BARRIERS TO PHYSICAL ACTIVITY AMONG KUWAITI UNIVERSITY STUDENTS

By

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This work is dedicated to the memory of my dad, Mohammed Nasser Alsahli (1937-2005), who instilled in me the lessons of hard work, who taught me the benefits of forgiveness and laughter, and who always showed me loyalty, devotion, and love. I miss you.

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ABSTRACT

A lack of physical activity has been linked to many negative health consequences. Why people do not exercise has become an important question. Perceived barriers to physical activity have become one means to determine why people limit their physical activity behavior. College students, particularly in Kuwait, have not been studied extensively to determine which internal and external barriers discourage them from being physically active. Therefore, the objective of this study was to identify major perceived barriers to physical activity in students at Kuwait University. Moreover, this study estimated the amount of physical activity among Kuwait University students. The Socio-Ecological Model and the Theory of Planned Behavior guided the research in this study. Data was obtained from 1,123 students from Kuwait University using both the International Physical Activity Questionnaire (IPAQ) and the Barriers to Physical Activity Questionnaire (BPAQ).

The results of the t-tests revealed that the strength of internal and external barriers to physical activity was greater among the females than the males. Moreover, chi-square tests showed that males with membership to sports clubs was significantly greater than females. However, the frequency of males who studied PE/health education was significantly less than females. T-tests found that lack of knowledge and lack of skills were a significantly greater barrier to physical activity for females than for males. A Partial Least Squares (PLS) analysis showed that gender and studying PE/health education did not predict an individual's lack of knowledge as a barrier to physical activity whereas gender and sports club membership predicted an individual's lack of skills as barrier to physical activity. Being female and not being a member of a sports club predicted more lack of skills as a barrier to physical activity.

According to a Multivariate Analysis of Variance (MANOVA), males tended to have significantly higher levels of overall physical activity than females. Furthermore, mean walking activity along with vigorous activity were higher among males than females, whereas the mean moderate activity tended to be lower among males than among females. A Multiple Linear Regression analysis found that gender and barriers to physical activity did not predict an individual's amount of walking activity or moderate physical activity. A Multiple Linear Regression analysis determined that gender, but not barriers to physical activity predicted an individual's amount of vigorous physical activity, meaning that being female predicted less vigorous physical activity. Finally, gender and external barriers to physical activity predicted an individual's amount of overall physical activity; being female and having external barriers predicted less overall physical activity.

The findings in this study should lead to appropriate program development and implementation to confront low physical activity levels and perceived barriers, particularly in Kuwait. As a substantial portion of the population, it is important to tailor intervention strategies to Kuwaiti university students to promote physical activity and minimize barriers. Program designers should shape policy and intervention with consideration to Kuwaiti culture and society as a solution to the lack of physical activity among Kuwaitis as a whole.

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CHAPTER I:

INTRODUCTION

When done regularly, physical activity is beneficial for every demographic (Munford, 2011). Benefits of physical activity include prevention of chronic illness and diseases (U.S. Department of Health and Human Services [DHHS], 2010). Engaging in physical activity on a regular basis benefits all people, and being active regularly has been linked with better health both physically and psychologically (Centers for Disease Control and Prevention, 2006). Furthermore, participation in moderate and vigorous levels of physical activity lowered the risk of premature death and chronic illnesses (DHHS, 2010). Currently, it is suggested that adults perform a minimum of 150 minutes of moderate physical activity every week.

However, many people worldwide do not maintain adequate levels of physical activity (DHHS, 2010; Raynor & Jankowiak, 2010; Robbins, Pender, & Kazanis, 2003; The World Health Organization [WHO], 2006). According to the Department of Health and Human Services (2010), less than half of the adult population engaged in regular physical activity. WHO (2006) likewise found that more than 60% of adults worldwide and two-thirds of Europeans do not get adequate physical activity. Adolescents' vigorous physical activity levels decrease as they get older (Robbins, et al., 2003).

