevalence is almost similar among men and women, research from George Washington University shows that men are at a higher risk of getting certain obesity related diseases such as heart attack when compared to women (Li et al., 2017). Economically,

obesity costs women twice more than men. Women tend to undertake surgeries to reduce their obesity explaining some of the increasing the cost whereas, men focus on exercising more to reduce their weight further (Li et al., 2017).

In Africa, South African women have a higher obesity prevalence (70%) compared to 39% for men (Kengn et al., 2013). In Kenya, 38.4% of women are obese compared to 17.5% for men. South Africa as a country thus has the highest obesity prevalence in Africa and thus drawing the question as to the reasons more women are obese compared to men in all age groups. Other races within Africa have similar obesity trends as the US due to their similarities in social and economic backgrounds. Obesity is generally caused by increased fat retention in the body which is not expelled. According to research conducted by Binghamton University, women require more nutrients to support their cognitive health and further promote their positive emotional well-being (Li et al., 2017). As a result, their brains tend to channel their energy towards bad eating habits which affect their overall health. Without physical exercise, such bad eating habits can easily cause obesity. In Africa, women from low-income economic backgrounds tend to consume unhealthy foods since they cannot access healthy foods.

The general predisposing factors affect both men and women equally across the world. Even though in some countries, more women tend to be obese than men, it is relevant to consider that the general factors affecting men and women are similar (Kanter & Caballero, 2012). Some of the general factors that lead to obesity in both men and women include genetics, family lifestyle, unhealthy diet, medical complications, and social and economic issues.

Obesity and Race. Race and ethnicity are risk factors associated with obesity not only in US, but also across the globe. A study conducted in California, a state where a large population is obese and of ethnic and racial diversity, showed that obesity prevalence among African

Americans is at 36.1%, among the Latinos is at 33.6%, among the whites is 22.0% and among the Asians is at 9.8% (Wang et al., 2017). Previous studies provided clear evidence for weight status disparity among races, these differences are as discussed below

African Americans. On average, African American households tend to have a lower income. As a result, these households may be unable to access healthy foods. African Americans are thus more likely to consume unhealthy foods which exposes them directly to the risk of obesity in the long run (Lincoln, Abdou, & Lloyd, 2014). On the other side, high-income household-individuals can access healthy foods and at the same time afford to spend time exercising thus reducing the risk of being obese.

The other factor that accelerates the increasing rates of obesity among the African American population is the level of education. On average, the African American community has less access to quality education and thus have less opportunity to learn the primary and most essential concepts of healthy living (Noonan, Velasco-Mondragon & Wagner, 2016). For sure, healthy lifestyles in any society are accelerated by good education among the people, and indeed higher education can result in a better lifestyle for people. Statistics also show that obese African Americans are less likely to be affected by depression and thus are likely to live a happy life (Li et al., 2017). As such, they remain less stressed but likely to be affected by other conditions such as high blood pressure and diabetes.

Hispanic. After the U.S., Mexico has the 2nd highest obesity rate in the world. Latinos in the U.S. are the fastest growing ethnic group in the country. Consequently, there is a significant increase in the number of Latinos every year (Holub et al., 2013). Additionally, more immigrants from Latin America are streaming to the United States in search of a better life. The people from Latin America are, thus, faced with the challenge of poverty and low education standards which

are an accelerating factor towards obesity in the US. The education levels and level of poverty can complicate access to healthy food and health education (Lincoln, Abdou, & Lloyd, 2014).

In U.S., the ethnic community has less access to medical insurance and thus spend very little time visiting doctors (Holub et al., 2013). The adult individuals from this ethnic group visit hospitals only when they feel it is necessary; as a consequence, some of them are unable to know whether they have an issue affecting their bodies or one that can lead to obesity. African Americans and Mexicans are less stressed about their obese bodies and therefore tend to be concerned about other things in their lives reducing obesity-induced depression (Holub et al., 2013).

White. Unlike the other races that seem to be unbothered about their weight, white people find stigma in overweight, and thus they work on every avenue possible to reduce their weight (Hendley et al., 2011). There are therefore fewer cases of obesity among the white Americans compared to blacks and Latinos due to their mentality towards obesity and also their economic status. The white's attitude towards obesity pushes them to work on avenues to keep an ideal body weight. White Americans also have access to better health care and, generally, have a high level of education due to the opportunities available to them (Hendley et al., 2011). Additionally, their economic status allows for healthy living and further visits to better medical facilities where they can monitor their bodies and conditions. The white population thus has an advantage in comparison to the blacks and Latinos due to their social and economic status.

Asians. Asians are always considered as a healthy population due to their long-life expectancy. In the United States, Asian Americans are generally less obese than any other race due to their lifestyle and also genetics. Asian Americans are usually thinner and thus many people can consider them as not obese (Dahl, 2013). However, statistics show that they suffer

from obese related complications more easily than other races. For the Asian race, body fat is more likely to be packed in between organs that putting individuals are more risk of conditions such as heart disease.

Findings from the National Health and Nutrition Examination Survey show that the rates of obesity among Asian Americans are continuously increasing thus positing a health risk among the population. Additionally, the population is facing economic challenges and health challenges due to the language barrier and their low accessibility to good healthcare (Dahl, 2013). Therefore, it is important for Asian Americans to continuously check their health status for understanding the effects of obesity in their bodies. The Asian population in the US is growing, and there is a need to stay alert on their health issues and the rising cases of complications that might arise from their bodies due to increased accumulation of fats.

Obesity and Educational Status.

Economists have found evidence on how education impacts economic growth. It has been shown that education has a significant impact and influence on health and wellbeing. There is strong evidence of the relationship between education and obesity. It is believed that those people that spend more time in school are less likely to drink a lot, smoke or to be overweight. They are also less likely to use illegal drugs. Furthermore, those people that are educated are likely to receive preventive care like vaccines, flu shots, colonoscopies, mammograms and pap smears (Cohen, Rehkopf & Abrams, 2013). Those affected most by inequalities in the society are the women and individuals that are poorly educated and disadvantaged to socioeconomic status. Evidence on individual labor market according to research carried out shows how education plays a vital role.

Many scholars have found that those that are learned and have more education are less likely to have health-related problems. The reason why educated people are less likely to be affected is that they have enough knowledge on how to handle most things. It is the reason why developing countries are the most affected with the global obesity problem (Brunello, Fabbrim & Fort, 2016). Individuals in developing countries as in Africa do not have comprehensive educational systems. Obesity cases have been reported to be on the rise in these countries. The educational systems help in addressing the obesity issues in developing and developed countries (Sassi, Devaux, Church, Cecchini & Borgonovi, 2009).

Obesity and Employment status. When comparing the obesity prevalence of U.S. adults to other countries, adults in US has the highest obesity rates among the industrialized/developed countries (33.9%), and ranking the ninth among developing countries (Ng et al., 2014). The rise of obesity across the world has affected economic productivity in many different ways. There were statistically significant associations between overweight or obesity and lower job qualities, particularly among women. Additionally, underweight women were 1.57 times more likely to have a stable job compared to normal-weight women (Lee, 2019). Individuals with obesity are seen to be less productive thus affecting their work status; therefore, the health condition has become both an economic and health burden to the country (Hammond & Levine, 2010). Furthermore, obesity in workplaces has increased among the men compared to the number of women (Kivimäki et al., 2015).

Obesity has profoundly affected the productivity of many firms around the globe because it has affected both employees and their employers. Unfortunately, obese workers may have to have longer sick leaves compared to a healthy individual who reduces the maximization of the scarce resources available to the organization. The sick leave at times could be as a result of

injuries from their working stations which gives them an employee's compensation (Tse et al., 2018). However, the compensation required for these individuals will be high and comes from the organization. Hence, there will be a delayed return to work because it takes time for this group of people to fully recover from these injuries. The cost burden for the organization is a source for the organization to experience reduced productivity.

Obesity decreases the probability of employment and negatively affect wages for both men and women; while it has a more pronounced impact for women (Sari & Acan, 2018). According to Sari & Acan (2018), A small number of studies focused on the effect of obesity on employment/unemployment. Because very little research has been done on the influence of student employment on health status, this research study may help understand the relationship between the employment status and the quality of life, physical activity, and weight status in the sample of adult online students.

Health of College/University Students

Healthy People 2020 has described higher education as an ideal environment where adults should be targeted for physical activity promotion (U.S. Department of Health and Human Services, 2015, Pauline, 2015). However, College students consistently experiencing food insecurity at a higher rate than in the general US population (Goldrick-Rab et al., 2017). Risk factors for food insecurity among college students varies. For example, Hispanic and Black adult students are at increased risk of food insecurity compared to White students (Bruening et al., 2016), and Students from low-income backgrounds are at increased risk for food insecurity in college (Martinez et al., 2018). In fact, adult students who experience food insecurity may lack access to the available resources, and have feelings of shame and isolation (Watson et al., 2017).

Despite evidence of food insecurity among college students, a few studies have examined the effect of food insecurity on mental health and academic performance of the students (Bruening et al., 2016). In 2015, the National College Health Assessment report sponsored by the American College Health Association reported that 14% of students had been diagnosed or treated or diagnosed with depression in the last 12 months, which impacted their academic performance. Colleges and universities in the United States continuously work to cope with the high levels of psychological distress among students (including financial stress, the increasing technology dependence, lifestyle changes, and independence in decision making); because understanding the nature of these health problems is of great importance to health professionals (Boehm, 2016).

According to Tam (2017), College is an environment where young adults will experience overconsumption of the readily available energy-dense meals. The academic pressures may lead to increases the time of studying and the use of computers which will devalue exercise and sport participation (Strong, Serena, Anderson, Winett & Davy, 2008). In addition, snacks that are available for adult students contain less nutrients and more abundance of refined sugar and fat (Tam, 2017). Therefore, nutrition education is a key factor that should be required for college students in order to guide them towards a high-quality life (Tam, 2017).

According to the U.S. Department of Education's National Center for Education Statistics (2017b), in 2016, 64% of individuals enrolled in higher education programs identified as White, compared to 14% identified as Black, 10% identified as Hispanic, and 8% identified as Asian. According to data from the U.S. Census Bureau (2019), there is a racial gap in higher educational attainments in the U.S, with 66.2% of non-Hispanic White students over the age of 25 have some college experience compared to 55.2% for black. In addition, more than 14.6% of

adult non-Hispanic Whites hold an advanced degree compared to 8.9% of adult black, and 2.3% of non-Hispanic Whites adults hold a doctoral degree compare to 1.2% of black holding doctorate degree. Also, literature has shown that obesity varies significantly among different racial and ethnic groups, with the Black non-Hispanic have the highest age-adjusted rates of obesity with 48.1%, followed by the Hispanics with 42.5% (CDC, 2016). In addition, White non-Hispanic have a lower percentage of 34.5%, and Asian non-Hispanic at 11.7% (CDC, 2016). It was proven that these differences depend on genetics, cultural, and lifestyle differences between different race and ethnic groups. This research study may help understand the relationship between race and the quality of life, physical activity, and weight status in the sample of adults in online education.

