Recent high school graduates knowledge about physical activity guidelines and disease related to sedentary lifestyle

Soojin Yoo
University of Nevada Las Vegas

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RECENT HIGH SCHOOL GRADUATES KNOWLEDGE ABOUT PHYSICAL ACTIVITY GUIDELINES AND DISEASE RELATED TO SEDENTARY LIFESTYLE

by

Soojin Yoo

Bachelor of Science
Ewha Women University
1993

Master of Science
Ewha Women University
1997

A thesis submitted in partial fulfillment of the requirements for the

Doctor of Philosophy Degree in Sports Education Leadership
Department of Sports Education Leadership
College of Education

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ABSTRACT

Recent High School Graduates Knowledge About Physical Activity Guidelines and Disease Related to Sedentary Lifestyle

by

Soojin Yoo

Dr. Monica Lounsbery, Examination Committee Chair
Department of Sports Education Leadership, Chair, Professor
University of Nevada, Las Vegas

This study examined recent high school graduates’ knowledge about physical activity (PA) guidelines and disease related to sedentary lifestyle. Using a cross-sectional descriptive design, focus was on assessing knowledge performance and relating it to gender, ethnicity, PA behavior, and conceptualizations about high school health education (HE) and physical education (PE). Study participants were 394 recent high school graduates between the ages of 18-20 years of age. Participants completed a questionnaire designed to measure knowledge about PA guidelines and disease associated with sedentary lifestyle. In addition, the questionnaire also comprised items designed to capture demographical information and provide some information about respondents’ PA behavior and high school HE and PE.

The mean score of knowledge about PA guidelines and disease related to sedentary lifestyle were 13.01 (SD=1.99, 68.8%) and 5.37 (SD=2.05, 53.7% respectively). No significant relationships were found between knowledge of PA guidelines and diseases related to sedentary lifestyle, and conceptualization of high school HE and PE. Multiple...
regression analysis revealed that gender and PA behavior were significant predictors of knowledge about PA guidelines ($F(5, 1391) = 13.395, p< .001, R^2 = .046$). Gender contributed to 17.3% of the variance in knowledge about PA guidelines, while PA behavior had 15.2%. Gender and ethnicity were also significant predictors of knowledge of disease related to sedentary lifestyle ($F(5, 1391) = 5.864, p< .001, R^2 = .021$). Gender contributed 9.5% of the variance in knowledge about disease related to sedentary lifestyle, while ethnicity contributed 9.2%. Other results showed that as respondents matriculated through high school, dramatically fewer enrolled in PE (88.6% as a freshman and only 22.8% as a senior) and HE (67% as a freshman and only 7.6% as a senior). Sport and nutrition were the most frequently reported conceptualizations of PE and HE respectively.

Recent high school graduates’ performance on knowledge of PA guidelines and diseases related to sedentary lifestyle was very poor. While the results of this study fail to find PA behavior or conceptualization of HE and PE as salient variables associated with knowledge performances, in addition to the poor knowledge performance, the study did provide valuable information regarding the low enrollment patterns in high school HE and PE with most individuals enrolling as freshman. While only subjective, it is interesting that respondents mostly conceptualized PE as sport oriented and HE as nutrition oriented as these data provide respondents’ perspectives as to what was emphasized in these courses. These data do raise the question of where the general public information access points are for gaining knowledge about PA guidelines and disease associated with sedentary lifestyle and that this content may not be what is emphasized in the PE or HE high school curriculum.
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CHAPTER 1

INTRODUCTION

Background

Chronic diseases such as coronary heart disease, stroke, type 2 diabetes mellitus, and obesity plague Americans and are linked with physical inactivity (Mokdad et al., 2004). More than 300,000 deaths per year in the United States are attributed to poor dietary intake and physical inactivity. The substantial benefits of regular physical activity and exercise have been reported to reduce the risk of type 2 diabetes mellitus (Knowler, 2002), osteoporosis (Vuori, 2001), depression (Brosse, Sheets, Lett, & Blumenthal., 2002), obesity (Wing & Hill, 2001), breast cancer (Breslow, Ballard-Barbash, Munoz, & Graubard, 2001), colon cancer (Slattery & Potter, 2002), and cardiovascular disease (Thompson et al., 2003).

Despite the fact that over the last two decades considerable evidence has accumulated concerning the importance of physical activity to good health, more than 50% of Americans do not engage in enough physical activity, additionally, more than 25% of Americans are sedentary (Centers for Disease Control and Prevention; CDC, 2005). Furthermore, surveillance studies have identified that there is a significant decline in physical activity during adolescence (U.S. Department of Health and Human Services; USDHHS, 1996).

Along with this significant decline in physical activity during adolescence, the
prevalence of overweight and obese adults has more than doubled, and the prevalence of overweight children and adolescents has more than tripled over the last 25 years (Flegal, Caroll, Ogden, & Johnson, 2002; Ogden et al., 2002, Ogden et al., 2006). Obesity has been shown to increases individual rates of severe life-threatening diseases and mortality. Prevention of obesity in adolescence may be the most effective means of decreasing associated mortality and morbidity rates in adults (Must et al., 1992; Whitaker et al., 1997). With these serious concerns nationally, many organizations have advocated for increased physical activity and guidelines for encouraging physically active lifestyles in terms of frequency, intensity, time and type of physical activity.

In 1995 the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) published physical activity recommendations for public health. The report stated that adults should accumulate at least 30 minutes a day of moderate-intensity physical activity on most, preferably all, days per week (Pate, Pratt, Blair et al., 1995). In 1996 Physical Activity and Health: A Report of the Surgeon General supported this same recommendation. In order to track the percentage of adults who meet this guideline, Centers for Disease Control and Prevention specified that “most” days per week were 5 days. Since 1995 the common recommendation has been that adults obtain at least 30 minutes of moderate-intensity physical activity on 5 or more days a week, for a total of at least 150 minutes a week.

The Physical Activity Guidelines for Americans on October 7th, 2008 affirms that it is acceptable to follow the CDC/ACSM recommendation and similar recommendations. However, according to the Advisory Committee report, the CDC/ACSM guideline was too specific. In other words, existing scientific evidence does not allow researchers to say,
for example, whether the health benefits of 30 minutes on 5 days a week are any different from the health benefits of 50 minutes on 3 days a week. As a result, the new Guidelines recommend that children and adolescents should do 60 minutes or more of physical activity daily. For substantial health benefits, adults should do at least 150 minutes a week of moderate-intensity, or 75 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week (USDHHS, 2008).

Despite of these government efforts, only 32% of Americans were aware of the physical activity guidelines (Morrow et al., 2004). Since awareness varied by age, ethnicity, and educational levels, these variables must be directed toward intended segments of the population. School and health care providers can also play a significant role in reinforcing the relationship of physical inactivity on chronic diseases (Morrow et al., 2004).

Knowledge is important but knowledge supports to develop or maintain lifelong PA with other variables (Parcel & Baranowski, 1981; Rudd & Glanz, 1990). Knowledge has also been shown to be related to perceived health risks (Meischke et al., 2000). Sallis and Hovell (1990) indicated that health knowledge and exercise knowledge were predictive of moderate physical activity and knowledge predicted maintenance of moderate and vigorous activity. If overweight people are knowledgeable about diseases related to physical inactivity, they may try to prevent the risk or make health lifestyles (Foreyt & Goodrick, 1995; Goldfine & Nahas, 1993).

Educating people about the physical activity guidelines and disease related to
sedentary lifestyle in schools are important steps to reversing unhealthy lifestyle by physical inactivity.

More than one-third of young people in grades nine through twelve do not regularly engage in vigorous-intensity physical activity, and daily participation in high school physical education classes dropped from 41.6% in 1991 to 28.4% in 2003 (Grunbaum et al., 2004). Participation in PE decreased from 9th grade to 12th grade: 9th grade (66.8%), 10th grade (56.8%), 11th grade (45.1%), and 12th grade (41.5%). Prevalence of attending PE classes in high school range are vary from 28.4% to 90.8% (CDC, 2008).

Many states and school districts allow exemptions or substitutions to be utilized in place of physical education courses leading to elimination of any physical activity during the school day for the students involved (NASPE, 2001). Although Sallis and McKenzie (1991) have suggested that physical education classes should not only provide physical activity programs during school but should also prepare students for a lifetime of habitual physical activity, many schools provided repetitious and meaningless curriculum (Kovar, Ermier, Mehrof & Napper-Owen, 2001). Also, traditional team sports are the main focus in high school physical education (Corbin, 1994).

According to results of School Health Policies and Programs (Lee, Burgeson, Fulton, & Spain, 2007), most states and districts have adopted a policy stating that schools will teach at least 1 of the 14 health topics identified by SHPPS, and nationwide nearly all schools require students to receive instruction on at least 1 of these topics in high school health education class. Only, 35.8% of high schools required instruction on all 14 topics. Other study also indicated that the percentage of high schools providing opportunities to learn knowledge related to alcohol-use or other drug-use prevention (80.7%), emotional
and mental health (65.1%), human sexuality (61.8%), nutrition and dietary behavior (64.6%), and physical activity and fitness (54.5%) as part of a required health education course (Kann, Telliohann, & Wooly, 2007).

Research is needed to identify how well public education prepared individuals to live physically active healthy lifestyle and what they know about physical activity guidelines and disease associated with sedentary lifestyle.

Scope of Study

Given the substantiated trends in sedentary lifestyle and the prevalence of associated chronic disease (Mokdad et al., 1999), learning more about what recent high school graduates know about current physical activity guidelines and disease related to sedentary lifestyle is an important endeavor. Such information could prove useful in illuminating future directions for high school health and physical education programs.

Purpose of Study

The purpose of this study is to examine recent high school graduates’ knowledge about physical activity guidelines and chronic disease. Particular focus will be on assessing how much individuals know about these issues and relating it to gender, ethnicity, physical activity behavior, and conceptualizations about high school health and physical education. The results of this study may prove beneficial in the curricular content revision of physical education and health education in high school settings.
Research Questions

The following research questions were addressed in this study:

1. What do recent high school graduates know about physical activity guidelines and disease related to sedentary lifestyle?

2. What is the relationship between knowledge of physical activity guidelines and diseases related to sedentary lifestyle, and conceptualization of high school health and physical education?

3. Among gender, ethnicity, and conceptualization of physical education and health education in high school, which is the strongest predictor of knowledge of physical activity guidelines and disease related to sedentary lifestyle?

4. What differences exist in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior?

Significance of Study

The adverse effects a lack of physical activity and its impact on cardiovascular and long-term health has been well documented. According to the Centers for Disease Control (CDC, 1996), only 38 percent of young people between the ages of 18 and 21 are physically active. This trend continues into adulthood with only 15 percent of adults physical activity participating in leisure time physical activity of the recommended frequency and duration (USDHHS, 1996; 2000). Because almost youth attend school, experts have recommended that school based programs are the preferred method for promoting life-long activity in the teen population (USDHHS, 1996; 2000).
The recommendations inspire the need to learn more about what recent high school graduates know about these major public health issues. In doing so, potential health-related educational gaps may be identified of which, may prove useful in health and physical education curriculum revision.

Limitation of Study

This study is limited to assessments of knowledge about physical activity guidelines and disease related to sedentary lifestyle, and conceptualization of high school health and physical education from recent high school graduates. While the questionnaire included respondents’ description about high school health and physical education, the quality and content of high school health and physical education were not measured directly. Therefore, inference about the content and quality of high school health and physical education were limited to participants’ reported enrollment and conceptualizations about health and physical education in high school.

In addition, this study did not include students who did not obtain a high school diploma in the U.S. (e.g., home schooling, students who graduated in another country). Furthermore, this study was limited by the use of self-reported information not observed behavior directly. Although self-reported PA has 80% agreement by a heart rate monitor (Strath, Bassett, Ham, & Swartz, 2003), the accuracy of participant self-reporting current physical activity level and high school health and physical education experiences were not subject to some variability in this study.
Definition of Terms

Descriptors of Physical Education:

- Outdoor adventure oriented: focused on personal and group development. Concepts that are promoted in adventure activities (e.g., teamwork, trust).
- Skill oriented: progresses from mastery of basic skills and movement patterns, to combinations and use of skills in a variety of contexts.
- Sport oriented: have students learn to become players in the fullest sense, and have them develop into competent, literate, and enthusiastic sportspersons.
- Health and wellness oriented: application of knowledge through an integrated and evolving exposure to fitness, and health and wellness concepts and practices. Typically organized around general concepts (i.e., cardiovascular health, muscular strength, body composition, energy balance, etc), and activities are focused primarily on lifetime sports and lifetime activities.
- Cooperation oriented: Students are grouped into learning teams with the expectation that all students will contribute. The purpose is to encourage positive group relationship, foster self esteem, and encourage cooperation with the team.