Physical inactivity can be detrimental to the individual's health and can be a contributing factor for obesity, weight gain, coronary heart disease, and other life-threatening illnesses (Munford, 2011). Adults from the ages of 18-29 were more likely to establish bad health habits and gain weight while at university (Hlaing, Nath, & Huffman, 2007; Klepfer, 2013). Habits established during young adulthood can carry on into old age and increase life-expectancy. College students are particularly important in reducing levels of physical inactivity (Kemper & Welsh, 2010; Mead, 2009). Therefore, promoting physical activity has been a primary health

initiative because of its ability to prevent certain chronic illnesses (DHHS, 2000; Hlaing, *et al.*, 2007; Crespo, Keteyian, Heath, & Sempos, 1996; Marcus *et al*., 2006).

Determining perceived barriers to physical activity among university students is the first step in promoting a healthy lifestyle for that demographic. University students exhibit high levels of physical inactivity which is a substantial health issue (DHHS, 2000; Kilpartrick, Hebert, and Bartholomew, 2005; Raynor, *et al.,* 2010). Understanding university students' specific barriers will help health officials address that population's needs and further promote physical activity among college students.

According to Stockton (2011) obesity and cardiovascular disease is a major health concern in Kuwait. Kuwait University also needs to do more to encourage physical activity habits in its student body. The facilities for physical activity are not as accessible for most students, especially females. The literature found that males are more physically active than females, making gender a predictor for physical activity levels (Sherwood & Jeffery, 2000). In general, the literature revealed that college students failed to participate in sufficient physical activity due to their obligations as students, making a lack of physical activity a substantial health issue among college students (Kilpatrick, Hebert, & Bartholomew, 2005; Klepfer, 2013; Sailors *et al*., 2010).

Understanding why most people are inactive or having low level of physical activity is necessary toward curtailing this epidemic. One explanation for the declining levels of physical activity is the number of barriers that make it difficult to participate. Perceived barriers are outlined as obstacles that prevent one's initiation or ability to maintain a desired behavior change (Allison, Dwyer, & Makin, 1999). Allison, *et al*., (1999) have categorized perceived barriers to physical activity into two categories, internal and external, which could explain why adults

participate or do not participate in exercise. Perceived barriers may represent more individual, psychologically based factors (internal barriers), such as a lack of motivation, exercise history, a lack of skills, other interests, or concerns about engaging in physical activity in public (Allison, et al., 1999). Moreover, perceived barriers may reflect environmental based factors (external barriers), such as a lack of support from friends and family, safety concerns, limited transportation options, a lack of time due to other responsibilities, or seasonal influences. Al-Otaibi (2013) asserted that it is essential to understand the barriers to physical activity in order to promote fitness and reduce chronic illnesses. This study focused on Kuwaiti university students in order to confront their needs and barriers to physical activity, as well as put Kuwaiti university students in an international context.

A theoretical framework is vital to identifying influences on physical activity behaviors, helping understand these behaviors, and ultimately planning successful interventions. The theoretical framework, the Socio-Ecological Model and the Theory of Planned Behavior, will provide a foundation for the research question and study. The Socio-Ecological Model assumed that physical activity behaviors were acted out due to intrapersonal, interpersonal, and physical environmental factors (Stanley, Boshoff, & Dollman, 2011). The Theory of Planned Behavior also examined environmental factors, but extended to individuals' attitudes, subjective norm, perceived behavioral control, and intention (Ajzen & Fishbein, 1975).

Finally, the research questions will be stated, to address issues concerning the prevalent barriers to physical activity as perceived by Kuwait University students. Once the most common barriers and general activity levels are established, further research can be done to create effective intervention programs and promote physical activity among students at Kuwait University. Therefore, the objective of this study was to identify major perceived barriers to

physical activity in students at Kuwait University. Moreover, this study determined the pattern of physical activity levels among Kuwait University students.