According to the Education at a glance report of the Organization for Economic Co-operation and Development (OECD) (2019), the percentage of U.S. adults aged 25- to 34-year with an associate's or bachelor's degree increased by 8% between 2008 and 2018, reaching to 49%, compared to the global OECD average of 44%. The report also noted that the percentage of U.S. students completing a bachelor's degree within 4 years was 38% in 2018, which is the same as the average among the OECD countries of 39%. In addition, while a higher percentage of U.S. young adults had completed a bachelor's degree compared with young adults in other OECD countries, a lower percentage had completed a master's or doctoral degree; with 11% of 25- to 34-year-olds in the U.S. had completed a master's or doctoral degree, compared to an average of 15% globally (OCED, 2019). This research study may help understand the relationship between the age and the quality of life, physical activity, and weight status in the sample of adults in online education.

Online Education

The transformations of higher education to e-learning settings is becoming more prevalent at the undergraduate and graduate level (Allen & Seaman, 2016). Data from the Online College Student survey has shown a steady increase in the rates of online enrollment by about 1% yearly since 2012 (Clinefelter & Aslanian, 2016). According to the National Student Clearinghouse Research Center (2015), of the 18.6 million students who were enrolled in higher education courses, 5.5 million chose to take courses that were online. According to Sari & Aydin (2014), the most significant problem for using the internet is the immobility and spending less energy, which puts the internet users in a vicious cycle of weight gain and further lack of mobility. It is impressive how advancement in technology is making it possible to acquire the desired training or education on the time you determine and at your convenience. Online education is gaining popularity in today's world (Kentnor, 2015). It is a flexible form of the education system that incorporates any learning that takes place through the internet. According to Projections of Education in Statistics in 2012, 7.1 million students in higher education institutions were enrolled in at least one online course, which is a 343.75% increase compared to only 1.6 million in 2002 (Allen & Seaman, 2014).

The evolution of online learning has been ongoing over the past two to three decades. It has resulted in a more erudite, readily obtainable and a well-accepted means of providing quality education (Bazylak & Weiss, 2017). The National Technological University launched the first online degree program in 1985. Since then, advancement in online training goes hand in hand with great improvements in technology. According to Kentnor (2015), the global recognition of online education is as a result of the worldwide presence of the internet. Through audio and video-based lectures, students can listen to lecturers, submit assignments and take part in

assessment tests. Despite most schools offering specific programs via the internet, some are operating fully online with no physical location.

According to Reiber (2017), the main reason for this progression in online education or as it is called virtual education or e-learning is the cumulative demand of internet operators for educational amenities. Higher education-institutions are now competing in the online setting to introduce new techniques of providing stress-free access to all forms of education via the internet. In addition, research indicates that over 75% of academic leaders believe online learning is superior to learning in a lecture hall (Kentnor, 2015).

The main benefit of online learning is its affordability (Arkorful & Abaidoo, 2015). The desire to save money has a significant impact on both the young and old in society in terms of choosing the most affordable and available way for education. One of the prime concerns for learners is the cost linked with going to campus and attaining a degree. A lot of money is spent on colleges and universities all in the name of education (Aithal, 2016). Other than tuition fees, students spend large amounts of cash on rents, paying expensive water bills, electricity bills and transport. It does not include the cost of textbooks and other materials related to the course. According to Aithal (2016), online learning has less expenditure to incur and all one needs is a device to connect to the internet. Additionally, students do not have to incur extra costs of living expenses at the college or commuting to campus.

Balancing work and higher education is very possible through online education; in fact, the flexibility of online courses enables full-time personnel to study desired courses to completion (Li & Lee, 2016). Online education system offers the learners sovereignty to move at their pace which illuminates why more people are registering in online courses than ever before.

The fact that everything seems to change with technology proves that education is heading on the same route.

Online schooling is the most suitable option for numerous individuals across the globe and for this reason the future of online learning is developing exponentially. Both private and public institutes are keeping up with technology to stay ahead of the curve of online education. Self-discipline is the key to succeeding in online education (Ugnich et al., 2019). Online schools call for an advanced level of individuality compared to traditional institutes. Arkorful & Abaidoo (2015) suggest that self-motivation is critical in online courses; it requires undertaking the requirements without directives from anyone. Regularly checking the class portal, reading course material needed, handling assignments and meeting all deadlines are amongst the key responsibilities.

According to recent research, most of online learners feel optimistic about the courses they pursue with only some scarce limitations (Ugnich et al., 2019), with three-quarters of online campus students' sign up to online courses for career-focused motives. In addition, research shows more students will access affordable, high-quality education from any location globally in the next five years (Kentnor, 2015). Today's domain is fast-paced where people's time is juggling between jobs, families, lifestyles, and education. Therefore, the prospect of online institutes is not only electrifying but essential.

Health Related Quality of Life

Health-Related Quality of Life (HRQOL) is defined as those aspects of overall quality of life that are shown to affect individual's health, including mental and physical health perceptions (CDC, 2016). Therefore, quality of life varies between individuals and depends mostly on personal knowledge, experience, and different situations that this person has been through in life.

It is always helpful to measure adults' self-experience with the clinical and objective measures of health (Office of Disease Prevention and Health Promotion [ODPHP], 2017). Health-related quality of life (HRQOL) is a multidimensional concept that stresses the effect of current health status on quality of life. According to Ferrans et al. (2005), HRQOL is used interchangeably with the term quality of life within research. In addition, HRQOL describes the effects of health, disease, and treatment on overall quality of life (Ferrans et al., 2005). However, later research has expanded their view of the concept of HRQOL to include the impact of self-health on the functional level, psychological status, and overall well-being of an individual (Huget, Kaplan, & Feeny, 2008; Jakobsoon & Hallberg, 2006; Kaplan, 2003).

Obesity is a risk factor for diminished HRQOL (Limbers, 2018). Findings from a college-based study revealed that young adults, aged 18-35, are gaining weight faster than their parents, with an average of 30 lbs of weight gain during this phase of their life (Nanney et al., 2015). Besides, previous research stated that there is increased body mass index (BMI) during college years with average gains of 2.3 kg (5.07 lbs.) in freshman year (Anderson, Shapiro, & Lundgren, 2003). In US overweight/obesity are negatively associated with unhealthy days, and activity limitation days (Huynh, 2018); with two of the four goals for Healthy People 2020 are directly related to quality of life: 1) attain high quality and 2) promote quality of life. Therefore, by continuously tracking population's HRQOL, we can monitor the nation's progress toward meeting these goals (CDC, 2018). According to the American College Health Association [ACHA], 2010), higher education has been identified as a critical stage of establishing healthy behaviors, although declining physical activity. In addition, previous studies have reported an inverse relationship between HRQOL and BMI (Kruger, Bowles, Jones, Ainsworth, & Kohl,

2007), with obesity has consistently been associated with higher body dissatisfaction within HRQOL measures (Breslin, Lalonde, & Bain, 2012).

These constructs of HRQOL enables health organizations to discuss broader areas of public health policy in collaboration with social service institutions, community organizations, and business groups (CDC, 2018). The Health-Related Quality of Life (HRQOL) program is part of the CDC initiatives to promote general population health and to provide support to well-being assessment at both the communities and states levels. The primary responsibility of the HRQOL program is to carry out surveillance and dissemination of HRQOL outcomes in the US using surveys (CDC, 2018). There have been many instruments developed over the years to measure health related quality of life (HRQOL), with the CDC's HRQOL-4 measures have been used the most in literature (Clifford, 2013). The CDC-HRQOL-4 consisted of four measures derived from the original version of the Medical Outcomes Study 36-item short-from survey (SF-36) instrument (CDC, 2018) and have been validated in both healthy and disabled populations with acceptable criterion validity and reliability comparable with SF-36 (Clifford, 2013).

Physical Activity

While physical activity has been shown to reduce health-risks associated with obesity (Dankel, 2016), physical inactivity and obesity are separately associated with adverse HRQOL (Herman, 2012). Research continuously supports the concept that regular physical activity provides an abundance of health benefits and combatting many diseases (Colman & Dave, 2013). Also, physically active individuals report feeling both physically and psychologically better compared to individuals who are not physically active (Colman & Dave, 2013).

A study by Leung, Ransdell, Gao, Shimon, Lucas, and Chung (2016) reported that college students who recorded “good or excellent perception of their health” were 2.19 times

more to meet the moderate-vigorous physical activity (MVPA) recommendations compared to those who reported "poor health." Furthermore, Davilla et al. (2014), confirmed that there is an established connection between obesity among college students and their life satisfaction. Also, it was found that young adults aged 18-24 had less life satisfaction than older adults, with 6% reporting being dissatisfied/very dissatisfied with their lives (Davilla et al., 2014). Reduced physical activity is health risk behaviors that contribute to the prediction of reduced HRQOL (Dey, Gmel, & Mohler-Kuo, 2013).

According to the WHO (2019), physical inactivity is the lack of physical activity which counts as the fourth leading cause for global mortality (6% of deaths globally). In addition, physical inactivity is estimated to be direct cause for about 21–25% of breast and colon cancers, 27% of diabetes and around 30% of ischemic heart diseases (WHO, 2019). On the other side, regular physical activity in adults proofed to reduce the risk of diabetes, breast and colon cancer, hypertension, coronary heart disease, stroke, , and depression and the risk of falls (WHO, 2019). Exercise is the planned, structured, maintained, and purposeful physical fitness, it is a subcategory of physical activity, which involve body movements as part of playing, working, house chores, and other activities (WHO, 2019).

The recommendations for ideal physical activity in adults aged 18–64 is at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week (WHO, 2019). However, despite all the benefits of regular physical activity, research shows a significant decline in engagement in physical activity during the college years mainly due to study load, work, and psychological transition to adult life (Calestine, 2017).

Summary and Conclusions

Although much research has been conducted on obesity among adult students in traditional education, a gap exists within the literature to the extent of the problem among adults enrolled in online education. Moreover, few studies have assessed the effect of online education on the quality of life and physical activity levels among adults in online education. These identified gaps in the literature are the aim of what this study attempted to better explore and understand. Chapter 2 presented an overview of the social cognitive theory that provides a behavior model where perceived self-efficacy can influence an individual's ability to adopt and maintain a healthy lifestyle. In addition, previous and current peer-reviewed literature was used to further understand the topic and to identify the gap in the literature. The chapter concludes by looking at the correlations between literature and identifies gaps in the literature and transitions into Chapter 3.

Chapter 3

Introduction

The purpose of this descriptive, exploratory, quantitative study was to examine the relationships between two independent variable domains, quality of life, physical activity, and their effect, if any, on the dependent weight status variables in adult online students. The study aimed to promote awareness of the growing problem of global obesity with the rapid evolution of technology, internet, and online education. The study also aimed to bring positive social change to adults in online education by promoting health education programs that adopt healthy eating habits and physical activities tailored directly to adults choosing online education. The following chapter details the research question that was tested to demonstrate if there is a statistically significant relationship between the variables. This chapter contains discussion regarding the research design, the statistical analysis that was used, and a description of the study participants. The chapter ends with a description for the threats to validity and the ethical procedures related to institutional permissions, participants' recruitments, and protection of data collected.

Research Design and Rationale

A quantitative, exploratory descriptive design was used to examine the relationship between quality of life, physical activity, and weight status among sample of online adult students. Potential cofounding variables were age, race, gender, geographic location, employment status, and program of study. The independent variables were quality of life and physical activity level. The dependent variable was the weight status of the participants.