Descriptors of Health Education:

- Substance abuse: curricula that are intended to promote an alcohol and other drug-free lifestyle.
- Drivers’ education; contains the tools to analyze and score curricula that are intended to promote safety driving.
- Sex education: curricula that are intended to promote sexual health and prevent risk-related health problems, including teen pregnancy, Human Immunodeficiency Virus
(HIV) infection, and other sexually transmitted diseases (STD).

- Physical activity: This module contains the tools to analyze and score health education curricula intended to promote physical activity.

- Nutrition: This module contains the tools to analyze and score curricula that are intended to promote healthy eating, sound nutrition, and healthy dietary practices.

Health-related fitness: A type of physical fitness that includes cardio-respiratory fitness, muscular strength and endurance, body composition, flexibility, and balance.

Lifestyle physical activities: Activities that a person carries out in the course of daily life and that can contribute to sizeable energy expenditure (e.g., taking the stairs instead of using the elevator, walking instead of driving, getting off a bus one stop early, or parking farther away than usual to walk to a destination).

Moderate-intensity physical activity: Activities between three and six METs or a comfortable intensity that can be sustained over a prolonged period of time (e.g., brisk walking at 3 to 4 mph and lifestyle activity).

Vigorous-intensity physical activity: Activities greater than six METs.
CHAPTER 2

REVIEW OF LITERATURE

Introduction

The adverse affects of a lack of physical activity and its impact on cardiovascular and long-term health has been well documented. Lack of physical activity trend continues into adulthood with only 15 percent of adults physical activity participating in leisure time physical activity of the recommended frequency and duration (USDHHS, 2000).

The recommendations provide a key focus for research into effective public school health and physical education programs. By investigating what recent high school graduates know about these major public health issues, potential health-related educational gaps may be identified of which and may prove useful in developing health and physical education curriculum.

The purpose of this chapter is to provide background into the physical inactivity problem, knowledge about physical activity, and status of health and physical education in public school for the conduct of the study. In order to accomplish to review, the chapter was divided into three major sections, (a) public health and PA, (b) relationship between PA behavior and knowledge, and (c) the status of public high school health and physical education. The first section subdivided disease and prevalence of physical inactivity, physical activity guidelines, and physical activity levels. The second section described relationship between physical activity behavior and knowledge. Finally, the
third section, the status of public high school health and physical education, was reviewed by first describing results from most recent School Health Programs and Policy Study (Lee, Burgeson, Fulton, & Spain, 2006). Additionally, literature that focuses on the scope of content and quality of high school physical education was examined. In summary, the chapter closes by making a case for the need to clarify what exiting public high school students know about physical activity guidelines and disease related to sedentary lifestyle.

Public Health and Physical Activity

*Disease and Prevalence of Physical Inactivity*

In the United States, overweight and obesity rates for youth have reached epidemic portions, and poor diet and physical inactivity account for the second leading cause of death among adults. The prevalence of overweight adolescents between the ages of 12 and 19 increased from 5% in 1980 to 17.6% in 2006 (CDC, 2008). Fifteen percent of Americans ages six to age 19 are overweight. One in five children, age five through 13, in the United States is currently diagnosed as being obese (Dietz, 2005). Overweight and obese individuals are at an increased risk for developing hypertension, osteoarthritis, high blood lipids, type 2 diabetes, coronary heart disease, and stroke (CDC, 2005). The number of diagnosis of diabetes increased two times from 1979-1999, the diagnosis of obesity and gallbladder diseases tripled, and sleep apnea increased five times (Wang & Dietz, 2002). Cardiovascular risk factors, such as systolic blood pressure, cholesterol, plasma insulin, and obesity tend to cluster and will persist into young adulthood (Dietz, 2005).
Furthermore, more than one-third of young people in grades nine through twelve do not regularly engage in vigorous-intensity physical activity, and daily participation in high school physical education classes dropped from 41.6% in 1991 to 28.4% in 2003 (Grunbaum et al., 2004). Youth should be started to learn healthy behavior to prevent carcinogenesis (USDHHS, 1994) and to develop PA behaviors because cancers have a long latent period and carcinogenic processes have potential to be started in youth (Colditz & Frazier, 1995).

**Benefits of Physical Activity**

Physical activity is a broad and complex concept that defined as any bodily movement produced by skeletal muscles that result in a substantial increase in total daily energy expenditure (Casperson, Powell, & Christenson, 1985). Physical activity that increases total daily energy expenditure during an individual’s discretionary time is considered leisure time physical activity. When leisure time physical activity is performed repeatedly over an extended period of time with the intent to improve fitness, physical performance, or health, it is often called exercise. Sport is a form of physical activity that involves competition whereas, occupational activity refers to the energy expenditure required to meet the demands of a job.

Moderate intensity is defined as activities between three and six METs or a comfortable intensity that can be sustained over a prolonged period of time (Jones, 1998; Balady et al., 2000). Examples include brisk walking at three to four mph and lifestyle activity. Vigorous intensity activity is defined as activities greater than six METs or “exercise intense enough to represent a substantial cardiorespiratory challenge” (Balady et al., 2000).
There have been many studies published about the benefits of physical activity in preventing risk factors for disease and for improvement of health. The Physical Activity and Health Reports from the Surgeon General (USDHHS, 1996) identified three major health benefits of regular participation in physical activity. This report indicated that people who are inactive can improve health by becoming moderately active on a regular basis. Further conclusions were that physical activity need not be strenuous to achieve health benefits and that greater health benefits could be achieved by increasing the duration, frequency or intensity of physical activity. Indications have also been demonstrated in studies that physical activity in childhood and adolescence may positively influence health status during childhood and adolescence as well as throughout adulthood (Blair, Chen & Holder, 2001).

The United States Department of Health and Human Services (2000) outlined eleven positive benefits of regular physical activity: (a) reducing the risk of premature deaths, (b) reducing the risk of cardiovascular disease, (c) reducing the risk of developing Type 2 Diabetes, (d) reducing the risk of developing high blood pressure, (e) reducing high blood pressure, (f) reducing the risk of colon cancer, (g) reducing feelings of depression and anxiety, (h) controlling body weight, (i) building and maintain healthy bones, muscles and joints, (j) helping older adults become stronger and better able to move about without falling, and (k) promoting psychological well-being.

**Physical Activity Guidelines**

As a result of the many benefits of increased physical activity, an important mission of the American College of Sports Medicine is to promote physical activity to the general public through the generation and promotion of public health recommendations for
physical activity because the recommendation could encourage increased participation in physical activity by a largely sedentary U.S. population.

In 1995 the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) published physical activity recommendations for public health. The report stated that adults should accumulate at least 30 minutes a day of moderate-intensity physical activity on most, preferably all, days per week (Pate, Pratt, Blair et al., 1995). In 1996 *Physical Activity and Health: A Report of the Surgeon General* supported this same recommendation. In order to track the percentage of adults who meet this guideline, Centers for Disease Control and Prevention specified that “most” days per week were 5 days. Since 1995 the common recommendation has been that adults obtain at least 30 minutes of moderate-intensity physical activity on 5 or more days a week, for a total of at least 150 minutes a week. The *Physical Activity Guidelines for Americans* affirms that it is acceptable to follow the CDC/ACSM recommendation and similar recommendations. However, according to the Advisory Committee report, the CDC/ACSM guideline was too specific. In other words, existing scientific evidence does not allow researchers to say, for example, whether the health benefits of 30 minutes on 5 days a week are any different from the health benefits of 50 minutes on 3 days a week.

The American College of Sports Medicine released initial guidelines from the performance of physical activity in 1970. These guidelines indicated that cardiovascular activities be performed at an intensity of 60-90 percent of maximum heart rate (ACSM, 1978). In 1990 a revised position statement on recommendation of quantity and quality of exercise for maintaining physical fitness was released indicating that healthy adults should engage in cardiovascular sessions of 20-60 minutes in length a minimum of three
of five days per week. The position changed with these new guidelines in which the ACSM recognized that moderate intensity activities may have benefits as well, instead of a strict adherence to the target heart rate guidelines. Additional recommendations were also made for muscular strength and endurance activities recommending moderate intensity weight training, consisting of 8-10 exercise for one set of 8-12 repetitions, at least two times per week (ACSM, 1990). As a result, the new Guidelines allow a person to accumulate 150 minutes a week in various ways (USDHH, 2008).

Physical Activity Level

Pinto and Marcus (1995) found that 46% of college students do not meet minimum guidelines established for PA. Pate et al (1995) reported that 32% of young adult aged 18 years and older meet minimal PA guidelines applied by the American College Sports Medicine guidelines. National College Health Risk Behavior Survey (Dogulas, Collins, & Warren, 1997) reported that 36% of students did not involve sufficient level of PA and the other research reported that 50% of students did not meet ACSM (Dinger, 1999) recommendations. Currently, the American College Health Association (2008) reported that 45.9 % of college students meet PA recommendation. The recommendation or standard that researchers used may not be similar. However, studies showed that the PA levels in young adults were decreased. Also, research revealed the pattern about the rapid rated of weigh gain and they were not be physically active (Levitsky, Halbmaier, & Mrdjenovic, 2004; Racetter, Deusinger, Strube, Highstein, & Deusinger, 2005). Other research showed that there is 62.5% reduction in PA behavior between high school and college (Cullen et al., 1999). This result emphasized that the PA skills being taught in middle and high schools are not having the desired impact on lifetime PA levels in young
adulthood. This should be considered to developing PE curriculum. The 2007 YRBSS results indicated that 26.2% of 11th grade and 28.9% of 12th grade did not participate in 60 or more minutes of PA on any day. PA level in these two grades were lower than 9th (21.5%) and 10th grade (24.0%).

Activities practiced by adolescents have been proposed to have an influence on adult physical activity (Trudeau & Shephard, 2005). Physical inactivity related to sedentary lifestyles increase to potential of cancer risk around the transition out of high school (Baranowski, Cullen, Ebasen-Enquist, Wetter, Cummings, Martineau, et al., 1997) because many changes occur in social roles including changing schools, leaving the parents’ home, and changing peers (Hamburgs, 1980).

Previous research has reported that womens’ participation in PA is lower and did not meet PA guidelines compare to men (CDC, 2005; Buckworth & Nigg, 2004; Wallace & Buckworth, 2002). Current American College Health Association (2008) reported that 42.9 percent of female and 52.7% of male students meet PA recommendations. Although research has been shown that there are gender differences in PA level and PA participation that women were lower than men, if provided diverse curricular experiences through PE in high school, women’s PA levels were associated positively with higher PA as young adults (Mears, 2007).

In addition, research revealed that there are differences in PA levels and ethnicity: Asians were the lowest, African Americans and Hispanics were next, and Caucasians in women. Hispanics were less active than Caucasians in men (Suminski, Petosa, Utter, & Zhang, 2002). Ethnicity should be considered for developing PA behavior for students in high school and college.
These findings indicate that the physical activity levels of youth, college aged individuals, and adult do not meet recommended guidelines to provide a basis for future research to promoting physical activity in order to prevent chronic diseases related to sedentary life styles.

The Status of Physical Education in Public Schools

Over the last two decades considerable evidence has accumulated concerning the importance of physical activity to good health. The Surgeon General’s Report on physical activity and Health, (USDHHS, 1996), documents the decline in PA during the teen years and targets promoting activity among youth as an important national concern. Because most of youth attend school, experts have recommended school-based physical education programs should be used for promoting lifelong physical activity (Sallis & McKenzie, 1991). With the development of qualify of physical education program, status of PE need to be reviewed. Two key areas of research will be discussed in this section: (a) participation in physical education and (b) physical educational curriculum models in high school.

Participation in Physical Education

The YRBSS survey results indicated the progress towards attaining the 2010 goals. Gains in high school students that were physically active in physical education class for more than 20 minutes three or more days of the week were made, from 30 percent in 1999 to 38 percent in 2003. Moderate physical activity, vigorous physical activity, and participation in daily physical education were less than 2010 target.
The proportion of high school students who did not engage in any moderate or vigorous physical activity remained relatively stable from 1999 (9.4%) to 2005 (9.6%). According to the Centers for Disease Control and Prevention (Lee, Burgeson, Fulton, & Spain, 2007), 53.6% of high school students participated in PE class in one or more days in a week in 2007. Participation in PE decreased from 9th grade to 12th grade: 9th grade (66.8%), 10th grade (56.8%), 11th grade (45.1%), and 12th grade (41.5%). Males (57.7%) were higher than females (49.4%) in PE participation and Hispanic students (61.0%) were higher than Caucasian students (50.4%) in PE participation.