CHAPTER II:

LITERATURE REVIEW

Introduction

The review of the literature addressed aspects of physical activity and levels of physical activity globally, as well as risks caused by physical inactivity. The country of Kuwait's physical activity behaviors, outside and within the university setting are discussed. Leisure time physical activity will be examined and gender differences in levels of physical activity were explored, along with methods utilized to assess physical activity.

The literature review in this study began by addressing physical activity. Physical activity is essential for a healthy life and maintaining well-being. There are numerous benefits to physical activity, and engaging in regular physical activity has been recommended in order to reduce the risks of many chronic illnesses such as cardiovascular disease and diabetes (Center of Disease Control and Prevention [CDC], 2006; DHHS, 2010). However, studies have shown that many do not participate in an adequate amount of physical activity each day (DHHS, 2010; Robbins, *et al*., 2003). Therefore, physical inactivity has been described and further addressed as a deterrent to regular participation in physical activity. In particular, physical inactivity has acted as a substitute for physical activity, and more people chose to avoid physical activity, especially university students.

This study aims to assess barriers to physical activity among university students in Kuwait, and as a result, the literature review places emphasis on physical activity levels in Kuwait. Kuwait has recently seen a decline in physical activity and a severe increase in obesity and weight gain (Ramadan, Vuori, Lankenau, Schmid, & Pratt, 2010). Based on Stockton's (2011) research, cardiovascular disease is the foremost cause of death in Kuwait. Kuwaitis have a sedentary lifestyle, due to work and other societal factors, which may keep them from engaging

in physical activity. Therefore, the literature indicates that addressing levels of physical activity is essential for the country to overcome the epidemic of chronic diseases and other issues caused by a lack of physical activity.

More specifically, the literature shows that university students are also not regularly engaging in physical activity (DHHS, 2000). Like most of the population, college students are sedentary (Raynor *et al*., 2010). Furthermore, a significant portion (30%-60%) of young adults attending college are not physically active (Irwin, 2004). Level of physical activity can also be predicted by gender. The literature review examined several studies done in different countries that emphasized gendered differences in perceived barriers to physical activity. This review has concluded that, overall, women tend to be less physically active than men and more overweight.

Leisure time physical activity (LTPA) is used to describe what physical activity is done outside of school, work, or other obligations (Kerner & Kurrant, 2003). The literature explains the use of LTPA as a tool for measuring how physically active students are in their leisure time (Kerner, *et al*., 2003). LTPA is also identified in the instrumentation as any physical activity done during students' free time. The CDC (2011) defines LTPA as participating in light or moderate LTPA for 30 minutes or more at least five times a week, or participating in vigorous LTPA for 20 minutes or more at least three times per week.

The literature review addresses the Socio-Ecological Model and the Theory of Planned Behavior as the framework for this particular study to create the foundation for research. As a means to discover perceived barriers to physical activity, it is important to look at individuals' context and discover what social, environmental, and institutional barriers are preventing them from practicing physical activity. The Socio-Ecological Model was chosen as the framework for this study because it enables the researcher to examine the many layers that affect individual

health behaviors and offer a more in-depth explanation of these behaviors. The Theory of Planned Behavior complimented the Socio-Ecological Model and focused on attitudes, the individuals' self-efficacy, and how their peers and family behave or influence their behavior. This theory allowed the study to examine perceived barriers from a cultural and individual perspective.

The literature divides perceived barriers to physical activity into two categories: internal and external (Allison, Dwyer, & Makin, 1999). This study uses those classifications to determine perceived barriers to physical activity, such as the weather, lack of facilities, lack of childcare (external barriers), and lack of motivation, lack of interest, and lack of energy (internal barriers). To identify common perceived barriers, this study reviewed research on global studies of perceived barriers to physical activity. This study found that most college students around the world engage in behaviors that do not increase their heart rate significantly above resting levels as opposed to physical activity due to various barriers (Abdullah, Wong, Yam, & Fielding, 2005; Gomez-Lopez, Granero-Gallegos, Baena-Extremera, & Ruiz-Juan, 2011). The literature indicates that college students face different barriers than those in the general population (Daskapan, Tuzun, & Eker, 2006). There is little information on the perceived barriers that college students face, and Kuwait in particular has no information on how physically active college students are.