A quantitative design was the best choice to answer the research question. Using quantitative design allowed for the collection and analysis of primary data that was relevant to

the dependent and independent variables. According to Creswell (2019), quantitative research designs are used when researchers are interested in testing the relationships among variables. This design allowed for the deductive testing of theories while controlling for alternate explanations, and allowed for the generalization of research findings (Creswell, 2009). While qualitative research design is inductive in nature, quantitative research designs are deductive in nature and involve nonexperimental approaches, such as surveys, to provide a useful numerical data from a subset of study participants (Creswell, 2009). Therefore, quantitative study design was selected for this study because it has the potential to provide information and statistics on the relationship between quality of life, physical activity levels, and weight status among the sample.

In this quantitative research a survey (questionnaire) was used to collect data from a convenience sample of participants who were identified as adult online students registered at three separate Higher Education Institutions coded HEI 1, HEI 2, and HEI 3. The study design supported the problem statement and aimed to answer the following research question:

RQ: Are Health-Related Quality of Life (HRQOL) and physical activity significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students?

The dependent variable for this study was weight status, calculated using self-reported height and weight. The independent variables (predictors) were the participants' health-related quality of life and the physical activity levels. The independent covariates were age, race, gender, geographic location, employment status, and program of study. The survey includes four sets of questions: participants' demographics (age, race, gender, geographic location, employment status, and program of study), participants' height and weights, participants' health-related quality of life, and participants' physical activity levels. The statistical analysis that is most

appropriate to answer the research question was Binary Logistic Regression. Binary Logistic regression is used in research to indicate the significant relationships between dependent variable and independent variable. In this research the dependent variable was weight status and the independent variables (predictors) were quality of life and physical activity levels.

Participants for this study were taking online classes, they were able to use and navigate technology and could complete the survey at any time. Using a survey is a non-invasive method to collect data from target population; in addition, online surveys allow respondents to use the device of their own choosing: laptop, tablet or smartphone (Haan, Lugtig & Toepoel, 2019), which allows for more convenience and a higher possibility for completing the survey.

Methodology

Population

The study is global and nationwide, and consists of adults who are over the age of 18 years and identified as solely online students at HEI 1, HEI 2, and HEI 3. There are more than 53,000 students, from across the U.S. and more than 145 countries, are pursuing their online education at HEI 1 (Walden, 2019). According to the National Center for Educational Statistics (NCES) (2020), HEI 1 had a total student enrollment of 9332 students, with 8974 undergraduates and 358 graduate students. With 89% of undergraduate students and 29% of graduate students enrolled in distance education (NCES, 2020), which give a total of 2902 online students (2602 enrolled in undergraduate education and 318 enrolled in graduate programs). According to NCES (2020), HEI 2 had a total student enrollment of 2040 students with total of 1729 students were undergraduates and a total of 311 students were graduate students (NCES, 2020). With 6% of undergraduate students and 94% of graduate students enrolled in distance education (NCES, 2020), which give a total of 395 online students (103 enrolled in undergraduate education and

292 enrolled in graduate programs). By adding the student's population of the three educational institutions, the population is a total of 56,297 online students.

Sampling and Sampling Procedures

The sample for this study was selected using convenience sampling. Because this population is easy to identify and contact, convenience sampling was the most practical approach for obtaining basic data (Elfil & Negida, 2017) regarding the study without the disadvantages of using a random sampling. The following were the inclusion criteria:

1. Be at least 18 years of age.
2. Online student at HEI 1, HEI 2, and HEI 3.
3. Willing to participate.

The following are criteria that excluded an individual from participating in the study:

1. Be under the age of 18.
2. Traditional or Hybrid student at HEI 1, HEI 2, and HEI 3.

The sample size was determined using the G*Power calculation tool (Faul, Erdfelder, Buchner, & Lang, 2009). To determine the sample size, a 95% confidence level was used (Frankfort-Nachmias et al., 2015), which corresponded to a z-value of 2.0006. A 95% confidence interval indicates that the probability that the population mean lies within +/-2.0006 Z score interval with an estimate of 95% confidence (see Frankfort-Nachmias et al., 2015). With a total population of 56,297 adult online students will be included in this study, the sample size was determined using the G*Power calculation tool (Faul, Erdfelder, Buchner, & Lang, 2009). Using an a priori power analysis, sample size calculations were determined as:

effect size f2 = 0.15;

α = probability of Type I error = 0.05;

β = probability of Type II error = 0.5;

power = 1- β = 1-0.5= 0.95.

Therefore, the total sample size for the study group was estimated to be 160. An alpha level of 0.05 was used to indicate that the chance of a significant difference takes place at least 5% of the time, which is not a true difference and occurs because of chance.

A p-value demonstrates the probability of having a Type I error. A type 1 error occurs with the rejection of the null hypothesis when the null should not be rejected (Marshall & Jonker, 2010). Although the Type I error does not provide information over the impact of effect size on the entire population (Marshall & Jonker, 2010), it is crucial to report both values to allow for a better discussion and dissemination the study's results.

The power level of 0.8 was used to increase the chances of a statistically significant difference in the study findings while rejecting the null hypothesis and thereby avoiding Type II errors.

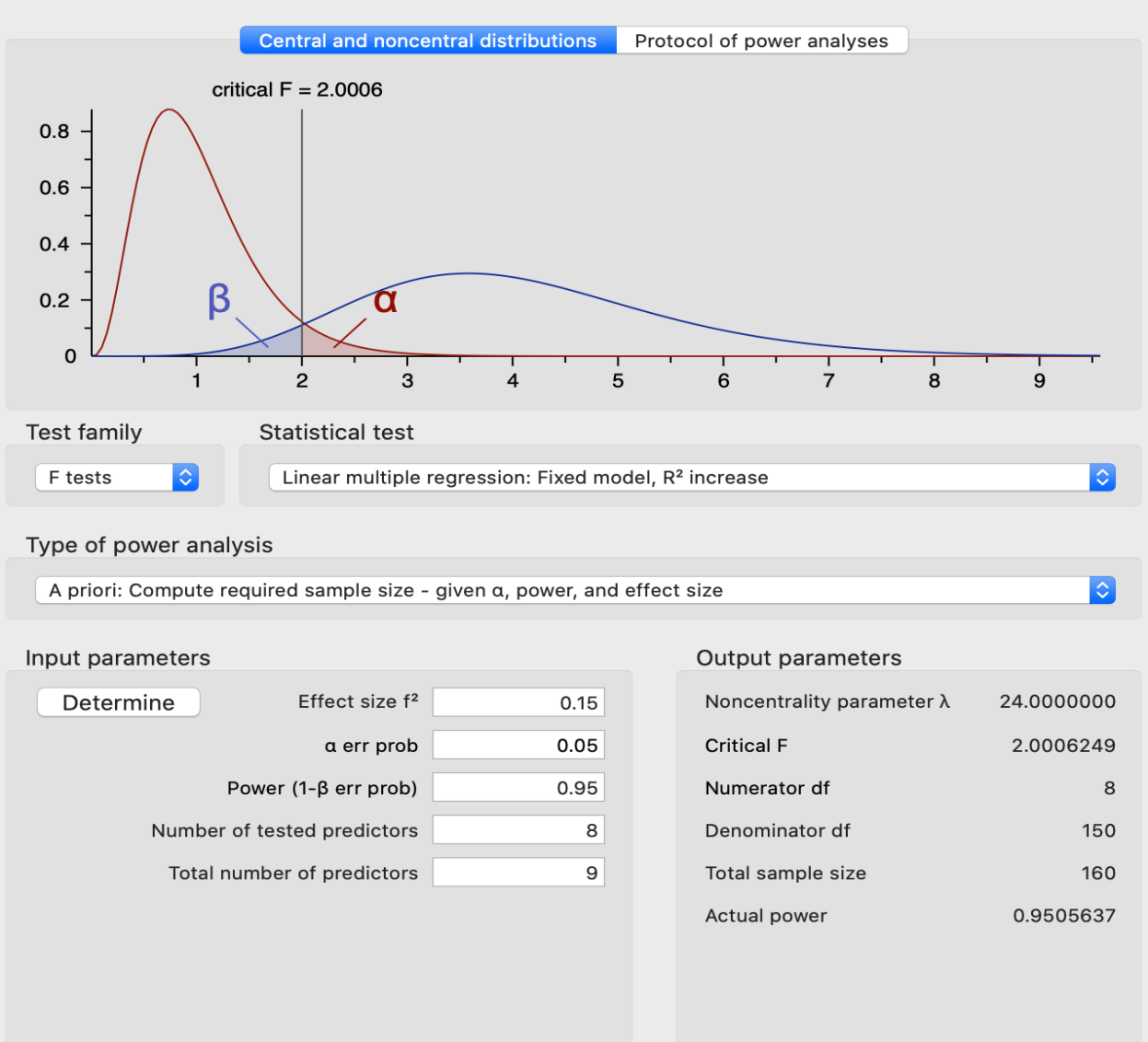

Figure 1 *priori power analysis, sample size calculations*

Procedures for Recruitment, Participation and Data Collection

The study investigated the relationship between the dependent variable (weight status), the independent variables (health-related quality of life and the physical activity level), and the independent covariates (age, race, gender, geographic location, employment status, and program of study). The convenience sample was recruited from the HEI 1 participant pool and by sending invitation letters using SurveyMonkey (2020) to online students at HEI 2 and HEI 3. Both research offices for HEI 2 and HEI 3 agreed to facilitate survey distribution to their students. The

Participant Pool of HEI 1 is a virtual bulletin where researchers can post their studies on the site to those who are interested in participating in research. SurveyMonkey is a platform that is safe and simple for a survey novice to use for students at HEI 1, HEI 2, and HEI 3. SurveyMonkey uses Secure Sockets Layer (SSL) to transmit private documents over the Internet; the SSL enables a secure connection by encrypting all sensitive information transmitted via the web (SurveyMonkey, 2019). In addition, all data was exported to a Statistical Package for the Social Sciences (SPSS) 25 file.

Each HEI had its own way to distribute surveys through emails. Therefore, all online students at the three higher education institutions who are 18 years of age and older were invited via emails to voluntarily participate in the study. Invitation emails provided a description for the study and contained a link to locate the survey on the HEI 1 participants' pool and SurveyMonkey. Data for the survey was initially planned to be collected over a maximum of 60 days to give the target population enough opportunity to participate at their convenience in an anonymous setting. However, the data collection process was stopped after three weeks when the number of participants reached to 434.

Instrumentation and Operationalization of Constructs

For the demographic questions, questions from the Behavioral Risk Factor Surveillance System (BRFSS) (CDC, 2019), were used to collect data related to the covariate variables (age, gender, race, employment status). The BRFSS is the U.S. premier system that collects data about U.S. residents' health-related risk behaviors, chronic health conditions, and use of preventive services (CDC, 2019). The BRFSS was established in 1984 with 15 states and now collects data in all 50 states, in addition to the District of Columbia and the three U.S. territories (CDC, 2019). BRFSS is the largest continuously conducted health survey system in the world and BRFSS has become

a powerful tool for targeting and building health promotion activities in U.S. and worldwide (CDC, 2019).