State requirements have been established for moderate and vigorous physical activity and physical education for high school youth. However, these requirements are subject to revisions and vary by state, school district, and individual schools. Some school districts or individual schools do not require physical education class for high school students, whereas other schools may require only one full year of physical education.

*High School Physical Educational Curriculum Models*

Professionals have developed the qualify physical education curriculum models. These models emphasized on needs, interests of students within sport (Seidentop, Hastie, & van der Mars, 2004), games (Mitchell, Oslin, & Griffin, 2006), and fitness (Corbin, 1994). Also, Sallis and McKenzie (1991) have suggested that physical education should not only provide physical activity program during school but also prepare students for a lifetime of habitual physical activity.

Siedentop (1994) initiated Sports Education Model, emphasized the development of positive social behaviors and provides students with opportunities for leadership skill development. This model was designed to promote a positive sports experience through
many roles including player, coach, equipment manager, general manager, official statistician or media through sports activity. Sports education oriented PE also can provide positive effect for PA participation but it should be considered that schools provide the quality of PE program for student to learn health-related to knowledge and PA behavior. Hastie and Sharpe (1999) also indicated that exposure to the curriculum model which is emphasized to sport increase students’ positive peer interactions and their social interaction behavior. These curriculum models were focused on the ability to increase especially social skill through PE program.

Dale, Corbin, and Chuddihy (1998) investigated conceptual physical education model that can promote physically active lifestyles. The objective of conceptual physical education model is to promote positive attitude toward activity and exercise that will encourage students to adopt physically active lifestyle. The traditional physical educations were considered as sports based programs. They examined the effect of programs between conceptual physical education and traditional physical education. Students were exposed in two different programs in 9th grade in high school. After high school graduation, females were significantly less likely to show sedentary behavior when they exposed to the conceptual physical education program. Dale and Corbin (2002) emphasized that students need to increase physical activity for lifelong health and fitness through conceptual physical education.

Sallis and McKenzie (1991) reported that children who participated in team games are more likely to those who participated in more lifetime activities as adults. This research emphasized that the promotion of lifetime PA through PE classes can effect on improving and maintaining on children’s health later in life. This curriculum model focused more
narrowly physical education as public health education through physical activity, for example programs, CATCH and SPARK (McKenzie, Strikmiller, Stone, Woods, Ehlinger, Romero, et al., 1994; Sallies & McKenzie, 1999).

Hellison and Templin (1991) developed the Multi-Activity Model. This model supports for students to be involved to variety of physical activities and sports by team management and game play. Also, DeLine (1991) suggested cooperative curriculum to promote cooperative and social skills.

Research revealed that the mostly conducted activities are football, basketball, volleyball, soccer, and baseball/softball in PE by high school (Simons- Morton, Eitel, & Small, 1999). Hence, many physical educators have been trained to provide a sport-based curriculum (Steinhardt, 1992) and have never received training to teach a health-related to PE curriculum (Cothran et al., 2006).

According to SHHPS (Lee, Burgeson, Fulton, & Spain, 2007), among the 78.3% of schools at all levels that required physical education, 98.5% taught group or team activities, 95.1% taught individual or paired activities, 63.2% taught dance activities, and 8.5% taught aquatic activities in required physical education. Many national organizations have been emphasized to implement quality and quantity of school PE programs with lifelong health related PA goals (rather than competitive sport-related skills) for all students in kindergarten to 12th grade students (AHA, 1995; NASPE, 1999).

Physical education needs to be conducted for students to learn physical activity behavior to promote and maintain healthy lifestyles. Curriculum effectiveness need to be evaluated what students learned in physical education classes.
The Status of Health Education in Public School

Through health education at school, students can be allowed to improve health-related knowledge, attitudes, skills and decrease the prevalence of health-risk behaviors (CDC, 2008). Healthy People 2010’ Objective 7-2a is to “increase the proportion of middle, junior high, and senior high schools that provide school health education to prevent health problems in the following area: unintentional injury, violence, suicide, tobacco use and addiction, alcohol and other drug use, unintended pregnancy, HIV/AIDS and STD infection, unhealthy dietary patterns, inadequate physical activity, and environmental health, USDHH (2000)”. Further federal level support for health education are necessary.

According to Kann, Telljohann and Wooley (2007), most states and districts have adopted at least one of the 14 topics and nearly all schools required students to receive instruction on at least 1 of these topics: an alcohol-use or other drug-use prevention, asthma awareness, emotional and mental health, food-borne illness prevention, HIV prevention, human sexuality, injury prevention and safety, nutrition and dietary behavior, other STD prevention, physical activity and fitness, pregnancy prevention, suicide prevention, tobacco-use prevention, and violence prevention.

Results from the 2000 School Health Policies and Programs Study (Kann, Brener, & Allensworth, 2001) revealed that 84% of high schools provided at least 450 minutes of required health education in each grade (equivalent to one 50-minute class per week for 9 weeks, one quarter) but the percentage of high schools requiring health education decreased from 10% in grade 9 to 2% in grade 12. Most state departments of education require high school students to attend at least one health education course (Kann, Brener, & Allensworth, 2001). Kann, Telljohann, and Wooley (2007) pointed out that 1.0 to 2.2
hours of health instruction per week was not sufficient to gain to prevent health risk behavior at school through analysis of national study data.

King and Snyder (2003) reported that the effectiveness of health education that high school graduates believe health education increased knowledge about using illegal drugs, a well balanced diet, and regular exercise behavior especially. After high school graduation, freshmen and sophomores compared to junior and senior in universities strongly felt that behaviors for healthy life were important to adopt (King & Snyder, 2003). They were more likely to feel that their high school health education was effective to build their health knowledge and behavior.

Schools should continually provide the opportunity to learn how to improve healthy lifestyle and assess the effectiveness of the health education curriculum by students’ health knowledge, attitudes, and behaviors, however, the policy should be supported for improving enrollment of health education in school.

Knowledge about PA and Disease Related to Sedentary Lifestyle

Many researchers have been found the relationship between knowledge and health related to behaviors. Social Cognitive Theory explained that knowledge about health behaviors and benefits offers increases self efficacy (Bandura, 1997). Sallis et al. (1992, p.s249) stated, “ … knowledge about health effects of physical activity are not important, but knowledge of how to be active may be a significant influence….”. Providing information of public physical activity knowledge could be helpful in developing health promotion and physical activity interventions. Sallis and Hovel (1990) indicated that health and exercise knowledge were predictive of moderate physical activity. Also,
knowledge predicted maintenance of moderate and vigorous activity. Currently, Behrens, Dinger, Heesch, and Sisson (2005) examined college students’ understanding of PA and the moderate PA recommendation. Result indicated that students knew the definition of PA, but were not aware of the specific terms including frequency, duration, and accumulation factors of the moderate PA recommendations. Also, students were confused about the benefits of moderate PA. These results suggest that college students need to understand the specific components of the PA recommendations.

For assessing to quantify and determine adequate levels of health-related PA knowledge, new tests were invented and conducted in secondary school through PE classes. The FitSmart National Health-Related Physical Fitness Knowledge Test for secondary students by Zhu, Safrit, and Cohen (1999) was developed and conducted to assess health-related physical fitness knowledge in secondary students. It was based on measuring knowledge about healthy lifestyles by grade, gender, and ethnicity. The result indicated that there was significant difference on physical fitness knowledge by grade especially between 9th grade and other grades. 10th, 11th, and 12th grades did not show significant differences. Gender and ethnicity have significant differences on test scores. Girls are higher than boys on test scores and Caucasians are higher than African-American students.

Ayears (2004) studied on assessing students’ knowledge based on the subdisciplinary areas related to what the profession has deemed necessary to be a physically educated individual. This study was to describe the conceptual knowledge base of a national sample of high school students using the assessment of subdisciplinary knowledge in physical education. The assessment composed of each of seven subdisciplinary areas (e.g.,
aesthetic experiences, biomechanics, exercise physiology, historical perspectives, motor
development, motor learning, and social psychology and teacher content coverage). On
this study, high school students’ average score were very low. Average test scores on
each section were: 65% on motor development, 62% on exercise physiology, 60% on
social psychology, 57% on biomechanics, 56% on aesthetic experience, 53% on motor
learning and 49% on historical perspectives. These results showed that best performance
is still grade “D”. Also, there were gender and ethnicity differences on test scores that
showed girls are higher than boys on the test scores and Caucasians are higher than all
other ethnic groups.

Morrow et al. (1999) reported that 32% American are not knowledgeable about PA
guidelines. Respondents in the study were aware of traditional physical activities (94%) that provided a health benefit and less aware of physical activity guidelines (68%) and lifestyle physical activities (71%).

Also, researchers have studied to examine relationship between knowledge about chronic disease and PA behavior. Vega et al.(1987) revealed that many factors to change behavior related to knowledge. The authors found relationship between knowledge of health behaviors and cardiovascular diseases between Anglo - and Mexican - Americans. Gender, education, self-efficacy, and acculturation were determinants of health knowledge for Mexican Americans. Parental health knowledge was determinants of health knowledge for children and education was the strongest predictor for Anglo-American adults.

Meischke et al. (2000) investigated the relationship between knowledge and perceived health risks. The authors suggested learning about personal risk perceptions of
health may have positive impacts on people's desire to engage in preventive health behaviors. Sminski et al. (1999) studied the relation between knowledge about cardiovascular disease risk factors and risk-reducing behaviors in adults. The study revealed that there was no association between knowledge and having cholesterol and blood pressure examinations in adult group aged from 20 to 49 years old. The average health risk knowledge score was 64%. There was no significant relationship between CVD risk factor knowledge and BMI for gender. This research revealed that CVD knowledge alone does not link to improve health behaviors and CVD risk factor knowledge was not necessary for improving CVD risk-reducing behaviors in this participation. These results may need to review other variables including level of education, income or other unique barriers to assess knowledge and behavior.

Nationwide, 3.9% of states required and 39.2% recommended that high school give written tests of student’s knowledge related to PE. 21.7% of districts required and 37.6% recommended that high school give written test of students' knowledge related to PE (Lee, Burgeson, Fulton and Spain, 2007). According to SHPPS data (2006), teachers used criteria to assess student performance in PE based on the level of participation (95.8%), attitudes (89.3%), attendance (56.9%), improvement in movement skills test scores (53.7%), final score on movement skills tests (49.3%), physical fitness test scores (45.9%), demonstration of self-management skills (39.7%), and participation in PA outside of PE (11.8%). To assess outcomes are important but the accessibilities to measure health related to knowledge are still low. Also, the test was not based on assessment of knowledge about health and physical activity although many experts have developed test to assess students’ knowledge. It focused on cognitive PE knowledge.
based on exercise physiology, biomechanics, skill, and health-related physical fitness on standardized testing in core subjects (Zhu, Safrit, & Cohen, 1999; Ayers, 2004).

Knowledge about PA guidelines and disease related to sedentary lifestyle should be included on testing during PE so students recognize and become aware how much they need to be active and what they can do to prevent chronic disease related to sedentary lifestyle. To educate people that regular physical activity can reduce risks for the development of chronic diseases among adults (USDHHS, 2000) including cardiovascular disease (Lichtenstein, Appel, Brands, et al., 2006), cancer (Jemal, Siegel, Ward, Murray, Xu, & Thun, 2004), and diabetes (CDC, 2005) because the problems related to sedentary lifestyles have been increased.

Health and physical education professionals are in a strategic position to help overweight individuals lose weight by promoting exercise. If overweight people are knowledgeable about diseases related to physical inactivity, they may try to prevent the risk or make health lifestyles (Foreyt & Goodrick, 1995; Goldfine & Nahas, 1993). Many researchers mentioned that knowledge is not sufficient to change health behaviors but it is required (Parcel & Baranowski, 1981; Rudd & Glanz, 1990) because there are many related factors to knowledge, for example, ethnicity, education, and age (Morrow et al., 2004). Also, the association between knowledge of PA and the health benefits showed to make people physically active (Kann, et al., 2002).
CHPATER 3

METHODOLOGY

Overview

As previously outlined in Chapter 1 and 2, the primary focus of this study is to examine knowledge about physical activity guidelines and chronic disease related to sedentary lifestyle among recent public high school graduates. The results of this study may prove beneficial in the curricular content revision of physical education and health education in high school settings. Again, the research questions that were addressed in this study were as follows:

1. What do recent high school graduates know about physical activity guidelines and disease related to sedentary lifestyle?