Two validated measures were used to measure Health Related Quality of Life and Physical Activity. The Health-Related Quality of Life (HRQOL) that assess all aspects of overall quality of life that can affect physical or mental health (CDC, 2016) and the International Physical Activity Questionnaire (IPAQ) to collect data about the physical activity of the participants. The standard 4-item set of Healthy Days questions (CDC HRQOL– 4) has been used with the Behavioral Risk Factor Surveillance System (BRFSS) since 1993, and with the National Health and Nutrition Examination Survey (NHANES) from 2000-2012 (CDC, 2018). It identifies four valid and reliable measures: self-reported health, numbers of recent physically unhealthy (sick) days, mentally unhealthy days, and finally any activity limitation days (CDC, 2018). The HRQOL instrument is available free of charge for researchers to use, and does not require permission for use or licensing fees (CDC, 2018). The development of the IPAQ commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries during 2000 (IPAQ, 2002). The final results of the IPAQ reliability and validity testing suggested that this international tool has acceptable measurement properties for use in many settings and in different languages (IPAQ, 2002). The IPAQ is a tool that captures self-reported physical activity, including walking, bicycling, and moderate to vigorous-intensity physical activity undertaken in the last week (Craig, 2017). The IPAQ has been determined reliable and valid (Craig et al., 2003), to obtain data on health–related physical activity, with repeatable outcomes (the Spearman's correlations clustered around 0.8); the criterion validity had a median of about 0.30, which is closely equivalent to most other self-report validation studies (Craig, 2003).

A copy of the survey is located in appendix A. There are four sections of the survey, with approximately 1 to 8 questions in each section. The survey questions consisted of short answer, multiple-choice answers or yes/no answers depending on whether the variable is dichotomous or continuous.

Operational Definitions

Demographic Information

The first section of the survey contained mostly questions aimed to collect descriptive data, these data help to ascertain certain inclusion or exclusion criteria based on the participants' answers and provide specific general description about the sample population. The survey starts by asking participants to identify the higher educational institution where they are registered as an online student. The choices were (a) [HEI 1] b) [HEI 2] c) [HEI 3]). Then, participants were asked to identify which area of study from the list is closely related to their program of study? choices included the following categories (a) Business and Management, b) Communication, c) Criminal Justice and Emergency Management, d) Education, e) Health and Health Sciences, f) Information Technology, g) Nursing, h) Psychology and Counseling, i) Public Policy and Administration, j) Social Work and Human Services). The list of the programs is based on the 2019 programs' catalog of HEI 1which is more inclusive, detailed, and offer more online programs compared to HEI 2, and HEI 3.

Dependent Variable (Weight Status)

After completion of the first three questions, participants were asked to report their height and weight. Questions from the BRFSS-CDC (2018) used to ask participants to report how much do they weigh without shoes? weight (pounds/kilograms), and about how tall are they without shoes? Height (ft/inches/meters/centimeters). During analysis BMI of the participants was

calculated by dividing the person's weight in kilograms by the square of height in meters. For this study, I used the BMI calculator of the CDC which includes both English and metric options for accurate calculation of the BMI (CDC, 2019). The BMI is used as a screening tool but not as a diagnostic test (CDC, 2016); the participants were divided to categories according to their weight status. The BMI constituted the values for the categorical variable (weight status). Participants' BMI scores categorized into 4 BMI groups: underweight (BMI < 18.5), normal weight (BMI 18.5–24.9), over-weight (BMI 25–29.9), and obese (BMI > 30) (CDC, 2017). For the purpose of using Binary Logistic Regression for analysis, weight status was dichotomized into two categories (BMI 18.5-24.9, and BMI>30).

Covariate Variables

As described earlier in the literature review, the inclusion of age, gender, race, location, employment status, and program of the study were all predicted to have an influential role on weight status, physical activity, and quality of life. Questions from Core Section 8: Demographics of the BRFSS-CDC (2018) were used to collect descriptive data from the participants.

Age. The survey asked participants to respond to the question: How old are you? Participants were classified in the following age groups (18 – 24 years, age 25 – 34, age 35 – 44, age 45 – 54, age 55 – 64, age 65 or older)

Gender. According to Trochim and Donnelly (2007), gender is considered a qualitative variable that not based on quantity consisted of "two text values: male and female" (p.8). For the purpose of data analysis, the two categories were coded as: Male (0), and female (1).

Race/Ethnicity. Two different questions used to specifically identify the race of the participants: 1- Are you Hispanic, Latino/a, or Spanish origin? (Yes, No). If No, 2- Which one of

these groups would you say best represents your race? 1) White, 2) Black or African American, 3) American Indian or Alaska Native, 4) Asian, and 5) Pacific Islander.

In this study, race/ethnicity was considered a descriptive variable, in terms of percentages, of participants. The survey question related to race or ethnicity was comprised of six categorical variables that coded as: White is 1 and, Black is 0, Hispanic/Latino is 2 Asian is 3, and American Indian or Alaska Native is 4; this yields five dummy variables for race or ethnicity. The dummy variables used in regression analysis to distinguish weight status among the race/ethnicity categories or groups.

Geographic Location. Two different questions were used to specifically identify the geographic location of the participants: In what county do you currently live? (U.S., Other Countries) 2- If you are not a U.S. resident, name your country of residence? The two categories for data analysis coded 0 for living in U.S. and 1 for not living in U.S.

Employment Status. The employment question was coded to two main categories 0 employed, and 1 student only (not employed).

Program of Study. As previously mentioned the list of programs adapted from the HEI 1 catalog and coded as: 0 health and health sciences, 1 psychology, 2 nursing, 3 counseling, 4 business, 5 communication, 6 criminal Justice, 7 education, 8 information technology, 9 public policy and administration, and 10 for social work and human services.

Independent Variables

Health Related Quality of Life (HRQOL). According to the CDC (2016), HRQOL assesses all aspects of overall quality of life that can alter/affect physical or mental health. Questions on HRQOL are pulled from the Health-Related Quality of Life Questionnaire of the CDC (2018). The HRQOL instrument measures five basic domains: physical, social,

environmental, mental, and general health perceptions (Balduyck et al, 2007).

HRQOL-4 is a specific measurement scale that evaluates the individuals' perceived health, physical and mental health, and recent limitation in usual activities. HRQOL is a commonly used, validated measure in the literature (CDC, 2016). The standard 4-item set of Healthy Days questions (CDC HRQOL– 4) has been used with the Behavioral Risk Factor Surveillance System (BRFSS) since 1993, and with the National Health and Nutrition Examination Survey (NHANES) from 2000-2012 (CDC, 2018). It identifies four valid and reliable measures: self-related health, numbers of recent Physically unhealthy (sick) days, mentally unhealthy days, and finally any activity limitation days (CDC, 2018). The HRQOL instrument is available free of charge for researchers to use, and does not require permission for use or licensing fees (CDC, 2018). A subset of the CDC-Health Related Quality of Life measures [HRQOL-4] used to collect data related to the participants' perception of their health status. These four questions, have demonstrated good retest reliability, validity, and responsiveness; also, have been included in the Behavioral Risk Factor Surveillance System (BRFSS) in all 50 states since 1993 with an acceptable exploratory factor analysis of .76 and goodness of fit (RMSEA = 0.039, CFI = 0.99, TLI = 0.94, SRMR = 0.01, CD = 0.89) (Yin, 2016).

The HRQOL survey included the following questions: 1) "Would you say that in general your health is excellent, very good, good, fair, or poor?" (2) "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" (3) "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" (4) "During the past 30 days, for about how many days did poor

physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?".

For scoring the HRQOL of the participants, unhealthy days are an estimate of the overall number of days during the previous 30 days when the participants' felt that their physical or mental health not good. According to (CDC, 2018), responses to questions 2 and 3 combined to calculate a summary index of overall unhealthy days, with a logical maximum of 30 unhealthy days per participants. For example, a participant who reports 4 physically unhealthy days and 2 mentally unhealthy days is assigned a value of 6 unhealthy days, and someone who reports 30 physically unhealthy days and 30 mentally unhealthy days is assigned the maximum of 30 unhealthy days (CDC, 2018). In addition, healthy days estimates the number of recent days when a participant's physical and mental health was good (or better) and is calculated by subtracting the number of unhealthy days from 30 days (CDC, 2018). For analysis of the HRQOL data, the self-reported overall health recoded into 2 categories: (1) excellent, very good, good; (2) fair, poor. Physically and mentally unhealthy days, and recent activity limitation days recoded in numbers from 0-30 and recoded to numbers. If either value of physically unhealthy days or mentally unhealthy days are missing this will result into missing value (CDC, 2018). For the purpose of this research, I focused on total unhealthy days, which is the sum of the number of days of recorded poor physical health (question 2) and recorded poor mental health (question 3), with a logical maximum of 30 unhealthy days per month. The unhealthy day's measure provides an assessment for the perceived physical and mental health over time, with good concurrent and acceptable criterion validity (CDC, 2016). According to prior research, the more unhealthy days reported per month, the poorer the HRQOL. If any participant reported (0) physically unhealthy days and (0) mentally unhealthy days, the question on activity limitation days (due to poor

physical or mental health) is skipped, imputing zero days is only valid when mentally unhealthy days and physically unhealthy days were both zero (CDC, 2018). The unhealthy days dichotomized to (0) no unhealthy days per month vs. reporting of one or more unhealthy days (1–30) per month.

The International Physical Activity Questionnaire (IPAQ). IPAQ was used to collect data about the physical activity of the participants. The development of the IPAQ commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries during 2000 (IPAQ, 2002). The final results of the IPAQ reliability and validity testing suggested that this international tool has acceptable measurement properties for use in many settings and in different languages (IPAQ, 2002). The IPAQ is a tool that captures self-reported physical activity, including walking, bicycling, and moderate to vigorous-intensity physical activity undertaken in the last week (Craig, 2017). The IPAQ has been determined reliable and valid (Craig et al., 2003), to obtain data on health–related physical activity, with repeatable outcomes (the Spearman's correlations clustered around 0.8); the criterion validity had a median of about 0.30, which is closely equivalent to most other self-report validation studies (Craig, 2003).

Questions from the IPAQ are: 1) "On how many days during the last 7 days did you do strenuous physical activities like heavy lifting, digging, heavy construction, or climbing upstairs as part of your work?" 2) "During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your work? Please do not count any walking you did to travel to or from work?" 3) "During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place?"

For scoring, the scoring guideline protocol available at the IPAQ (2016), IPAQ scoring protocol was used. Retrieved from https://sites.google.com/site/theipaq/scoring-protocol.

A combined total physical activity MET-min/week is the sum of Walking + Moderate + Vigorous MET-min/week (IPAQ, 2002); with MET defined as the metabolic equivalents which is the energy that the body uses when resting or sitting still (IPAQ, 2002). According to the scoring protocol participants assigned to three different categorical scores (levels) of physical activity:

Category 1: low level of physical activity. This is the lowest level of physical activity. Those individuals who are not meeting criteria for categories 2 or 3 are considered low/inactive.

Category 2: moderate level of physical activity. Which includes any participant who met one of the following 3 criteria:

• 3 or more days of vigorous activity of at least 20 minutes per day OR

• 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day OR

• 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week.

Category 3: high level of physical activity. Which included any participant who met any one of the following 2 criteria:

• Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/ week OR

• 7 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week

As stated earlier, the scoring guideline protocol available at the IPAQ official website used for scoring and results scaled into 3 categories (low level, moderate level, high level) physical activity.

Data Analysis Plan

IBM SPSS Statistics version 25 was used for data analysis of this study. Data for the survey was collected over three weeks from 5-18-2020 until 6-7-2020. All data were exported to SPSS once the data collection process stopped.

RQ: Are Health-Related Quality of Life (HRQOL) and physical activity significant predictors for weight status, holding age, gender, race, employment status, and program of study constant in this sample of adult online students?

H01: Health-Related Quality of Life (HRQOL) and physical activity are not significant predictors for weight status, holding age, gender, race, employment status, and program of study constant in this sample of adult online students.

Ha1: Health-Related quality of life (HRQOL) and physical activity are significant predictors for weight status, holding age, gender, race, employment status, and program of study constant in this sample of adult online students.

The results of this study were presented using both descriptive and inferential analysis. Using descriptive statistics presented and summarized data in an effective and meaningful way (Frankfort-Nachmias & Nachmias, 2008). Descriptive statistics included : 1) calculate mean and standard deviation for all numerical variables (age, BMI) and frequencies for categorical variables (weight status, race, gender, employment status, geographic location, and program of study). 2) calculate the mean of the physically unhealthy days, mentally unhealthy days, and unhealthy days for both of the categorical group within the HRQOL scale. For the IPAQ, results

from scoring reported in categories (low activity levels, moderate activity levels or high activity levels). For the HRQOL, results from scoring reported into 2 data sets [categories: (1) excellent, very good, good; (2) fair, poor; numerical: number of unhealthy days]. For the analysis, I used the categorical description for assessing the relationship between the variables.

Inferential statistics allowed inferences to be made by interpreting the pattern of the results among participants (Frankfort- Nachmias & Nachmias, 2008). The inferential statistic that was selected for this study was binary logistic regression, the binary logistic regression was used to answer the research question, if there was an association between the dependent variable, weight status, and independent variable (HRQOL and Physical activity level). As discussed in chapter two, the covariates (age, race, gender, geographic location, employment status, and program of study are contributing factors to the obesity pandemic nationally and globally). It was essential for this study to understand the potential effect of the covariates on weight status of adults-online students. These variables added to the statistical analysis during the binary logistic regression analysis, to support the accuracy of the results.

Statistical Tests

Binary logistic regression analysis was the statistical test appropriate for the research question. Binary logistic regression is used to predict a nominal (categorical) dependent variable from two predictor variables, while controlling for covariates (age, gender, race, locations, employment status, and program of study). Binary Logistic Regression was the most appropriate analysis for this study because there was one binary dependent variable (Warner, 2013), weight status; with two categories [underweight (BMI < 18.5), normal weight (BMI 18.5–24.9); and over-weight (BMI 25–29.9), obese (BMI > 30)].

The independent variables were:

- HRQOL, dichotomized into 2 data sets [categories: (1) excellent, very good, good; (2) fair, poor; numerical: number of unhealthy days, (0) 0 unhealthy days and (1) 1 or more unhealthy days]. For the analysis, I have used the categorical dichotomized description for assessing the relationship between the variables.
- Physical Activity, measured and scaled into 3 categories (low level, moderate level, high level). After collection of data the IPAQ was dichotomized to only two categories low level (0) and moderate level (1); as none of the participants reported high physical activity levels.

The Covariates were:

- age: 18 – 24 years (0), age 25 – 34 (1), age 35 – 44 (2), age 45 – 54 (3), age 55 – 64 (4), age 65 or older (5).
- gender: male (0), and female (1)
- race/Ethnicity: White (0), African American (1), Hispanic/Mexican (2), Another Hispanic/Latino (3), Asian (4), Chicano (5), American Indian or Alaska Native (6), and Pacific Islander (7).
- geographic location: U.S. location (0), non-U.S. location (1)
- employment status: employed (0), student only (1)
- program of study: Psychology (0), Business (1), nursing (2), Social Work(3), Health Science (4), Education (5), Information Technology (6), Criminal Justice (7), public policy (8), and Communication (9).

Threats to Validity

Understanding threats to validity is crucial in conducting a research study. Discussing the different situations that could introduce threats the study is essential for conducting the analysis and writing the results of the research.

Threats to Internal validity

Threats to internal validity refer to factors that may threaten the study process, including history and selection of subjects (Hagstromer, Oja & Sjostrom, 2005). Threats to internal validity involve the factors that compromise the researcher's confidence in stating the relationship exists between the study variables (Michael, n.d.). Since this study is descriptive-exploratory and non-experimental, then there are few threats to internal validity. A convenience sampling technique was used to recruit participants and there were no interventions of any kind. Using BMI as a standard to determine obesity has limitations; in fact, self-reported height and weight may cause systemic bias; while some participants may not know their exact height and weight, others may intentionally misreport to fit the social norms (Ghosh-Dastidar, 2016). For this study, although the selection of study participants and survey design is highly controlled by certain participation criteria, participants may answer the survey questions incorrectly to indicate better weight status or improved levels of physical activity which may in turn influence the data they provided on the survey. My assumption was that the participants were honest in filling out the survey questions

Threats to External Validity

By selecting the research participants, treatments, experimental situations, and any tests the external validity will be insured, and the results may be applied to larger population (Thomas, Nelson, & Silverman, 2015). Threats to external validity are the factors that negatively affect the researcher's confidence in stating whether the study's findings are applicable to other

populations (Michael, n.d.). Therefore, understanding all the threats to external validity helped in assuring that the results of the study might be applicable to other individuals, at different settings and times. The study participants are adults who were online students, I expected that they were able to manage technology and fulfill online surveys. There is a probability that participants may get frustrated with answering questions related to their body weight and lifestyle. To address these concerns, the consent form stated clearly that students should answer each question honestly and respond to every question in the survey. The IRB process of the three educational institutions participating in the study ensured authenticity of the study. Finally, it was determined that there was no need for any pilot studies due to the fact that there is no intervention and no new measures were developed specifically for this study.

Ethical Procedures

This study is official research for completion of doctoral study that required approval. Approval for the study granted through the Institutional Review Board (IRB) of Walden University, the dissertation committee, and the Walden University Research Reviewer (URR) before data collection started. Upon completion of the online surveys, collected data was stored in electronic format and will not be made available to others. The Walden University Internal Review Board (IRB) granted approval (IRB# 05-06-20-0548617) to conduct the study. The researcher stored the data on a password protected laptop and will keep the data encrypted for 5 years at which time it would be destroyed, and the researcher was the only person who have access to the data.

Dissemination of Findings

Study findings will be disseminated by completing a dissertation manuscript, and through health publications dealing with health education and promotion, physical activity, quality of

life, obesity, and BMI issues associated with college health. Any other possible dissemination channels will be considered an option upon completion of the study.

Summary and Transition

Chapter three described the research methodology including the use of a self- administered questionnaire, data collection, study approach, study population, sample size, and the instrumentation. Chapter 4 describes the data collection and data analysis conducted to address the study's research questions.

Chapter 4

Introduction

The purpose of this descriptive, exploratory, quantitative study was to explore whether Health-Related Quality of Life (HRQOL) and physical activity level were significant predictors of weight status, holding age, gender, race, location, employment status, and program of study constant in this sample of adult online students.

The following research question and hypotheses were the guide for this research study:

RQ: Are Health-Related Quality of Life (HRQOL) and physical activity significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students?

H01: Health-Related Quality of Life (HRQOL) and physical activity are not significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students.

Ha1: Health-Related quality of life (HRQOL) and physical activity are significant predictors for weight status, holding age, gender, race, employment status, location, and program of study constant in this sample of adult online students.

This chapter provides a description of the data collection process including the recruitment of participants and response rate. The chapter also reports the results of the study to include descriptive and inferential statistics; and answers the research question based on analysis. Finally, a summary for the chapter provided an answer to the research question and provided a transitional material to chapter five.

Data Collection

The study survey was posted on SurveyMonkey and the HEI 1 participants' pool from May 18th, 2020 until June 6th, 2020. An invitation email was sent to HEI 2 students with an active link for quick access to the study survey posted on SurveyMonkey https://www.surveymonkey.com/r/PW733HN. The same invitation email format was posted as an announcement to the Canvas portal of HEI 3, as an invitation to for online students to participate in the study. As described in chapter 3, the necessary sample size for the study was calculated to be 160; however, within less than three weeks of posting the survey, the total participants number from the three higher institution reached 434 participants, 429 students who participated through the SurveyMonkey and 5 students who participated through the HEI 1 participants' pool. Of the 434 adult online students who participated in the study, 405 completed the entire survey.

Statistical Package for the Social Sciences (SPSS) 25 was used to analyze all data collected from participants. Data was transferred from SurveyMonkey and the participants' pool for 434 participants to the SPSS 25. Upon completion of entering all the data and before starting the analysis process, 29 participants' responses were not used due to not completing the HRQOL and IPAQ questions; 2 participants were also excluded from the analysis due to their age being less than 18 years old; 5 participants were excluded for not reporting their age, and finally 1 participant was excluded for not reporting their race. After cleaning the SPSS file from these incomplete responses and participants who did not meet the inclusion criteria, the total number of participants was 397. Data were entered to SPSS using the U.S. metrics (feet, inch, and pounds lbs.). The BMI calculator of the CDC which includes both English and metric options

was used for accurate calculation of BMI (CDC, 2019). Seven categorical variables were calculated from the available 21 variables to have a total of 28 variables listed in the SPSS file.

As described earlier, age, gender, race, location, employment status, and program of the study were all hypothesized to have an influential role on weight status, physical activity, and quality of life for adults. Weight status was the dependent variable with two categories [underweight (BMI < 18.5), normal weight (BMI 18.5–24.9); and over-weight (BMI 25–29.9), obese (BMI > 30)].

The independent variables were:

- HRQOL, dichotomized into 2 groups [categories: (1) excellent, very good, good; (2) fair, poor; numerical: number of unhealthy days, (0) 0 unhealthy days and (1) 1 or more unhealthy days]. For the analysis, I have used the categorical dichotomized description for assessing the relationship between the variables.
- IPAQ, dichotomized into 2 categories: low level (0) and moderate level (1). With low activity level represented any combination of walking, moderate-intensity or vigorous intensity activities of less than 600 MET-min/week; and moderate activity represented any combination of walking, moderate-intensity or vigorous intensity activities of 600-3000 MET-min/week. MET defined as the metabolic equivalents which is the energy that the body uses when resting or sitting still (IPAQ, 2002).

The Covariates with their coding were:

- age: 18 – 24 years (0), age 25 – 34 (1), age 35 – 44 (2), age 45 – 54 (3), age 55 – 64 (4), age 65 or older (5).
- gender: male (0), and female (1)

- race/Ethnicity: White (0), African American (1), Hispanic/Mexican (2), Another Hispanic/Latino (3), Asian (4), Chicano (5), American Indian or Alaska Native (6), and Pacific Islander (7).
- geographic location: U.S. location (0), non-U.S. location (1)
- employment status: employed (0), student only (1)

program of study: Psychology (0), Business (1), nursing (2), Social Work(3), Health Science (4), Education (5), Information Technology (6), Criminal Justice (7), public policy (8), and Communication (9).

Results

Descriptive Statistics

Descriptive statistics were used to summarize the demographics and the general characteristics of the participants, the analysis included the percentage distribution and frequency distribution (Gerstman, 2008). SPSS 25 was used to analyze all data collected from participants.

Descriptive statistics are presented in Table 1.