2. What is the relationship between knowledge of physical activity guidelines and diseases related to sedentary lifestyle, and conceptualization of high school health and physical education?

3. Among gender, ethnicity, and conceptualization of physical education and health education in high school, which is the strongest predictor of knowledge of physical activity guidelines and disease related to sedentary lifestyle?

4. What differences exist in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior?
This Chapter provides a description of the methodology that was used in the conduct of this study. An overview of the setting, participants, design, data collection and data analyses is provided.

Setting

Conduct of this study took place at the University of Nevada, Las Vegas. This setting was selected for its convenience in obtaining a participant sample of recent high school graduates and furthermore, selection of participants possessing low academic capability may be less likely. In addition, this setting provided tremendous population diversity. As Table 1 shows, less than half of students are identified as being Caucasian (45.3%) and a significant proportion is either Hispanic (15.8%), African American (9.1%), Asian/Pacific Islander (21%) or American Indian/Alaskan Native (0.6%). Gender was identified by 55.6% of women and 44.4% of men (Table 1).

Table 1. University of Nevada Las Vegas Enrollments in 2007

<table>
<thead>
<tr>
<th></th>
<th>Freshmen Fall 2008</th>
<th>Freshmen %</th>
<th>Sophomores Fall 2008</th>
<th>Sophomores %</th>
<th>Total Fall 2008</th>
<th>Total %</th>
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<tbody>
<tr>
<td>African American</td>
<td>530</td>
<td>9.5</td>
<td>340</td>
<td>8.6</td>
<td>870</td>
<td>9.1</td>
</tr>
<tr>
<td>Asian</td>
<td>1218</td>
<td>21.9</td>
<td>781</td>
<td>19.7</td>
<td>1999</td>
<td>21.0</td>
</tr>
<tr>
<td>Caucasian</td>
<td>2465</td>
<td>44.2</td>
<td>1851</td>
<td>46.7</td>
<td>4316</td>
<td>45.3</td>
</tr>
<tr>
<td>Latino</td>
<td>946</td>
<td>17.0</td>
<td>558</td>
<td>14.1</td>
<td>1504</td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>28</td>
<td>0.5</td>
<td>30</td>
<td>0.8</td>
<td>58</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>5574</td>
<td></td>
<td>3963</td>
<td></td>
<td>9537</td>
<td></td>
</tr>
</tbody>
</table>

Participants and Sampling Procedures

Students attending the University of Nevada, Las Vegas and have recently graduated from high school were asked to participate in this study. Recent graduation was operationalized as two or less years post high school graduation. This means that participants in this study were likely college freshmen and sophomores and are between ages of 18 and 20 years old.

Power calculations were conducted to obtain the minimum number of respondents needed to respond to this survey. Using recommendations for power calculations by Cochran (1977) and using for a large effect size for this study, a total sample size of 377 was required. A 95% confidence level and $p = .5$ are assumed for equation.

In order to obtain the sample for this study, collaborative relationships was sought between the researcher and admission officers, new student orientation directors, and directors of specialized programs and advising services for freshman and sophomore level students such as UNLV’s First Year Program. In working with these individuals, the researcher sought support and advisement with the intention of increasing accessibility to large numbers of individuals meeting the selection criteria. In addition, the researcher communicated with and solicited the support of instructors who teach English 101 and general education classes that may have significant freshman and sophomore student enrollment. It was anticipated that support from the dean and the department chair may engender higher receptivity and cooperation from course instructors, and hence, increased access. The researcher distributed the questionnaire to students in the general education classes, student recreation center, and other appropriate venues as described.
Prior to soliciting participation in this study, IRB approval was secured and in accordance with approval, participant’s informed consent was obtained.

Study Design

The research questions were addressed using a cross-sectional research design. Descriptive research is used to describe situations, events, or other phenomenon (Babbie, 1999; Isaac & Michaels, 1995). Cross-sectional designs provide a description of a group at a single time frame (Fink, 1995). In this study, knowledge of physical activity guidelines and disease related to sedentary lifestyle, conceptualization of health and physical education, physical activity behavior used to describe the population of interest.

Data Collection and Instrumentation

This study used a questionnaire that had been used in previous studies to assess knowledge about physical activity guidelines and disease related to sedentary lifestyle (Morrow et al., 2004). Kuder-Richardson internal consistency reliability for the 30 items was .59 (moderate). This questionnaire was developed with input from a number of experts involved in physical activity research (e.g., the American College of Sports Medicine, the American Heart Association, the American Alliance for Health, Physical Education, Recreation and Dance)

From the questionnaire by Morrow et al. (2004), the 19 items in the questionnaire reflected knowledge of traditional and lifestyle physical activities for this study. The items was answered by true and false, and five items were related to physical activity guidelines, eight to related traditional physical activities, and six items were related to
lifestyle physical activities (i.e., some with a MET value ≥3.0, which is estimated as the minimum MET level for a health benefit).

Another 10 items assessed knowledge about disease related to sedentary lifestyle (i.e., cancer, depression, heart disease, high blood pressure, osteoporosis, and stroke). Additional diseases not affected by physical activity (i.e., asthma, bunions, and kidney disease) included to account for response set where in respondents might tend to answer yes to all items. Kuder-Richardson internal consistency reliability for the 29 items for this study was .69.

Additional items added to this questionnaire to capture the demographic profile of respondents as well as their conceptualizations about high school health and physical education. A description of the items pertaining to the demographic profile and conceptualization about high school health and physical education was provided below.

**Demographic Profile**

The demographic variables in this study included respondents’ gender, ethnicity (American Indian or Alaskan Native, Asian, African American, Hispanic or Latino, Native Hawaiian or Pacific Islander, Caucasian, Other) and academic major in the college. To verify they have met the selection criteria, the year graduated from high school was asked.

In addition, a single-response item developed and validated by Jackson, Morrow, Bowles, FitzGerald, & Blair (2007) was used to assess physical activity behavior (refer Table 2). This single self-report item was selected because of its simplicity and significant correlation with cardiorespiratory fitness as determined by a maximal exercise test on a treadmill (r = .53). Furthermore, stability reliability estimates of .98 were
obtained for the test-retest protocols. When this item was dichotomized as described above, test-retest modified Kappa coefficients were .84, and proportion of agreements were .92.

Table 2. Physical Activity Level

<table>
<thead>
<tr>
<th>PA Guidelines</th>
<th>Level</th>
</tr>
</thead>
</table>
| Does Not Meet (0) | 1. I don’t exercise/walk regularly now, & don’t intend to start in near future.  
2. I don’t exercise or walk regularly, but I have been thinking of starting.  
3. I’m trying to start to exercise or walk or I exercise/walk infrequently.  
4. I’m doing 25 minutes of vigorous** exercise <3 times/wk or 30 minutes (or <75 minutes/wk) of moderate* exercise <5 times/wk (or <2 1/2 hrs/wk). |
| Does Meet (1) | 5. I’ve been doing 30 minutes of moderate* exercise >5 /wk (or >2 1/2 hrs/wk) for last 1-6 month.  
6. I’ve been doing moderate* exercise >5 /wk (or >2 1/2 hrs/wk) for last >7 month.  
7. I’ve been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for 1-6 months.  
8. I’ve been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for 7 or more months. |

* The word MODERATE refers to activities like brisk walking, gardening, slow cycling, dancing, or hard work around the house.  
** The word VIGOROUS refers to activities like basketball, jogging, running, fast cycling, aerobics class, swimming laps, singles tennis, racquetball, etc.

Conceptualization of High School Health and Physical Education

Participants asked to complete questions concerning number of health and physical education classes taken in high school, what grades health and physical education were taken in, and which description is best captures of the primary focus of health and physical education.
Data Analyses

All data analyses performed using Statistical Package for Social Science version 16.0 (SPSS, 2007). A significance level of $p < .05$ was used for all statistical procedures. The demographic data calculated using measures of central tendency descriptive statistics. Frequency counts and percentages were computed to describe the findings.

Descriptive statistics were used for calculating the variable type and distribution. Continuous outcomes described using appropriate measures of central tendency (e.g., mean, median) and variability (standard deviation, range).

Results are presented in frequency tables for specific questions. Chi-square analyses conducted to determine if specific dichotomous variables (e.g., yes/no) are related to items within the demographic profile (e.g., gender, ethnicity). Analyses for each research question provided below.

Question 1. “How much do recent high school graduates know about physical activity guidelines and disease related to sedentary lifestyle?”; descriptive statistics were conducted. Gender, ethnicity, and scores of knowledge of physical activity guidelines and diseases related to sedentary lifestyle grouped by crosstabulation tables.

Question 2. “What is the relationship between knowledge of physical activity guidelines and diseases related to sedentary lifestyle, and conceptualization of high school health and physical education?”; correlation analysis was conducted.

Question 3. “Among gender, ethnicity, and conceptualization of physical education and health education in high school, which is the strongest predictor of knowledge of physical activity guidelines and disease related to sedentary life style?”; multiple linear regression analysis was conducted.
Question 4. What difference exits in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior?"; multivariate analysis of variance (MANOVA) was conducted. As independent variables gender, ethnicity, conceptualization of high school health and physical education, and self-reported physical activity behavior were used. As dependent variables, knowledge score of physical activity guidelines and chronic disease were analyzed.
CHAPTER 4

RESULTS

The purpose of this study was to examine recent high school graduates’ knowledge about PA guidelines and chronic disease. Particular focus was on assessing what individuals know about these issues and relating it to gender, ethnicity, PA behavior, and conceptualizations about high school HE and PE. This chapter provides an overview of the study results and is subdivided into the following areas: sample demographics, knowledge about PA guidelines and disease related to sedentary lifestyle, PA behavior, high school HE and PE, predictor of PA knowledge and disease related to sedentary lifestyle, PA behavior, and knowledge about PA guidelines and disease by gender, race, PA behavior, conceptualization of HE and PE.

Sample Demographics

As described in Chapter 3, a questionnaire was distributed to some students at the University of Nevada Las Vegas during the spring semester of 2009. Four hundred and one completed surveys were collected. Based on the screening criteria, 7 surveys were not utilized for data analysis because they either did not meet the selection criteria or the respondent completed the survey more than once. After these exclusions, the total number of participants who completed surveys and met the selection criteria was 394 and comprise the sample for this study. Participant demographics, including gender, age and high school graduation year is presented in Table 3. Slightly more than one-half of the
sample respondents (55%) were women and as Table 4 shows the ethnic diversity in this sample (Caucasian-38.8%, Hispanic or Latino-18.3%, and Asian-18.0%).

Table 3. Participant Demographics

<table>
<thead>
<tr>
<th>Categories</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>179</td>
<td>45.4</td>
</tr>
<tr>
<td>Female</td>
<td>215</td>
<td>54.6</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>185</td>
<td>47.0</td>
</tr>
<tr>
<td>19</td>
<td>184</td>
<td>46.7</td>
</tr>
<tr>
<td>20</td>
<td>25</td>
<td>6.3</td>
</tr>
<tr>
<td>Graduation year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>54</td>
<td>13.7</td>
</tr>
<tr>
<td>2008</td>
<td>340</td>
<td>86.3</td>
</tr>
</tbody>
</table>

Table 4. Participant Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian or Alaskan Native</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>Asian</td>
<td>71</td>
<td>18.0</td>
</tr>
<tr>
<td>African American</td>
<td>37</td>
<td>9.4</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>73</td>
<td>18.5</td>
</tr>
<tr>
<td>Native Hawaiian or Pacific Islander</td>
<td>26</td>
<td>6.6</td>
</tr>
<tr>
<td>Caucasian</td>
<td>154</td>
<td>39.1</td>
</tr>
<tr>
<td>Other</td>
<td>29</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Knowledge about PA Guidelines and Disease Related to Sedentary Lifestyle

As described in the Chapter 3, 19 items were used to assess knowledge of traditional and lifestyle physical activities in relation to PA guidelines. Another 10 items assessed knowledge about disease related to sedentary lifestyle (i.e., cancer, depression, heart disease, high blood pressure, osteoporosis, and stroke). Table 5 showed that the overall
mean score for knowledge about PA guidelines was 13.1 (SD=1.99, 68.8%) with women scoring slightly higher than men (M=13.3, 70% and M=12.8, 67.4% respectively) and this difference, though small, was statistically significant ($F (1, 392) = 6.240, p < .05$). Also, as Table 5 shows, individuals who met guidelines (M=13.3, 70.0%) also scored slightly higher than those who did not meet PA guidelines (M = 12.79, 67.3%). There was statistically significant ($F (1, 392) = 6.372, p < .05$).