Table 1 *Descriptive Analysis*

Variable	Category	*N*	%
Higher Education Institution (HEI) (n = 397)	HEI 1	210	52.9
	HEI 2	33	8.2
	HEI 3	154	38.2
Age (n = 397)	18-24	70	17.6
	25-34	149	37.5
	35-44	97	24.4
	45-54	62	15.6
	55-64	15	3.8
	65 and older	4	1.0
Gender (n = 397)	Male	355	10.6
	Female	42	89.4
Race (n = 397)	White	266	67.0
	African American	86	21.7
	Hispanic/Mexican	12	3.0
	Another Hispanic	10	2.5
	Asian	8	2
	Chicano/Puerto Rican	6	1.5
	American Indian/Alaskan	6	1.5
	Pacific Islander	3	0.8
Geographic Location (n = 397)	USA	382	96.2
	Outside USA	15	3.8
Employment Status (n = 397)	Employed	322	81.1
	Students only	75	18.9
Program of Study (n = 397)	Psychology	87	21.9
	Business	78	19.6
	Nursing	63	15.9
	Social work	57	14.4
	Health Science	32	8.1
	Education	34	8.6
	Information technology	17	4.3
	Criminal Justice	18	4.5
	Public Policy	10	2.5
	Communication	1	0.3

Variable	Category	*N*	%
BMI/Weight Status (n = 397)	Underweight	7	1.8
	Normal weight	114	28.7
	Over weight	100	25.2
	Obese	176	44.3
HRQOL (n = 397)	Excellent	39	9.8
	Very good	138	34.8
	Good	166	41.8
	Fair	43	10.8
	Poor	11	2.8
Unhealthy Days (n = 397)	0 Unhealthy days	49	12.3
	1 or more unhealthy days	348	87.7
Physical Activity level (n = 397)	Low	358	90.2
	Moderate	39	9.8

As shown in Table 1, the majority of the 397 participants were female (89.4%). Two hundred and ten participants were students at HEI 1, 33 participants were students at HEI 2, and 154 participants were students at HEI 3. The majority of the participants were white (66.5%) followed by black or African American (21.6%). Eighty-seven participants (21.9%) were studying psychology and 78 (19.6%) were studying business. From the three higher education institutions, the majority of participants (81.1%) were employed. Also, the majority of participants (96.2%) were U.S. residents, while 15 (3.8%) were living outside the U.S. A total of 397 students reported their age with a mean age of 34.7, with the majority of participants (37.5%) were between the age of 25-34. In addition, 86.4% of the participants reported excellent, very good, or good quality of life compared to 13.4% who reported fair or poor quality of life. Also, 87.7% of the participants reported 1 or more unhealthy day compared to 12.3% that reported 0 unhealthy days. Finally, 90.2% of the sample reported low physical activity level (less

than 600 MET-min/week) compared to only 9.8% that reported moderate physical activity (600-3000 MET-min/week), and no participants reported high physical activity.

The statistics of the study sample were similar to the statistics of the college students and adults in general. The study population represented a reflection to the general population; 44.35% of participants were obese and 25.2% were overweight which are close to the data of the Organization of Economic Cooperation and Development (OECD, 2017) that reported a steady increase in the obesity rates among US adults, where 47% of the United States population are projected to be obese by 2030. Also, In the United States (US), approximately two-thirds of the adults over the age of 18 are either categorized as overweight or obese (NCHS, 2013), which is similar to the results of this study that concluded a total of 69.55% of the participants as overweight or obese. According to the WHO (2016), obesity has tripled globally since 1975; with around about 650 million cases of obesity among adults in 2016 (Hales et al., 2017), this is also consistent with the results of the study.

A series of Chi Square tests were applied to determine the relationship between weight status and age group, gender, race, geographic location, employment status, and program of study. The results of this descriptive analyses confirmed that there was a statistically significant association between weight status of the participants and their age groups (X2(.183) = , $p <$ .001). with those who age 25-34 reporting the highest rates of obesity and overweight among the participants. Based on the Chi Square analysis there was no statistically significant association between weight status and gender (X2(1) = .001, p=.989 > .001), weight status and race (X2(1) = -.104, p=.039 > .001), weight status and location (X2(1) = .092, p=.067 > .001), and weight status and employment (X2(1) = -.030, p=.558 > .001). While not all the covariates were statistically significant, the findings were consistent with the data described in literature review.

As the study showed that 23.3% of females are overweight and 45.3% are obese, compared to 40.4% of males are overweight and 35.7% are obese; the results were higher than the average global rates, and consistent with the literature statistics that show adult females in general have higher BMI compared to adult males. The results of this study identified 29 % of African American as overweight, and 53.5% as obese compared to 23.7% of white participants were overweight and 43.2% were obese. This was in conformity with the report of Gillespie and Christian (2016) that the prevalence of obesity in U.S. is higher among African Americans.

The external validity of the study was controlled with the selection criteria; however, participants might have answered the survey questions incorrectly to indicate optimal weight status or improved levels of physical activity which could of have affected the study results. According to Ghosh-Dastidar (2016), using BMI as a standard to determine obesity has limitations; in fact, self-reported height and weight may have caused systemic bias; while some participants might not know their exact height and weight, others might intentionally misreport to fit the social norms. My assumption was that the participants were honest in filling out the survey questions. Finally, speaking more than one language could have served as an emotional buffer that might made bilinguals feel uncomfortable when dealing with sensitive and emotional topics (Ivaz, Griffin, & Duñabeitia, 2019). However, this issue wasn't a threat to the study as all of the particpants were able to complete the survey in English Language-format.

Inferential Statistics

This study was guided by the following research question and hypothesis.

RQ: Are Health-Related Quality of Life (HRQOL) and physical activity significant predictors for weight status, holding age, gender, race, location, employment status, and program of study constant in this sample of adult online students?

H01: Health-Related Quality of Life (HRQOL) and physical activity are not significant predictors for weight status, holding age, gender, race, employment status, and program of study constant in this sample of adult online students.

Ha1: Health-Related quality of life (HRQOL) and physical activity are significant predictors for weight status, holding age, gender, race, employment status, and program of study constant in this sample of adult online students.

Binary logistic regression was conducted to examine the predictor effect of HRQOL and physical activity level on the weight status, holding age, gender, race, location, employment status, and program of study constant. There are several assumptions implied in binary logistic regression (Tabachnick & Fidell, 2007. pge 444). The first is that the outcome variable must be binary. This was accomplished by combining underweight with normal weight and overweight with obese to achieve a binary outcome variable for this study. The second is that observations have to be independent of each other, which was achieved by the cross-sectional nature of the study. Additionally it is assumed that there are no extreme outliers and that independent variables are not highly correlated. For this study, the data was examined for outliers and the independent variables were free of multicolinarity.

Holding the covariates constant/controlled in the analysis added to the value of the covariate's effects on the weight status, and reliably improves the predictor effect of HRQOL and physical activity levels on weight status (Tabachnick & Fidell, 2007. pge 440). Findings from this study are consistent with the finding of previous college-based study that described young adults, aged 18-35, as gaining weight faster than their parents, with an average of 30 lbs of weight gain during this phase of their life (Nanney et al., 2015). With adults who are educated are likely to receive preventive care compared to those who are not educated (Cohen, Rehkopf &

Abrams, 2013), in the presence of inconsistent positive association between women and high obesity rates, especially with minority women (Hernandez, Reesor & Murillo, 2017). In addition, Zhang (2019), reported that overweight and obesity were negatively associated with HRQOL, and that there is a need for targeted interventions conducted mainly for women, to reduce the obesity effects associated with poor HRQOL. According to Sells (2016), despite the evidence that regular physical activity may reduce obesity and its complications, many Americans do not participate in regular physical activity, with an estimated 21%, only, of U.S. adults achieve the recommended physical activity level. For the above reasons there was a need to control the covariates in the study for a better understanding of the predictor effect of HRQOL and physical activity on weight status.

According to Stevens (2016), binary logistic regression is calculated using Chi Square statistics, which trend toward significance as the sample size increases, so it was also important to explore the effect sizes of the variables within the regressions. The odds ratio was used to determine predictors' effect on weight status. when the covariates were entered in step 1, the model wasn't statistically significant, $X^2(20, N = 397) = 45.163$, $p = .001$, with age group was statistically significant at values of $p = .001$. After entering the predictors in the second step, the chi square value for model became statistically significant [$X^2(22, N = 397) = 50.833$, $p = .000$], indicating that the model was able to distinguish between respondents who reported being obese/overweight and those who were normal weight/underweight. Based on the results, HRQOL was a statistically significant predictor for weight status in the model, HRQOL (OR = .429, 95% CI = .200 - .921, $p = .030$), while physical activity level (OR = .807, 95% CI = .354 – 1.843, $p = .612$) wasn't a statistically significant predictor of overweight status in this model.

Table 2 presents the binary logistic regression summary.

Table 2 *Binary Logistic Regression*

	B	*S.E*	*Wald*	*df*	*p*	*Odds Ratio*	*95% CI for Odds Ratio*	
							Lower	*Upper*
HRQOL	-.846	.390	4.710	1	.030	.429	.200	.921
Physical Activity level	-.214	.421	.258	1	.612	.807	.354	1.843
Age groups	.043	.013	11.663	1	.001	1.044	1.018	1.070
Gender	.460	.450	1.047	1	.306	1.584	.656	3.824
Race			11.064	7	.136			
White	.916	.786	1.356	1	.244	2.499	.535	11.667
Hispanic	.160	.736	.047	1	.828	1.173	.277	4.965
American Indian/Alaskan	-.418	.944	.196	1	.658	.658	.103	4.188
Asian	-.666	1.161	.329	1	.566	.514	.053	5.003
Pacific Island	-.143	1.081	.017	1	.895	.867	.104	7.212
Chicano/PR	20.19	2136	.000	1	99	5.87E+8	.000	.
Another Hispanic	-1.525	1.198	1.621	1	.203	.218	.021	2.276
Location	-1.041	.861	1.461	1	.227	.353	.065	1.910
Employment	.338	.297	1.297	1	.255	1.403	.783	2.512
Program			6.026	9	.737			
Psychology	.213	.534	.159	1	.690	1.237	.435	3.522
Nursing	.169	.406	.174	1	.677	1.185	.534	2.626
Business	-.503	.24	1.404	1	.236	.605	.263	1.390
Communication	-.214	.404	.281	1	.596	.807	.366	1.781

	B	*S.E*	*Wald*	*df*	*p*	*Odds Ratio*	*95% CI for Odds Ratio*	
							Lower	*Upper*
Criminal Justice	20.684	4019 3.0	.000	1	1.000	9.61E+8	.000	.
Education	-.733	.629	1.359	1	.244	.480	.140	1.648
Information Technology	-.362	.509	.507	1	.477	.696	.257	1.887
Public policy	.326	.698	.018	1	.641	1.385	.353	5.443
Social work	19.335	1183 5.1	.000	1	.999	2.50E+8	.000	0
Constant	.878	1.408	.389	1	.533	2.406		

Summary

This research study used survey data to quantitatively examine the predictor effect of health-related quality of life and physical activity level among a convenience sample of adult online students. This study focused on investigating the weight status of online students in a sample of 397 online students from three different higher institutions. The BMI of the participants was calculated from the height and weight variables provided on the survey. Two predictor variables, quality of life and physical activity; and seven covariates (age, gender, race, location, employment status, program of study), were evaluated against weight status with a binary logistic regression model. The results partially supported the hypothesis; HRQOL (OR = .429, 95% CI = .200 - .921, p = .030) was a statistically significant predictor to weight status in the model, while physical activity level (OR = .807, 95% CI = .354 – 1.843, p = .612) was not a

statistically significant predictor for weight status. Also, age group was statistically significant covariate and a predictor for weight status at values of $p = .001$.