No differences were found in knowledge about disease related to sedentary lifestyles by gender and PA behavior, however, significant differences between ethnicity and knowledge about disease related to sedentary lifestyle ($F (6, 387) = 2.484, p < .05$) were found with American Indian or Alaskan Native scoring highest (70%) and African Americans scoring lowest (45.9%). The overall mean score for knowledge about disease related to sedentary lifestyle was 5.37 (53.7%) with women scoring higher than men (55.3% and 51.8% respectively).

**Physical Activity Behavior**

Student physical activity behavior was measured using the single item of “what best identifies your current level of exercise?” and provided respondents with eight options to select the one that best describes exercise level. The number and percentages of participants selecting each option within this question are provided in Table 6. From these data it is clear that a moderate portion of the sample (22%) selected “I've been doing 25 minutes of vigorous 3-5 times per week (or 75 minutes/wk) for 7 or more months,” which meets current PA guidelines.
Table 5. Respondent Profiles Relative to Knowledge About PA guidelines and Disease

<table>
<thead>
<tr>
<th>PA knowledge</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>% Correct</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 items</td>
<td>Male</td>
<td>179</td>
<td>12.81</td>
<td>2.23</td>
<td>67.4</td>
<td>17</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>215</td>
<td>13.31</td>
<td>1.75</td>
<td>70.0</td>
<td>9</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>American Indian or Alaskan Native</td>
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<td>12.75</td>
<td>2.63</td>
<td>67.1</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>71</td>
<td>12.63</td>
<td>1.73</td>
<td>66.5</td>
<td>8</td>
<td>8</td>
<td>16</td>
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<td></td>
<td>African</td>
<td>37</td>
<td>13.22</td>
<td>2.08</td>
<td>69.6</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>American Hispanic or Latino Native Hawaiian or Pacific Islander</td>
<td>26</td>
<td>13.12</td>
<td>1.86</td>
<td>69.1</td>
<td>7</td>
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<td>154</td>
<td>13.17</td>
<td>2.24</td>
<td>69.2</td>
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<td>17</td>
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<td>Other</td>
<td>29</td>
<td>13.07</td>
<td>2.22</td>
<td>68.8</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>PA behavior</td>
<td>PA meet</td>
<td>224</td>
<td>13.30</td>
<td>1.78</td>
<td>70.0</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>PA not meet</td>
<td>170</td>
<td>12.79</td>
<td>2.22</td>
<td>67.3</td>
<td>17</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Disease knowledge</td>
<td>Gender</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>% Correct</td>
<td>Range</td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>10 items</td>
<td>Male</td>
<td>179</td>
<td>5.18</td>
<td>2.15</td>
<td>51.8</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>215</td>
<td>5.53</td>
<td>1.95</td>
<td>55.3</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>American Indian or Alaskan Native</td>
<td>4</td>
<td>7.00</td>
<td>3.56</td>
<td>70.0</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>71</td>
<td>5.21</td>
<td>2.15</td>
<td>52.1</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>African</td>
<td>37</td>
<td>4.59</td>
<td>2.44</td>
<td>45.9</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>American Hispanic or Latino Native Hawaiian or Pacific Islander</td>
<td>26</td>
<td>6.04</td>
<td>1.97</td>
<td>60.4</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Caucasian</td>
<td>154</td>
<td>5.58</td>
<td>1.91</td>
<td>55.8</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>29</td>
<td>5.55</td>
<td>2.11</td>
<td>55.5</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>PA behavior</td>
<td>PA meet</td>
<td>224</td>
<td>5.39</td>
<td>2.08</td>
<td>53.9</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PA not meet</td>
<td>170</td>
<td>5.34</td>
<td>2.00</td>
<td>53.4</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 6. Physical Activity Level Self Reported

<table>
<thead>
<tr>
<th>PA Level</th>
<th>Total (N=394)</th>
<th>Male (n=179)</th>
<th>Female (n=215)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not Meet</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>1. I don't exercise/walk regularly now, &amp; don't intend to start in near future.</td>
<td>12</td>
<td>3.0</td>
<td>4</td>
</tr>
<tr>
<td>2. I don't exercise or walk regularly, but I have been thinking of starting.</td>
<td>21</td>
<td>5.3</td>
<td>9</td>
</tr>
<tr>
<td>3. I'm trying to start to exercise or walk or I exercise/walk infrequently.</td>
<td>82</td>
<td>21.0</td>
<td>25</td>
</tr>
<tr>
<td>4. I'm doing 25 minutes of vigorous** exercise &lt;3 times/wk or 30 minutes (or &lt;75 minutes/wk) of moderate* exercise &lt;5 times/wk (or &lt;2 1/2 hrs/wk).</td>
<td>55</td>
<td>14.0</td>
<td>19</td>
</tr>
<tr>
<td>Does Meet</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>5. I've been doing 30 minutes of moderate* exercise &gt;5 /wk (or &gt;2 1/2 hrs/wk) for last 1-6 month.</td>
<td>50</td>
<td>12.7</td>
<td>21</td>
</tr>
<tr>
<td>6. I've been doing moderate* exercise &gt;5 /wk (or &gt;2 1/2 hrs/wk) for last &gt;7 month.</td>
<td>27</td>
<td>6.9</td>
<td>14</td>
</tr>
<tr>
<td>7. I've been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for 1-6 months.</td>
<td>60</td>
<td>15.0</td>
<td>30</td>
</tr>
<tr>
<td>8. I've been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for 7 or more months.</td>
<td>87</td>
<td>22.0</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>394</td>
<td>100</td>
<td>179</td>
</tr>
</tbody>
</table>

Table 7 provides the frequencies and percentages of participants’ PA behavior relative to high school graduation year, gender and ethnicity. As Table 7 illustrates, a higher percentage of individuals who graduated in 2007 met PA guidelines (70.4%) than the most recent 2008 high school graduates (68.8%).

Furthermore, these data show that only 56% of the sample met PA guidelines and that more men (68.2%) met guidelines than women (47.4%). Among ethnic group
comparisons, American Indian or Alaskan Native (75%) had the highest proportion of individuals that met PA Guidelines and conversely, African Americans had the lowest proportion (48.6%).

Chi-square test for gender and PA behavior revealed a significant association between high school graduation year and PA behavior ($\chi^2 (1) = 4.045, N=394, p < .05$), and between gender and PA behavior ($\chi^2 (1) = 16.252, N=394, p < .001$). However, no significant differences were found between ethnicity and PA behavior ($\chi^2 (6) = 5.608, N=394, p = .469$).

<table>
<thead>
<tr>
<th>Table 7. Participant PA behavior Relative to PA Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA recommendation</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>High school</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2008</td>
</tr>
<tr>
<td>Gender**</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>African American</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
</tr>
<tr>
<td>Native Hawaiian or Pacific Islander</td>
</tr>
<tr>
<td>Caucasian</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

** $p < .001$

High School Health and Physical Education

Given the focus of this study on knowledge about PA guidelines and disease related to sedentary lifestyle among recent high school graduates, understanding more about
participants’ enrollment in HE and PE was important due to their curricular subject matters. Additionally, although subjective, if given a choice of short descriptors for HE and PE for each year and semester of enrollment, we felt it would be interesting to learn how respondents conceptualized these courses in terms of their major focus. What follows are the results from this portion of the questionnaire.

*Enrollment*

As Table 8 showed, enrollment in PE ranged fully with respondents indicating from 0 to 8 semesters of enrollment. Twenty participants or 5.1% of the sample reported never enrolled in PE, while 34.3% reported enrollment in four semesters. Enrollment in PE was dramatically decreased from freshman (88.3%), sophomore (65.0%), junior (28.7%) and senior (22.8%) in each year in this study.

<table>
<thead>
<tr>
<th>Number of Semester</th>
<th>Rank</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
<td>20</td>
<td>5.1</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>26</td>
<td>6.6</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>99</td>
<td>25.1</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>25</td>
<td>6.3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>135</td>
<td>34.3</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>8</td>
<td>2.0</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>34</td>
<td>8.6</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>45</td>
<td>11.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>394</td>
<td>100.0</td>
</tr>
</tbody>
</table>
In terms of health education (HE), 8% reported never enrolling in HE. The result showed the HE enrollment was decreased from 67% as a freshman to only 7.6% as a senior.

Table 9. Participant Enrollment in HE by Semester

<table>
<thead>
<tr>
<th>Number of Semester</th>
<th>Rank</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>32</td>
<td>8.2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>237</td>
<td>60.2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>92</td>
<td>23.4</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>12</td>
<td>3.0</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>15</td>
<td>3.8</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>394</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
When participants indicated enrollment by semester, they were also asked to select the descriptor which is best captures of the primary focus of the class (e.g., HE or PE). Descriptors options for PE were sports, skill, health and wellness cooperation, and outdoor adventure. Descriptors for HE description were substance abuse, drivers’ education, sex education, physical activity, and nutrition.

For the purpose of analyses, descriptor selections were aggregated across all semesters and years and therefore, among 394 participants, enrollment in PE was recorded 1576 times and, as Figure 4 shows 63.3% of these enrollments were conceptualized by respondents as being sport oriented and only 20.1% selected the health and wellness as the descriptor. For HE, the number of enrollments was far fewer (n=264) and 38.3% of these enrollments were conceptualized by respondents as being nutrition focused and only 15.5% conceptualized HE as physical activity focused (see Figure 4).
Pearson’s correlation coefficient was performed to examine the relationships between knowledge about PA guidelines, knowledge of disease related to sedentary lifestyle, and conceptualization of HE and PE. No significance between knowledge about PA guidelines and conceptualization HE ($r = -.002$), knowledge about PA guidelines and conceptualization PE ($r = -.005$), disease related to sedentary lifestyle and
conceptualization HE (r = -.018), and disease related to sedentary lifestyle and PE (r =-.045) were found. Small correlations between PA behavior and knowledge about PA guidelines (r = .126, n= 394, p<.05) were found. PA behavior level account for 1.6% of the variance in participants’ scores on the knowledge about PA guidelines.

Predictor of Knowledge About PA Guidelines and Disease Related to Sedentary Lifestyle

Multiple linear regression analyses were conducted to find the strongest predictor of knowledge about PA guidelines and knowledge about disease related to sedentary lifestyle among gender, ethnicity, and conceptualization of high school PE and HE. For investigating the descriptions of HE and PE variables, data were aggregated across the entire school year for each respondent so the number of descriptions of HE and PE do not match the number of respondents given that an individual respondent could select 0 to 8 semesters of enrollment and for each enrollment, select the best descriptor for the focus of the class.

Using the standard multiple regression, the result explains 4.6% of the variance on knowledge about PA guidelines by gender and PA behavior (F (5, 1391) = 13.395, p< .001, R² = .046). Gender and PA behavior were significant predictors on knowledge of PA guidelines in this study, but the other variable was not. Based on the regression table, gender had a unique contribution of 17.3% of the variance in knowledge about PA guidelines, while PA behavior had 15.2%. Gender and ethnicity were also the strongest predictor of knowledge about disease related to sedentary lifestyle. The result explained 2.1% of the variance on knowledge about disease related to sedentary lifestyle (F (5,
1391) = 5.864, \( p < .005 \), \( R^2 = .021 \), Table 10). Gender had a contribution of 9.5\% of the variance in knowledge about disease related to sedentary lifestyle, while ethnicity had 9.2\%.