Chapter Four presented the descriptive statistics for the study variables and results of the statistical analyses to answer the research question. This brings chapter four to conclusion with a transition into chapter five for interpretations of results, draw conclusions based on the findings, discuss implications for social change, and suggest a series of recommendations.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this descriptive, exploratory, quantitative study was to explore the predictor effects of quality of life and physical activity on weight status among a group of adult online college students. The key findings of the statistical analysis reported HRQOL (OR = .429, 95% CI = .200 - .921, p = .030) as a statistically significant predictor to weight status in the model, while physical activity level (OR = .807, 95% CI = .354 – 1.843, p = .612) was not a statistically significant predictor for weight status. In addition, 69.5% of the participants were either overweight or obese (25.2% were overweight and 44.3% were obese). The results are consistent with the assumptions of the study and reflected a definite need for health education programs targeting the obesity problem among adults in online education.

Interpretation of Findings

The weight status, quality of life, and physical activity level statistics of the study sample were similar to the statistics previously reported on college students and adults in general. The weight status of the study participants represented a reflection of the general population, with 44.35% of participants being obese and 25.2% overweight, which was close to the data reported from OECD (2017) that there is a steady increase in the obesity rates among US adults, with 47% of the US population are projected to be obese by 2030. In addition, the results of the study were consistent with the NCHS (2013) data that two-thirds of the US adults over the age of 18 are either categorized as overweight or obese. Indeed, studying the prevalence of obesity among adults plays an important role in informing public health workers with the recent data and relevant factors to decrease the prevalence of this condition. The weight status of the participants in this study was even higher than the average global rates, and consistent with the literature

statistics that show adult females have higher BMI compared to adult males. This is consistent with the findings of Kivimäki et al (2015), who reported that obesity in workplaces has increased among the men compared to the number of women.

Previous studies have reported factors associated with high BMI among college students, but most of these factors were implemented at the individual level (Odlaug et al., 2015), Researchers have also studied how individual psychosocial stressors are positively associated with overweight and obesity among college students (Odlaug et al., 2015). The present study explored more demographic and lifestyle factors associated with overweight and obesity among adult online students. Although, the majority of participants (44.3%) were obese and (25.2%) were overweight, 86.4% of the participants reported excellent, very good, good quality of life compared to only13.6% reporting fair or poor quality of life. HRQOL was found to be a negative predictor of weight status, which is is consistent with Zhang (2019), that reported that overweight and obesity were negatively associated with HRQOL. Findings from Zhange (2019) went on to report that there is a need for targeted interventions conducted mainly for women, to reduce the obesity effects associated with poor HRQOL. This study also supports these findings as the vast majority of the sample was female. The results are also consistent with the findings of Truthmann (2017), who reported that obesity was significantly related to lower physical HRQOL, independent of metabolic health status; this inverse relationship can be partly explained by age, educational status, and health- related behaviors.

Results from the study supported the data and findings introduced in literature review, obesity is a common problem among adults in US. The study reported that 69.5% of adult-online students were either overweight or obese (25.2% were overweight and 44.3% were obese); with 33.9% of females were overweight and 45% were obese, compared to males in the

study where 40% were overweight and 36% were obese. It is important to note that findings from this study may be more indicative of females than males. Thus findings may be more informative for practictioners and researchers targeting that specific population. The results concluded that HRQOL was a significant predictor for weight status, which confirmed what Breslin, Lalonde, & Bain (2012), reported about obesity being consistently associated with higher body dissatisfaction and low HRQOL measures and also consistent with the findings of Davilla et al. (2014), who confirmed that there is an established connection between obesity among college students and their life satisfaction with young adults aged 18-24 had less life satisfaction than older adults.

In the US overweight and obesity are negatively associated with unhealthy days, and activity limitation days (Huynh, 2018). Two of the four goals for Healthy People 2020 are directly related to quality of life: 1) attain high quality and 2) promote quality of life. Therefore, by continuously tracking population's HRQOL, we can monitor the nation's progress toward meeting these goals (CDC, 2018). The present study reported that the majority (87.7%) of the participants reported 1 or more unhealthy day compared to 12.3% reported 0 unhealthy days. This was consistent with the results of Huynh (2018), who reported that overweight/obesity are negatively associated with unhealthy days, and activity limitation days; with two of the four goals for Healthy People 2020 are directly related to quality of life: 1) attain high quality and 2) promote quality of life. The findings of the study supporting the conclusions of Rozjabek (2020), who reported that increasing levels of obesity tended to have a greater negative impact on HRQOL, work productivity, and weight loss behaviors, with some differences in effects by age, gender, were observed. Therefore, by continuously tracking population's HRQOL, we can monitor the nation's progress toward meeting these goals (CDC, 2018). Previous research found

that there is increased body mass index (BMI) during college years with average gains of 2.3 kg (5.07 lbs.) in freshman year (Anderson, Shapiro, & Lundgren, 2003).

Although, low physical activity and obesity are separately associated with adverse HRQOL (Herman, 2012), the results from the study showed that physical activity level (MET-min/week) was not a significant predictor for weight status among participants. A combined total physical activity MET-min/week is the sum of Walking + Moderate + Vigorous MET-min/week (IPAQ, 2002); with MET defined as the metabolic equivalents which is the energy that the body uses when resting or sitting still (IPAQ, 2002). The present study reported that the majority (90.2%) of the participants recorded low physical activity level (less than 600 MET-min/week) compared to only 9.8% reported moderate physical activity (600-3000 MET-min/week), with no participants reported high physical activity; which was consistent with the findings from a college-based study revealed that young adults, aged 18-35, are gaining weight faster than their parents, with an average of 30 lbs of weight gain during this phase of their life (Nanney et al., 2015) and also consistent with the findings of Calestine (2017) who reported that despite all the benefits of regular physical activity, research shows a significant decline in engagement in physical activity during the college years (Calestine, 2017). In addition, the global problem of the COVID-19 pandemic, the social distancing, and the stay at home-orders; all may have had a negative impact on the physical activity of the participants.

The current novel coronavirus, COVID-19 invaded the world by the end of 2019 and was announced by the World Health Organization (WHO) as a global pandemic on 11 March 2020 (Hâncu, A., & Mihălțan, F., 2020). With about 34% of the Americans obese and yearly between 160 to 210 million Americans becoming obese, a healthy lifestyle including a healthy nutrition model, daily physical activity and optimal sleep, will remain the key principle for a healthy

future for patients both during and after COVID-19 (Hâncu, A., & Mihălțan, F., 2020). In addition, the current novel coronavirus, COVID-19 pandemic, has reduced the face-to-face contact, and this has challenged how health professionals and students can access classes, and accreditation; and increased the availability and use of online and virtual mechanisms study (Seymour-Walsh, 2020. Globally, online channels have been used to promote social learning in regional and remote communities, with strategies for learning and tutor training proposed to support health professions education remotely (Seymour-Walsh, 2020)

The SCT was chosen as the framework for this study because it provides links and answers to individual behaviors. Discussing the findings of the study and interpreting them within the context of Bandura's social cognitive theory (1977) provided insight into the perspectives of participants, and allowed me as a researcher to understand how weight status of the participants might be a reflection for their health-related quality of life and physical activity levels. According to Bandura (1986), SCT is a learning theory that addresses the reciprocal relationship and interaction among individual's characteristics, behaviors, and environment. while emphasizing on the active role of each individual (Bandura, 2001. PP1-26). This concept of reciprocal determinism was helpful in predicting the social origin of the obesity problem among adults who choose online education and could also be used as a framework for planning health education programs targeting obesity among adults in online education; considering the person's experiences (online education) and any associated behaviors (quality of life and exercise habits) that may contribute to obesity.

According to Reisi et al. (2016), individuals are more motivated to engage in positive behaviors if they believe they would benefit from those behaviors. Which is similar to the findings of McAlister et al. (2008), who advocated that adapting new behavior is compatible

with the everyday routines and the sociocultural values of individuals. Although physically active individuals report feeling both physically and psychologically better compared to individuals who are not physically active (Colman & Dave, 2013), many studies reported a significant decline in engagement in physical activity during the college years mainly due to study load, work, and psychological transition to adult life (Calestine, 2017); which is consistent with the findings of this study with the majority of participants reported low physical activities.

Limitations of the Study

In this research study, recall bias, information bias, and other unknown confounders were identified as potential limitations. The first limitation of this research study was information bias. The survey was open to all online students in three U.S. higher education institutions via the SurveyMonkey and responses were anonymous. Participants in the study were not required to provide any personal information. Therefore, information bias could result from a general tendency of respondents to complete the survey even if they are not fully-online students; which could lead to misclassification, also known as recall bias (Frankfort-Nachmias & Nachmias, 2008). Recall bias could affected respondents' ability to recall past experiences related to quality of life and physical activity. Also, recall bias could have had an impact on those surveyed remembering or reporting information such as height, weight, days not feeling well, and weekly exercise. Generally, recall biases could pose limitations on the accuracy and interpretation of the descriptive statistics, and may limit the generalizability of the findings.

The results of this research study were applicable to the study population only and not a reference for the weight status of the general population of adult online students. Using a convenience sample posed a significant limitation to this study, as it is not a representation of the entire population of adult online students. The target population included adult online students

over the age of 18 years old. Therefore, the lack of including the general population of adult online students, limited the ability to infer conclusions about the weight status of adult online students nationally and globally.

Recommendations

Based on the findings of this study and what was shared from existing literature on predictors of obesity, there is a strong need for health education programs that target the obesity problem among adult online students. Allen & Seaman (2017), stated that registration for online courses in United States significantly increased in 2015, with 29.7% of all students in higher education were taking at least one online education course, representing a 3.9% increase from 2014. With the current COVID-19 pandemic, necessitating many university classes to be switched and adapted to online formats, there is an even greater need to address the predictors and risk factors of obesity among online students. In addition, exploring the demographic factors of adult online students may determine specific characteristics factors predicting obesity among different population at different campuses nationally and globally.

Although many studies have reported an association between obesity and HRQOL, most have focused on the inverse association between these two variables only (Park, 2017). More studies are needed to examine the relationship between obesity and HRQOL and determine the mediating effects of pathologic conditions, including Diabetes Mellitus, hypertension, and dyslipidemia on the relationship between obesity and HRQOL, especially since obesity and obesity-related diseases should be treated and prevented with an understanding of the role of gender (Park, 2017). Because obesity is related to the development of comorbidities and many chronic health conditions that impair not only the person's health status but also their self-perceived health; decision makers should have access to factors associated with obesity, such as

lower health-related quality of life, in order to build policies focused on reducing the negative effects of obesity on today's society (Busutil, 2017). Both private and public institutes are keeping up with technology to stay ahead of the curve of online education. According to the American College Health Association [ACHA], 2010), higher education has been identified as a critical stage of establishing healthy behaviors, although declining physical activity. In addition, previous studies have reported an inverse relationship between HRQOL and BMI (Kruger, Bowles, Jones, Ainsworth, & Kohl, 2007).

Obesity has consistently been associated with higher body dissatisfaction within HRQOL measures (Breslin, Lalonde, & Bain, 2012), and obesity is a risk factor for diminished HRQOL (Limbers, 2018). Therefore, planning and implementing interventions to promote overall wellness for online students should focus on promoting regular physical activity, improving eating habits, and empowering self-efficacy of those adults who suffers from mental and physical health problems. Arkorful & Abaidoo (2015) suggested that self-motivation is critical in online courses; In addition, Kentnor, (2015), stated that students will access affordable, high-quality education from any location globally in the next five years. Therefore, the prospect of online institutes is not only an option but essential to deliver health education messages targeting those who are at high risk of chronic diseases due to overweight and obesity.