Table 10. Regression Model: Knowledge about PA Guidelines and Disease Related to Sedentary Lifestyle

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>( \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge About PA guidelines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.701</td>
<td>.108</td>
<td>.173 **</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.054</td>
<td>.031</td>
<td>.045</td>
</tr>
<tr>
<td>PA behavior</td>
<td>.621</td>
<td>.109</td>
<td>.152 **</td>
</tr>
<tr>
<td>PE type</td>
<td>-.013</td>
<td>.049</td>
<td>-.007</td>
</tr>
<tr>
<td>HE type</td>
<td>-.002</td>
<td>.036</td>
<td>-.002</td>
</tr>
<tr>
<td>Knowledge About Disease Related to Sedentary Lifestyle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.391</td>
<td>.112</td>
<td>.095 **</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.112</td>
<td>.032</td>
<td>.092 **</td>
</tr>
<tr>
<td>PA behavior</td>
<td>.143</td>
<td>.113</td>
<td>.035</td>
</tr>
<tr>
<td>PE type</td>
<td>-.085</td>
<td>.050</td>
<td>-.046</td>
</tr>
<tr>
<td>HE type</td>
<td>-.009</td>
<td>.037</td>
<td>-.007</td>
</tr>
</tbody>
</table>

** \( p < .001 \)

Knowledge About PA Guidelines and Disease by Gender, Race,
PA Behavior, Conceptualization of HE and PE

To explore potential difference and interaction in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior, multivariate analysis of variance (MANOVA) was conducted. Five independent variables were used: gender, ethnicity, PA behavior, conceptualization of health education and physical education. The two dependent variables were knowledge about PA guidelines and knowledge about disease related to sedentary lifestyle.
According to Tabachnick and Fiedell (2007, p252), Pillai’s trace is more robust when the data have unequal number of values and violation of assumptions. This sample had unequal number of values in each groups and showed violation of assumptions (Leven’s Test of Equality of Error Variances = .000). Therefore, as suggested an alpha of .01 and Pillai’s Trace was used (Tabachnick & Fiedell, 2007). Results from this analysis showed one interaction between gender and ethnicity on PA knowledge and knowledge about disease related to sedentary lifestyle (F (6,1304) = 3.225, \( p < .001 \); Pillai’s Trace = .029, Table 13). Analysis of two dependent variables, using Bonferroni adjusted alpha level of .025, showed significant contribution of PA knowledge, (F(6,134)=8.461, \( p < .025 \), partial eta squared = .011) and on knowledge about disease related to sedentary lifestyle (F(6,1304)=18.471, \( p < .001 \), partial eta squared = .000), respectively.
CHAPTER 5

DISCUSSION

This study examined recent high school graduates’ knowledge of PA guidelines and disease related to sedentary lifestyle, and conceptualization of high school HE and PE. In addition, PA behavior was also examined to determine the relationship and difference between variables as they relate to these knowledge outcomes. The specific research questions in this study were:

1. What do recent high school graduates know about physical activity guidelines and disease related to sedentary lifestyle?

2. What is the relationship between knowledge of physical activity guidelines and diseases related to sedentary lifestyle, and conceptualization of high school health and physical education?

3. Among gender, ethnicity, and conceptualization of physical education and health education in high school, which is the strongest predictor of knowledge of physical activity guidelines and disease related to sedentary lifestyle?

4. What differences exist in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior?

This chapter discusses the results presented in Chapter 4. The chapter is organized relative to each research question undertaken.
Knowledge about PA Guidelines and Disease Related to Sedentary Lifestyle

Question one: what do recent high school graduates know about physical activity guidelines and disease related to sedentary lifestyle? The data from this study showed that the mean score of knowledge about PA guidelines was 13.01 out of 19 items (68.8%). Overall, this result indicated that recent high school graduates generally performed at or below the C-level (70% or worse). Also, the mean score of knowledge about disease related to sedentary lifestyle was 5.37 out of 10 items (53.7%). These results are concerning and support the notion that recent high school graduates’ awareness about physical activity guidelines and diseases associated with sedentary lifestyle is lacking. Unlike the study undertaken by Morrow et al. (2004) whose participants ranged in age from 18 to 61, participants in this study were recent high school graduates suggesting health-related content gaps in the high school curriculum. In terms of gender about knowledge about PA guidelines, a statistically significant difference between men and women was found with women performing slightly higher than men (men = 12.81 ± 2.23, 67.4%, women = 13.31±1.75, 70.0%). This difference, though small, was statistically significant ($F (1, 392) = 6.240, p< .05$ but perhaps not practically significant given less than a 3% difference with both scores at or below the C-level (70% or less).

On examining knowledge performance relative to respondents who met PA behavior guidelines, people who met PA guidelines ($M=13.3, 70.0\%$) scored slightly higher than people who did not meet PA guidelines ($M = 12.79, 67.3\%$). People who were active are more knowledgeable on PA guidelines and type of PA ($F (1, 392) = 6.372, p < .05$). However, significant differences should be considered because the sample size in this study is small. Sallis and Hovel (1990) researched about relationship between health and
exercise knowledge and moderate PA. According to their results, knowledge predicted maintenance of moderate and vigorous PA.

In examining individual items on knowledge about PA guidelines, 146 respondents (62.9%) correctly identified how much vigorous PA they needed per week. Also, only 60 respondents (15.2%) correctly answered how much moderate PA they needed per week. However, in this study, no matter gender, ethnicity or PA behavior, all segments of the sample scored low. These data indicates that knowledge gaps exist across all ethnicities and genders and support the idea that school health-related curriculums need to bolster teacher preparedness and curricular materials in these important areas. One limitation to this finding, however, is that new PA guidelines were only very recently released and perhaps not fully disseminated and certainly, these new guidelines were not addressed in the high school educational experiences of members of the sample.

Overall, participants did not appear to know if lifestyle PA (e.g., gardening and lawn work, household cleaning, moving furniture, preparing meals, raking leaves) can provide a health benefit. Their correct answer rates were low ranged from 64.7% to 44.7%; gardening and lawn work (54.8%), household cleaning (44.7%), moving furniture (54.8%), preparing meals (68.7%), and raking leaves (54.2%). Participants appeared to understand more about traditional physical activities (e.g., aerobic class (94.9%), biking (98.7%), dancing (94.4%), jogging/running (100.0%), recreational sports (99.0%), swimming (99.2%), walking (98.0%), and weightlifting (95.4%).

The intensities of lifestyle activities vary but most of them are ranged from 3.0 METs in the compendium of physical activities (Ainsworth et al., 1993). Lifestyle activities explained by activities that a person carries out in the course of daily life (e.g., taking the
stairs instead of using the elevator, walking instead of driving, getting off a bus one stop early, or parking farther away than usual to walk to a destination (USDHHS, 2008).

However, participants in this study did not understand relationships between lifestyle activities and health benefits. It also should be focused on education for people that lifestyle activities can provide healthy benefits and effective ways to increase and maintain PA levels that meet PA recommendations (Dunn, Andersen, & Jakicic, 1998).

In terms of knowledge about disease related to sedentary lifestyle the mean score for the sample was 5.37 (53.7%) with women scoring higher than men (55.3% and 51.8% respectively). The results showed that there were a statistically significant effect of score of knowledge about disease related to sedentary lifestyles by ethnicity ($F (6, 386) = 2.468, p < .05$). American Indian or Alaskan Native ($M= 7.00, SD=3.559$) was highest, Native Hawaiian or Pacific Islander ($M=6.04, SD=1.969$), Caucasian ($M= 5.58, SD=1.911$), other ($SD= 5.55, M= 2.114$), Asian ($M=5.21, SD=2.151$), Hispanic or Latino ($M=5.07, SD=1.782$) and African American ($M =4.59, SD= 2.443$) were scored in this order.

It should be noted that group comparisons in this variable yielded a small effect size (partial eta squared = .015). The small sample sizes in each ethnic group were a limitation in this analysis. Participants did not appear to know about disease related to sedentary lifestyle (e.g., cancer, osteoarthritis, cancer, depression, diabetes, heart disease, high blood pressure, osteoporosis, and stroke). The over all mean was 5.37 out of 10 (53.7%). Also, correct answer rates were varied; cancer (23.7%), depression (33.8%), osteoarthritis (40.8%), stroke (58.9%), heart disease (70.7%), high blood pressure (78.3%), and diabetes (78.5%).

Scientific evidence (USDHHS, 2000) showed that health benefits, such as reduce
chronic disease (cardiovascular disease, cancers, type 2 diabetes) and decrease blood pressure. Previous research (Behrens, Dinger, Heesch, & Sisson, 2005) supported the founding in this study that that college students are more likely to understand well on the immediate benefits of PA (weight management, muscular development) instead of the long-term benefits (e.g., reduction of chronic disease risk). Therefore, this information should be disseminated widely and part of a standard high school health-related curriculum for people to prevent chronic disease. Also, only 23.7% of respondents were aware of a relationship between cancer and PA. These results are similar to findings from Morrow et al (2002) that found low awareness of participant in the relationship between PA and chronic disease (i.e., osteoporosis; 54%, diabetes; 50%, and cancer; 42%). Especially, cancers have a long latency, with some carcinogenic processes likely beginning in youth (Colditz & Frazier, 1995). Physical inactivity contributes to cancers of the colon (Slattery & Potter, 2002) and breast (Breslow, Ballard-Barbash, Munoz, & Graubard, 2001). The fact that this knowledge gap existed in this and other students suggest a greater need for more focused dissemination efforts, including emphases in health-related education curricula s behaviors that can initiate carcinogenesis should be learned early in life (USDHHS, 1994).

**Physical Activity Behavior**

In terms of high school graduation year related to PA behavior this study showed that individuals who graduated in 2007 (N=54, 70.4%) were more likely to meet PA guidelines (N=54, 70.4%) than those who graduated in 2008 (N=340, 54.7%). A limitation of the present study was the relatively small sample of student who graduated in 2007 (13.7%) compare to sample who graduated in 2008 (86.3%) because these
survey conducted mostly in English 101 classes so many of them may have been attributable to the freshmen who graduated in 2008. Founding in this study that high school graduates in 2008, many of them are in freshman. Research showed the pattern that the rapid rate of weight gain observed during freshman year and not be physically active (Levitsky, Halbmaier, & Mrdjenovic, 2004; Racetter, Deusinger, Strube, Highstein, & Deusinger, 2005). Also, other research showed that there is an estimated 62.5% reduction in PA behavior between high school and college (Cullen et al., 1999). These result suggested that school-based PA and health-related curricula are not having the desired impact on lifetime PA levels in young adulthood. This finding demonstrates the need to revisit high school curriculum standards and importance place on PA provisions within school settings.

In terms of gender difference in PA behavior, results in this study showed that men are more likely to meet PA guidelines (N= 179, 68.2%) than women (N= 215, 47.7%). Previous research has been reported that women’ participation in PA is lower and did not meet PA guidelines compare to men (CDC, 2005; Buckworth & Nigg, 2004; Wallace & Buckworth, 2002). Current American College Health Association (2008) reported that 42.9 percent of female and 52.7% of male students meet PA recommendation. Many research have been showing there is gender difference in PA level and PA participation in women was lower than men so the strategies for women have to found because providing diverse curricular experiences through PE in high school, girls’ PA level is associated with higher PA as young adults positively (Mears, 2007).
Ethnicity differences were not found to be associated with PA behavior in this study. However, the rate to meet PA guidelines relatives to ethnicity was varied from 75% (American Indian or Alaskan Native) to 48.6% (African American). Asian (50.7%) and Hispanic (52.1%) also showed low PA behavior level. Many studies have been showing ethnicity differences on PA behavior. Previous study showed Asians are the lowest African Americans and Hispanics are less active than Caucasians in women. Hispanics are less active than Caucasian in men (Suminski, Petosa, Utter, & Zhang, 2002). Ethnicity should be considered for developing PA behavior for students in high school and college.

Research has demonstrated that quality PE lead to increase physical activity levels, and reduced sedentary behaviors following graduation from high school (Dale & Corbin, 2000). Activities practiced by adolescents have been proposed to have an influence on adult activity (Trudeau & Shephard, 2005). Most lifestyle behaviors display increasing cancer risk around the transition out of high school (Baranowski, Cullen, Ebasen-Enquist, Wetter, Cummings, Martineau, et al., 1997) because many changes occur in social roles including changing schools, leaving the parents’ home, changing peers (Hamburgs, 1980). The investigation in this study did not reveal the PA behavior if it has been developed from high school or not, but PA level depends on high school graduation year was revealed. PE program should be helped students to be physically active after high school graduation.

High School Health and Physical Education

Result in this study showed that enrollment in PE dramatically decreased with matriculation through freshman to senior years. According to SHHPS (2006), percentage
of all schools that required physical education was 55.3% in 9th, 33.2% in 10th, 20.2% in 11th and 20.4% in 12th. Other Research also indicated that there is sharp decline in PE enrollment between 8th (91%) and 12th (34%) grades (Johnston, Delva & O’Malley, 2007). These data support the assertion by McKenzie and Lounsbery (2009) that “PE is the pill not taken” as clearly it has potential to promote and increase PA but students are not enrolled.

In addition to limited enrollment, it is also perplexing that highest enrollment is during the freshman or 9th grade year, a time when students still can not drive and depend largely on their parents for day to day management of their lives (e.g., activity involvement, dietary decisions, and etc). It seems that if enrollment requirements were to remain the same, it may be much more beneficial to require it during the junior or senior years – a time when day to day life management becomes more autonomous as these individuals can and often do drive themselves and this in turn, creates more opportunities for decision making independent of parents. These decisions may include small purchases like food and activity involvement as well as social experiences. For these individuals, PE may seem much more valuable.

Participant PE conceptualization in this study, which captured their enrollment information and the primary descriptor (selected among 5 choices), provided insight into respondents perceptions about what their high school experiences. The most frequently selected description for PE was Sport oriented (63.3%). Conversely, health and wellness was selected as the descriptor for PE for only 20.1% of the PE enrollments reported. This finding is consistent with the most recent SHHPS report (2006) which found that among the 78.3% of schools at all levels that required physical education, 98.5% taught group or
team activities, 95.1% taught individual or paired activities, 63.2% taught dance activities, and 8.5% taught aquatic activities in required physical education. Furthermore, other research has shown that the most frequently taught activities in high school PE are football, basketball, volleyball, soccer, and baseball/softball (Simons-Morton, Eitel, & Small, 1999).

Many national organizations have emphasized the importance of quality and quantity of school PE programs with lifelong health related PA goals (rather than competitive sport-related skills) for all students in kindergarten to 12th grade students (AHA, 1995; NASPE, 1999). However, the American Academy of Pediatrics (1987) reported that schools emphasize sports in PE classes to develop agility and skill but are not particularly fitness improvements. Sallis and McKenzie (1991) have advocated that PE ought to emphasize the promotion of lifetime PA and maintaining health later in life. Shephard and Trudeau (2000) echoed this sentiment in their assertion that PE should focus on long-term health for students.

Clearly, there is disparity between public health goals and the common curricular content of high school PE. Given the obesity health crises and the countless recommendations for daily quality PE from health related organizations and government agencies, school PE has not experienced increases in enrollment requirements nor has the content been shifted away from sport and toward a public health focus. This is unfortunate given that school PE represents one of the most salient opportunities to reach all segments of the population to promote and increase PA - it is the only place where the least active child can experience PA at higher intensities.
Conceptualization data related to school health was similar in that enrollment was limited and primarily in the freshman and sophomore years. Participants took HE class on average 1.41 semester (male = 1.37, female = 1.44). Also, HE enrollment in this study decreased from 67% as a freshman to only 7.6% as a senior. Results from the 2000 School Health Policies and Programs Study (Kann et al., 2001) revealed that 84% of high schools provided at least 450 minutes of required HE in each grade (equivalent to one 50-minute class per week for 9 weeks, one quarter) but the percentage of high schools requiring HE decreased from 10% in grade 9 to 2% in grade 12. After high school graduation, freshmen and sophomores compared to junior and senior in university strongly felt that behaviors for healthy life were important to adopt (King, & Snyder, 2003). They were more likely to feel that their high school health education was effective to build their health knowledge and behavior. However, the results in this study did not find a significant relationship between HE enrollment and knowledge about PA guidelines and disease related to sedentary lifestyle. Sixty percent of respondents in this study enrolled one semester in HE in high school and under this circumstance, PA and disease associated with sedentary lifestyle, if addressed at all was likely not much longer than 10 days or two weeks - perhaps not enough for students to gain a workable knowledge about healthy lifestyle especially in consideration that one semester of health was all that most respondents had. Kann, Telljohann, and Wooley (2007) agree that 1.0 to 2.2 hours of health instruction per week was not sufficient to gain to prevent health risk behavior at school through analysis of national study data.

Most respondent described their health education as nutrition education (38.3%) oriented, sex education oriented (22.0%), substance abuse education oriented (16.7%),
physical activity education oriented (15.5%) and drivers’ education oriented (7.6%) in this study. King and Snyder (2003) reported that effectiveness of health education that high school graduates believe health education increased knowledge about refrain from using illegal drugs, well balanced diet and regular exercise behavior especially.

Schools should continually provide the opportunity to learn how to improve healthy lifestyle and assess the effectiveness of health education curriculum by students’ health knowledge, attitudes, and behavior, however, policy should be supported for improving enrollment of HE in school.

This study found poor knowledge and that health and PE are likely not addressing it due to low enrollment requirements and curricular challenges. Most described PE as sport and HE as nutrition oriented by participants in this study. These results showed that public education systems need to provide accessibility for gaining knowledge about PA guidelines and disease related to sedentary lifestyle. These results showed that contents in curriculum in PE and HE may not be used, as specific topics to teach for students.

**Relationship and Predictors: Knowledge About PA Guidelines and Disease by Gender, Race, PA behavior, Conceptualization of HE and PE**

Question two and three: What is the relationship and the strongest predictor between knowledge of physical activity guidelines and diseases related to sedentary lifestyle, and conceptualization of high school health and physical education?; In this study, the result did not find significances relationship between knowledge about PA guidelines and disease related to sedentary lifestyle and conceptualization of HE and PE. This result may be a reflection of low sample size because enrollment of HE and PE was low, however
small correlations between PA behavior and knowledge about PA guidelines ($r = .126$, $n = 394$, $p < .05$) were found.

This study did show that predictors for knowledge about PA guidelines and disease related to sedentary lifestyles were gender and ethnicity. Gender and PA behavior were predictors for knowledge about PA guidelines and gender and ethnicity were predictors for knowledge about disease related to sedentary lifestyle. This was supported by the result that people who are more physically active more likely to know knowledge about PA guidelines.

As Morrow et al found, American’s knowledge about PA guidelines and disease related to sedentary lifestyle were low (Morrow et al., 2002, 2004). Some research has shown a relationship between knowledge and health behavior; (Baranowki, Perry, & Parcel, 2002). Association between knowledge of PA and health benefits of PA produce the source for being physically active person (Kann, Brener, & Allensworth, 2001). It would be important for people to educate on these health benefits through PA participation.

In addition, national wide, 3.9% of states required and 39.2% recommended that high school give written tests of student’s knowledge related to PE, and 21.7% of districts required and 37.6% recommended that high school give written test of students’ knowledge related to PE (Lee, Burgeson, Fulton, & Spain, 2007). According to the result teacher used criteria to assess student performance in PE was based on level of participation (95.8%), students attitude (89.3%), attendance (56.9%), improvement in movement skills test scores (53.7%), final score on movement skills tests (49.3%),
physical fitness test scores (45.9%), demonstration of self-management skills (39.7%) and participation in PA outside of PE (11.8%).

These data, once again, seem to highlight that PE may be missing the mark in that instruction and assessment of health related knowledge appear to be low. There is a clear need to rethink required health and PE curriculum to address knowledge gaps relative to knowledge about PA guidelines and disease related to sedentary lifestyle.

Differences: Knowledge about PA Guidelines and Disease by Gender, Race, PA Behavior, Conceptualization of HE and PE

Question four: What differences exist in knowledge about physical activity guidelines and diseases related to sedentary lifestyle based on gender, ethnicity, conceptualization of high school health and physical education and self-reported physical activity behavior? As Morrow et al. (2004) mentioned that knowledge was not only related to PA behavior for a health benefit but there was considerable relation to ethnicity, education, and age. With these effects, the results in this study did not show a main effect of knowledge about PA guidelines and disease related to sedentary lifestyles based on gender, PA behavior, and conceptualization of HE and PE. The only finding was an interaction effect by gender and ethnicity on knowledge about PA guidelines and knowledge about disease related to sedentary lifestyle. Due to results that there were significant effects on knowledge about physical activity guidelines by gender and on knowledge about disease related to sedentary lifestyle by ethnicity, gender and ethnicity should be considered for students to develop their knowledge or awareness about PA guidelines and disease related to sedentary lifestyles. Description of HE and PE did not affect knowledge about PA guidelines and disease related to sedentary lifestyle.
The results have implications that there are differences in recent high school graduates to understand knowledge about PA guidelines and disease by gender and ethnicity. Therefore, these factors should be considered to educate knowledge about PA guidelines and disease related to sedentary lifestyle in this age group. Although there was not a significant effect on conceptualization of HE and PE, and knowledge about PA guidelines and disease related to sedentary lifestyles, the accessibilities to educate knowledge about PA should be considered including developing curriculum models of HE and PE in high school, because the high school setting is the last opportunity to be educated in large groups.

Conclusion

Recent high school graduates’ performance on knowledge of PA guidelines and diseases related to sedentary lifestyle was poor. While the results of this study fail to find PA behavior or conceptualization of HE and PE as salient variables associated with knowledge performances, the study did provide valuable information regarding the low enrollment patterns in high school HE and PE with most individuals enrolling as freshman. As participants described, mostly conceptualized PE as sport oriented and HE as nutrition oriented.

In contrast to Morrow et al (2000), it is important to note that this study attempted to learn more about recent high school graduates knowledge in an effort to examine how well high school education addressees these public health issues but more so, to identify gaps in knowledge that could be addressed in high school HE and PE. Because there are many accesses points to public health information (e.g., schools, mass communication, community outlets, churches, etc), it is challenging to pinpoint the individual sources.
However, because schools have students for 9 months for more than 13 years, they have an enormous role to play shaping active living. Furthermore, HE and PE are formalized curriculums in which student enrollment is required and represent primary opportunity to address these gaps in knowledge relative to PA guidelines and disease associated with sedentary living.

With increasing epidemic proportions of the population as overweight and obese, educating people about the physical activity guidelines and disease related to sedentary lifestyle associated with how to develop and maintain physical activity and exercise into their daily routine are important steps to reversing the lifestyle associated chronic disease trends. If overweight individuals are knowledgeable about the potential dangers of inactivity, they will be better prepared to make healthy lifestyle choices (Foreyt & Goodrick, 1995; Goldfine & Nahas, 1993).

Strategies for increasing the opportunity are important for students in high school settings. As shown, in this study, HE and PE enrollment was decreased from freshman to senior years and knowledge was poor. Better strategies to provide opportunity for students should be considered for juniors and seniors because their accessibility to be involved in PA and becomes more independent. Most of all, enrollment requirements for HE and PE should be seriously reconsidered. Policy must support developing strategies to require greater enrollment in HE and PE as they have address this important content and target increased knowledge and healthy lifestyle behavior as primary content outcomes.
APPENDIX A

Social/Behavioral IRB – Expedited Review Approval Notice

NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: March 4, 2009
TO: Dr. Monica Lounsbury, Sports Education Leadership
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. Paul Jones, Co-Chair
Protocol Title: Recent high school graduates knowledge about physical activity guidelines and disease related to sedentary lifestyle
Protocol #: 0901-3000

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45 CFR 46. The protocol has been reviewed and approved.

The protocol is approved for a period of one year from the date of IRB approval. The expiration date of this protocol is February 26, 2010. Work on the project may begin as soon as you receive written notification from the Office for the Protection of Research Subjects (OPRS).

PLEASE NOTE:
Attached to this approval notice is the official Informed Consent/Assent (IC/IA) Form for this study. The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

Should there be any change to the protocol, it will be necessary to submit a Modification Form through OPRS. No changes may be made to the existing protocol until modifications have been approved by the IRB.

Should the use of human subjects described in this protocol continue beyond February 26, 2010, it would be necessary to submit a Continuing Review Request Form 60 days before the expiration date.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.

Office for the Protection of Research Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047

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TITLE OF STUDY: Recent High School Graduates Knowledge about Physical Activity Guidelines and Disease related to Sedentary Lifestyle

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for 3 years after completion of the study. After the storage time the information gathered will be destroyed.

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

A copy of this form has been provided me for future record.

Waiver of documentation of consent
Completing and returning the enclosed questionnaire indicates I agree to all explained terms and consent to participate in this study.

Participant Note: Please do not return the questionnaire if the Approval Stamp is missing or is expired from this consent letter.
APPENDIX B

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

INFORMED CONSENT
-Department of Sports Education Leadership

TITLE OF STUDY: Recent High School Graduates Knowledge about Physical Activity Guidelines and Disease related to Sedentary Lifestyle

INVESTIGATOR(S): Monica Lounsbery, PhD and Soojin Yoo

CONTACT PHONE NUMBER: 702-895-4629

You are invited to participate in a research study. The purpose of this study is to examine recent high school graduates’ knowledge about physical activity guidelines and chronic disease, and conceptualizations about high school health and physical education.