The sample in this study was largely female and also included a high percentage of African Americans. Thus, findings from this study could be used to devlelop research and programming specific to female populations and African American females. Tailored online health messages with different formats: videos, pamphlets, group activities, and short scenarios may target the online students based on their demographics and preferences. Finally, there is a need to understand the effect of total screen time and work type on the weight status of adults in

online education. With great advancements in technology, many adults work while being students online, which could further impact their ability to be active and thus their weight status

Although, the number of programs promoting physical activities in higher education has decreased over the last few decades, several college/university-based interventions that do exist are generally based on the SCT (Boyle et. al, 2011). Therefore, SCT is a good framework that could be used as a guideline to help health educators design and implement obesity intervention programs especially with having defined predictors (Nerud & Samra, 2017). Because, SCT proposes that individual's behaviors, personal and environmental factors work to impact the behavior outcomes (Boyle et al., 2011), any intervention programs utilizing a source of social support, has shown to be effective in small groups where the interaction is more evident (Boyle et. al, 2011).

According to Bandura (1998), an individual's beliefs in their ability to regulate their motivation and personal behavior influences-plays a critical role in developing and maintaining a level of personal health. This includes the ability to recognize and execute an action necessary to produce a particular degree of attainment which acts on determinants in controlling personal behavior (Bandura, 1998). Therefore, while the online education platform could have some relationship or influence on obesity/weight status statistics among adults, it could also potentially be used to develop programming to influence personal beliefs and reciprocal determinism.

Bandura (1997) suggested that the individual's knowledge, and ability to acquire new knowledge, could be directly related to his or her observations of others through social interaction and experience. In addition, according to Sells (2016), despite the evidence that regular physical activity may reduce obesity and its complications, many Americans do not participate in regular physical activity, with only an estimated 21% of U.S. adults achieve the

recommended physical activity level. Therefore, there might be a need for more research study, mainly qualitative that would explore and address more variables that would affect the weight status of adults taking in consideration the effect of online education, screen time, the COVID-19 pandemic, the advancement in technology, and social networking on the eating habits, physical activities, and weight status of adults.

Many health assumptions are made about the online learning environment, including students' being at higher risk of sedentary lifestyles, smoking, and mental issues as depression (Rohrer, Cole, & Schulze, 2012). Results of this study suggested that quality of life and age were significant predictor for weight status, while physical activity wasn't a significant predictor for weight status. While previous studies have discussed the role of physical activity and quality of life on weight status of college students, there is a need to understand the role of technology and online education in controlling the physical activity levels and quality of life of online college students of all ages. The results also suggested that there is an opportunity for using the online education as a channel to increase the number of health education programs and physical activity messages offered mainly to online students. Planning for such programs should take in consideration the specific demographics of the target population in order to effectively implement interventions programs that uses technology to engage online students in making positive health decisions. Therefore, universities should leverage digital media to deliver health education messages for online college students (Armstrong, 2016).

According to the WHO (2019), positive changes in dietary and physical activity patterns are often results in individual and environmental changes to manage obesity. Therefore, it is recommended that quantitative and qualitative research be carried out on similar adult populations to allow better understanding to the predictors of obesity among different

populations. In addition, further understanding of the individuals' perceptions and beliefs may help researchers to design health education program targeting individual knowledge of obesity.

Implications for Social Change

This descriptive, exploratory, quantitative study examined the association between weight status, quality of life, and physical activity among a convenience sample of adult online students The findings of this study were significant and the results may contribute to positive social change as means of managing the obesity pandemic through studying the contributing factors to obesity/overweight rates among online students. Adult online students who participated in the study provided information that could lead to Positive Social Change using the online education as a channel to implement and deliver health education programs.

Positive Social Change is the process of positively transforming the populations' thoughts, behaviors, institutions, and social structure to create more beneficial outcomes for individuals, communities, societies, and the environment (Stephan & Patterson, 2016). According to Aithal (2016), online learning has less expenditure to incur and all one needs is a device to connect to the internet. Additionally, the main benefit of online learning is its affordability (Arkorful & Abaidoo, 2015). Because the prevalence of obesity presents an enormous medical burden; innovative treatment strategies are needed, whose success will depend on considering all the personal, cultural, economic and social aspects of adults with high BMI (Busutil, 2017). Therefore, this study aimed to bring positive social change to adults in online education by providing information that could be used in designing and implementing health education programs that promote the adoption of positive quality of life and promoting physical activities tailored directly to adults in online education. At a systems level, higher education institutions should develop protocols to identify and assist students who are at risk for food

insecurity, in collaboration with health educators, local food-bank, and university administrators (Knol, L. L., 2017), which may improve the students' overall health and well-being.

Obesity is identified as the fourth risk factor for global mortality rates (Arbel et al., 2019). The findings from this study could inform positive social change by promoting obesity intervention programs targeting adults in online education, taking in consideration the effect of COVID-19 pandemic on the availability of exercising facilities and social distancing. Findings of this research also suggest further research to develop applications and online health classes aligned with social cognitive theory that links individuals' confidence in adapting new behavior over unhealthy behaviors. Finally, results from this study could help policymakers and higher educational institutions to develop obesity prevention programs to empower adult online students to practice healthy lifestyles based on their age, race, gender, geographic location, employment status, and program of study; such programs could contribute to the reduction of obesity rates.

Conclusion

This study added a significant value to the body of research available on obesity and to the relationship between weight status, quality of life, and physical activity level. The study addressed the predictors of weight status among adult online students, which wasn't addressed before in research and happened to be conducted during the peak time of the COVID-19 pandemic, where most of the classes were switched to online formats and there was a limited physical activity due to "stay at home-orders". The research studied the weight status of the participants and the predictors of obesity, the findings revealed that the model was significant, with HRQOL making a unique statistically significant contribution to the model, HRQOL (OR = .429, 95% CI = .200 - .921, p = .030), while physical activity level (OR = .807, 95% CI = .354 – 1.843, p = .612) wasn't statistically significant. The results suggested that there might be a need

for more research studies that would predict the weight status of adults taking in consideration the effect of online education, screen time, the COVID-19 pandemic, the advancement in technology, and social networking; on the eating behaviors and physical activities.

The results of the study confirmed a definite need for health education programs targeting obesity among adults in online education. This implies that improvement of quality of life and increasing physical activity could help reduce obesity in adult online students in higher education. The results of this research study have significant public health implications for the education of online students to modify their lifestyle, and increase physical activity level to control obesity. Public health professionals and other healthcare professional need to take immediate actions to educate online students about how to prevent obesity, and consequently, prevent many chronic diseases caused by obesity.

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Appendix A: Survey

Demographics

The templates for the demographic questions was adopted from the BRFSS of the CDC. https://www.cdc.gov/brfss/questionnaires/pdf-ques/2017_BRFSS_Pub_Ques_508_tagged.pdf.

Please identify the higher institution where you registered as an online student?

- [HEI 1]
- [HEI 2]
- [HEI 3]

Which of the following is most closely related to your program of study?

- Business and Management
- Communication
- Criminal Justice and Emergency Management
- Education
- Health and Health Sciences
- Information Technology
- Nursing
- Psychology and Counseling
- Public Policy and Administration
- Social Work and Human Services

How tall are you without your shoes on?

- _____ feet _____ inches or _____ cm

How much do you weigh without your shoes on?

- _____ pounds or _____ Kg

What is your gender?

- Male
- Female

What was your age on your last birthday?

Are you Hispanic, Latino/a, or Spanish origin?

A) If yes, are you
   - Mexican, Mexican American

- Chicano/a Puerto Rican
- Cuba
- Another Hispanic, Latino/a, or Spanish origin

B) No

Which one of these groups would you say best represents your race?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Pacific Islander

In what county do you currently live?

- U.S. resident
- Non-U.S. Resident

If not U.S, where you currently live?

Identify your employment status?

- Employed
- Student only

HRQOL-Scale

In general, would you say that your overall health is?

- Excellent
- Very Good
- Good
- Fair
- Poor
- Prefer not to answer

Now thinking about your physical health, which includes physical illness and injury, how many days during the past 30 days was your physical health not good?

- ___ days
- Prefer not to answer

Now thinking about your mental health, which includes stress, depression, and problems with emotions, how many days during the past 30 days was your mental health not good?

- ___ days
- Prefer not to answer

During the past 30 days, approximately how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

- ___ days
- Prefer not to answer

IPAQ

The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1) During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

No vigorous physical activities Skip to question 3

2) How much time did you usually spend doing vigorous physical activities on one of those days?

- _____ hours per day _____ minutes per day
- Don't know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3) During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week

No moderate physical activities Skip to question 5

4) How much time did you usually spend doing moderate physical activities on one of those days?

- _____ hours per day _____ minutes per day
- Don't know/Not sure

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5) During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____ days per week

No walking Skip to question 7

6) How much time did you usually spend walking on one of those days?

- _____ hours per day _____ minutes per day
- Don't know/Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7) During the last 7 days, how much time did you spend sitting on a week day?

- _____ hours per day _____ minutes per day
- Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

4. How tall are you without your shoes on?

· _____ feet _____ inches or _____ cm

5. How much do you weigh without your shoes on?

· _____ pounds or _____ Kg

6. What is your sex?

- ◯ Male
- ◯ Female

8. Are you Hispanic, Latino/a, or Spanish origin?

- ◯ Yes-Mexican, Mexican American
- ◯ Yes- Chicano/a Puerto Rican
- ◯ Yes-Cuba
- ◯ Yes-Another Hispanic, Latino/a, or Spanish origin
- ◯ No

9. Which one of these groups would you say best represents your race?

- ◯ White
- ◯ Black or African American

Health Related Quality of Life (HRQOL)-Scale

13. In general, would you say that your overall health is?

- ◯ Excellent
- ◯ Very Good
- ◯ Good
- ◯ Fair
- ◯ Poor
- ◯ Prefer not to answer

18. How much time did you usually spend doing vigorous physical activities on one of those days?

hours/day	
minutes/day	
Don't know/Not sure	

Appendix B: Description of Operational Measures

Description of operational measures for quality of life , physical activity level, weight status, and demographic factors

Variables	***Survey Question***	***Response Category***	***Type of Variable***
Weight Status	Height-weight	0 Underweight-normal weight 1 Overweight-Obese	Categorical
Gender	Self-identified gender	0 Male 1 Female	Nominal
Age	Age in Years	Age 18 – 24 years Age 25 – 34 Age 35 - 44 Age 45 - 54 Age 55 - 64 Age 65 or older	Ordinal Categorical
Race/Ethnicity	Group best represents race	0 Black or African American 1 White 2 Hispanic/Mexican 4 Asian 5 American Indian, Alaska Native 6 Other Notes: Specify_____ 9 Refused	Nominal
Geographical location	U.S. or Non-U.S.	0 U.S. 1 non-U.S.	Nominal
Employment status		0 employed 1 student only	Categorical
Program of Study		0 health and health sciences 1 psychology 2 nursing 3 counseling 4 business 5 communication 6 criminal Justice	Categorical

		7 education 8 information technology 9 public policy and administration 10 social work and human services	
HRQOL		0 excellent, very good, good; 1 fair, poor; unhealthy days 0 No unhealthy days 1 number of unhealthy days	Categorical Numerical
IPAQ		0 Low level 1 Moderate level 2 High Level	Categorical