You are being asked to participate in the study because you are a recent high school graduate (from 2007 to recent to date) and are between ages of 18 to 21 years old.

If you volunteer to participate in this study, you will be asked to complete a survey. The survey will ask you about physical activity guidelines and disease related to sedentary lifestyles. Additionally, the survey will be asked you about your own current physical activity behavior and conceptualizations about your high school health and physical education courses.

There may not be direct benefits to you as a participant in this study. However, we hope to learn important information that may prove beneficial in high school health and physical education curricular content revision.

There are no anticipated risks to participating in this study. However, you might be uncomfortable answering some of the questions asked. You are encouraged to discuss this with me and I will explain the questions to you in more detail.

There will not be financial cost to you to participate in this study. The study will take 10-15 minutes of your time. You will not be compensated for your time.

If you have any questions or concerns about the study, you may contact Dr. Monica Lounsbery at 702-895-4629. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office for the Protection of Research Subjects at 702-895-2794.

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.
APPENDIX C

KNOWLEDGE ABOUT PHYSICAL ACTIVITY GUIDELINES AND DISEASES,
AND CONCEPTUALIZATION OF HEALTH AND PHYSICAL EDUCATION

I. Demographic Profile
1. Have you taken this survey before? ☐ Yes ☐ No
2. What year did you graduate from high school? ☐ 2007 ☐ 2008 ☐ Other
3. What is your age? ☐ 18 ☐ 19 ☐ 20 ☐ 21
4. In what state did you graduate high school? ______________________
5. What school district was the high school in? ______________________
6. What high school did you graduate from? ______________________
7. What is your gender? ☐ Male ☐ Female
8. How do you describe your ethnicity
   ☐ American Indian or Alaskan Native ☐ Asian
   ☐ African American ☐ Hispanic or Latino
   ☐ Native Hawaiian or Pacific Islander ☐ Caucasian
   ☐ Other
9. What is your major in college? _________________________________
10. What best identifies your current level of exercise? (please choose one)
    * The word MODERATE refers to activities like brisk walking, gardening, slow
        cycling, dancing, or hard work around the house.
    ** The word VIGOROUS refers to activities like basketball, jogging, running, fast
        cycling, aerobics class, swimming laps, singles tennis, racquetball, etc.
    ☐ I don't exercise/walk regularly now, & don't intend to start in near future.
    ☐ I don't exercise or walk regularly, but I have been thinking of starting.
    ☐ I'm trying to start to exercise or walk or I exercise/walk infrequently.
    ☐ I'm doing 25 minutes of vigorous** exercise <3 times/wk or 30 minutes (or <75
        minutes/wk) of moderate* exercise <5 times/wk (or <2 1/2 hrs/wk).
    ☐ I've been doing 30 minutes of moderate* exercise >5 /wk (or >2 1/2 hrs/wk) for last
        1-6 month.
    ☐ I've been doing moderate* exercise >5 /wk (or >2 1/2 hrs/wk) for last >7 month.
    ☐ I've been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for
        1-6 months.
    ☐ I've been doing 25 minutes of vigorous ** 3-5 times per week (or 75 minutes/wk) for
        7 or more months.
II. Conceptualization of High School Physical Education

<table>
<thead>
<tr>
<th>When did you take physical education?</th>
<th>How many semesters in a year did you take physical education?</th>
<th>How many days per week did you take physical education?</th>
<th>How long were class sessions?</th>
<th>Which descriptor most describes your PE experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
<td>0 days/week</td>
<td>30 minutes</td>
<td>Sport</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>1 day/week</td>
<td>40 minutes</td>
<td>Skill</td>
</tr>
<tr>
<td>No</td>
<td>One</td>
<td>2 days/week</td>
<td>50 minutes</td>
<td>Health and wellness</td>
</tr>
<tr>
<td>If no, please go to Sophomore year.</td>
<td>Two</td>
<td>3 days/week</td>
<td>60 minutes</td>
<td>Cooperation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 days/week</td>
<td>70 minutes</td>
<td>Outdoor adventure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 days/week</td>
<td>80 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>90 minutes</td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
<td>0 days/week</td>
<td>30 minutes</td>
<td>Sport</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>1 day/week</td>
<td>40 minutes</td>
<td>Skill</td>
</tr>
<tr>
<td>No</td>
<td>One</td>
<td>2 days/week</td>
<td>50 minutes</td>
<td>Health and wellness</td>
</tr>
<tr>
<td>If no, please go to Junior year.</td>
<td>Two</td>
<td>3 days/week</td>
<td>60 minutes</td>
<td>Cooperation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 days/week</td>
<td>70 minutes</td>
<td>Outdoor adventure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 days/week</td>
<td>80 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>90 minutes</td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td></td>
<td>0 days/week</td>
<td>30 minutes</td>
<td>Sport</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>1 day/week</td>
<td>40 minutes</td>
<td>Skill</td>
</tr>
<tr>
<td>No</td>
<td>One</td>
<td>2 days/week</td>
<td>50 minutes</td>
<td>Health and wellness</td>
</tr>
<tr>
<td>If no, please go to Senior year.</td>
<td>Two</td>
<td>3 days/week</td>
<td>60 minutes</td>
<td>Cooperation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 days/week</td>
<td>70 minutes</td>
<td>Outdoor adventure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 days/week</td>
<td>80 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>90 minutes</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td></td>
<td>0 days/week</td>
<td>30 minutes</td>
<td>Sport</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>1 day/week</td>
<td>40 minutes</td>
<td>Skill</td>
</tr>
<tr>
<td>No</td>
<td>One</td>
<td>2 days/week</td>
<td>50 minutes</td>
<td>Health and wellness</td>
</tr>
<tr>
<td></td>
<td>Two</td>
<td>3 days/week</td>
<td>60 minutes</td>
<td>Cooperation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 days/week</td>
<td>70 minutes</td>
<td>Outdoor adventure</td>
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<td>5 days/week</td>
<td>80 minutes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>90 minutes</td>
<td></td>
</tr>
</tbody>
</table>
### III. Conceptualization of High School Health Education

<table>
<thead>
<tr>
<th>When did you take health education?</th>
<th>How many semesters in a year did you take health education?</th>
<th>How many days per week did you take health education?</th>
<th>How long were class sessions?</th>
<th>Which descriptor most describes your health education experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
<td>0 days/ week</td>
<td>30 minutes</td>
<td>Substance abuse education</td>
</tr>
<tr>
<td>Yes</td>
<td>One</td>
<td>1 day/ week</td>
<td>40 minutes</td>
<td>Drivers’ education</td>
</tr>
<tr>
<td>No</td>
<td>Two</td>
<td>2 days/ week</td>
<td>50 minutes</td>
<td>Sex education</td>
</tr>
<tr>
<td>If no, please go to Sophomore year.</td>
<td></td>
<td>3 days/ week</td>
<td>60 minutes</td>
<td>Physical activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 days/ week</td>
<td>70 minutes</td>
<td>Nutrition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 days/ week</td>
<td>80 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>90 minutes</td>
<td></td>
</tr>
</tbody>
</table>

| Sophomore                            |                                                            | 0 days/ week                                          | 30 minutes                    | Substance abuse education                                    |
| Yes                                  | One                                                        | 1 day/ week                                            | 40 minutes                    | Drivers’ education                                           |
| No                                   | Two                                                        | 2 days/ week                                           | 50 minutes                    | Sex education                                                |
| If no, please go to Junior year.     |                                                            | 3 days/ week                                           | 60 minutes                    | Physical activity                                            |
|                                       |                                                            | 4 days/ week                                           | 70 minutes                    | Nutrition                                                    |
|                                       |                                                            | 5 days/ week                                           | 80 minutes                    |                                                              |
|                                       |                                                            |                                                        | 90 minutes                    |                                                              |

| Junior                               |                                                            | 0 days/ week                                          | 30 minutes                    | Substance abuse education                                    |
| Yes                                  | One                                                        | 1 day/ week                                            | 40 minutes                    | Drivers’ education                                           |
| No                                   | Two                                                        | 2 days/ week                                           | 50 minutes                    | Sex education                                                |
| If no, please go to Senior year.     |                                                            | 3 days/ week                                           | 60 minutes                    | Physical activity                                            |
|                                       |                                                            | 4 days/ week                                           | 70 minutes                    | Nutrition                                                    |
|                                       |                                                            | 5 days/ week                                           | 80 minutes                    |                                                              |
|                                       |                                                            |                                                        | 90 minutes                    |                                                              |

| Senior                               |                                                            | 0 days/ week                                          | 30 minutes                    | Substance abuse education                                    |
| Yes                                  | One                                                        | 1 day/ week                                            | 40 minutes                    | Drivers’ education                                           |
| No                                   | Two                                                        | 2 days/ week                                           | 50 minutes                    | Sex education                                                |
|                                       |                                                            | 3 days/ week                                           | 60 minutes                    | Physical activity                                            |
|                                       |                                                            | 4 days/ week                                           | 70 minutes                    | Nutrition                                                    |
|                                       |                                                            | 5 days/ week                                           | 80 minutes                    |                                                              |
|                                       |                                                            |                                                        | 90 minutes                    |                                                              |

### IV. Knowledge about Physical Activity Guidelines

1. Moderate levels of physical activity do NOT provide any health benefits.
   
   - [ ] True
   - [ ] False
   - [ ] I don’t know
2. Vigorous levels of physical activity are necessary to provide a health benefit.
   - True
   - False
   - I don’t know

3. Everyone should get 30 minutes of moderate physical activity most days of the week.
   - True
   - False
   - I don’t know

4. What is the minimum length of time of vigorous-intensity (in minutes) one needs to be physically active throughout a week to achieve a health benefit?
   - 75 minutes
   - 90 minutes
   - 110 minutes
   - 130 minutes
   - 150 minutes

5. What is the minimum length of time of moderate-intensity (in minutes) one needs to be physically active throughout a week to achieve a health benefit?
   - 75 minutes
   - 90 minutes
   - 110 minutes
   - 130 minutes
   - 150 minutes

Which of the following physical activities do you believe will provide a health benefit?

T = Traditional physical activity, LS = Lifestyle physical activity

7. Aerobic class (T)
   - Yes
   - No
   - I don’t know

8. Biking (T)
   - Yes
   - No
   - I don’t know

9. Dancing (T)
   - Yes
   - No
   - I don’t know

10. Gardening and lawn work (LS)
    - Yes
    - No
    - I don’t know

12. Jogging/running (T)
    - Yes
    - No
    - I don’t know
13. Playing a musical instrument (LS)
  □ Yes
  □ No
  □ I don’t know
14. Moving furniture (LS)
  □ Yes
  □ No
  □ I don’t know
15. Preparing meals (LS)
  □ Yes
  □ No
  □ I don’t know
16. Raking leaves (LS)
  □ Yes
  □ No
  □ I don’t know
17. Recreational sports (e.g., team and individual sports)
  □ Yes
  □ No
  □ I don’t know
18. Swimming (T)
  □ Yes
  □ No
  □ I don’t know
19. Walking (T)
  □ Yes
  □ No
  □ I don’t know
20. Weightlifting (T)
  □ Yes
  □ No
  □ I don’t know

V. Knowledge about disease related to sedentary or inactive lifestyle

Does a sedentary or inactive lifestyle contribute to the development of any of the following diseases?

1. Asthma
  □ Yes
  □ No
  □ I don’t know
2. Bunions
  □ Yes
  □ No
  □ I don’t know
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Prevention.


VITA
Graduate College
University of Nevada, Las Vegas
Soojin Yoo

Local Address:
4200 Paradise road #3011
Las Vegas, Nevada 89169

Home Address:
467-29 Dokok-dong, Kangnam-ku
Seoul, Korea, 135-554

Degrees:
Bachelor of Science, Exercise Science, 1993
Ewha Women University, Seoul, Korea

Master of Science, Exercise Physiology, 1997
Ewha Women University, Seoul, Korea


Dissertation Title: Recent High School Graduates Knowledge About Physical Activity Guidelines and Disease Related to Sedentary Lifestyle

Dissertation Examination Committee:
Chairperson, Dr. Monica Lounsbery, Ph.D.
Committee Member, Dr. Jerry Landwer, Ed.D.
Committee Member, Dr. Timothy Bungum, Dr.P.H.
Graduate Faculty Representative, Dr. Chad Cross, Ph.D.