After conducting a review on several separate cultures and perceived barriers to physical activity, this study then looked at perceived barriers across cultures and along gender lines. Females were overwhelmingly more likely to abstain from physical activity due to perceived barriers (Al-Otaibi, 2013; Arab, 2007; Milanovic & Sporis, 2011; Robbins, *et al*., 2003; Romaguera, *et al*., 2011).

The review of the literature on perceived barriers to physical activity leads this study to determine the most frequent barriers to physical activity among students at Kuwait University. This study is designed to further estimate the physical activity level among Kuwait University students and hypothesizes that the number of perceived barriers to physical activity that students acknowledge is negatively related to their participation level in physical activity.

Physical Activity

Regular participation in physical activity has tremendous benefits for all individuals. Being regularly active has been found to be associated with better physical and psychological health outcomes (CDC, 2006). Numerous researchers have confirmed that regular participation in moderate to vigorous physical activity was a factor in reduced risk of premature death in adults and decreased likelihood of acquiring several diseases and undesirable conditions such as coronary heart disease, type-2 diabetes, high blood pressure, high cholesterol, stroke, sleep apnea, respiratory problems, and endometrial, breast, prostate, and colon cancers (DHHS, 2010). Moreover, Blaber (2005) identified a number of psychological benefits associated with being active including increased self-esteem, enhanced body image and improved mood. Many studies affirmed that engaging regularly in physical activity might also improve one's mental health by reducing stress and improving mood (Adams, Moore, & Dye, 2007). Regular participation in physical activity plays an important role in the mental health of undergraduate students (Tyson, Wilson, Crone, Brailsford, & Laws, 2010).

Physical activity has lifelong benefits for each demographic. Weight control is yet another example of the benefits of regular physical activity, and exercise helps the body gain muscle while simultaneously losing fat, according to Brody (1995). Physical activity that does not focus on weight has benefits as well, such as increasing bone density, alleviating effects of

osteoporosis for older people, and promoting strength and balance (Brody, 1995; Davidson, 2009). Davidson (2009) claims an additional benefit to regular physical activity for older adults is a reduced risk of diabetes and overall improvement of the immune system, which indicates that it is important to establish patterns of physical activity early in order to maintain lasting health.

Patterns of Physical Activity

Physical activity can be divided into low, moderate, and vigorous intensity levels. A low level of physical activity is achieved when the heart rate does not rise much above the resting level. Moderate levels of physical activity are activities that make you breathe somewhat harder than normal. The last category, vigorous level physical activity, is defined as activities that make you breathe much harder than normal. Bicycling at a regular pace, swimming at a regular pace, and doubles tennis are examples of moderate activity, while aerobics, running, fast bicycling, or fast swimming are example of vigorous activity. The current recommendations for physical activity for adults are defined as performing at least 150 minutes of moderate physical activity each week. This level of physical activity should also include muscle strengthening activities two or more days a week that work all major muscle groups including legs, hips, back, abdomen, chest, shoulders, and arms (CDC, 2006). Adults may achieve these recommendations through forms of moderate-intensity physical activities, including aerobic dance, gardening, hunting, cycling, stair climbing, swimming, running, and brisk walking.

Physical Inactivity

Despite the strong evidence on the benefits of physical activity, less than half of the adult population participated in regular physical activity (DHHS, 2010). Adolescents are likewise not meeting recommended standards of physical activity, and a larger percentage of American

students fail to engage in vigorous-intensity physical activity (Robbins, *et al*., 2003). The World Health Organization [WHO] (2006) revealed that over 60% of adults worldwide or two-thirds of Europeans fail to achieve the recommended levels of physical activity. One such case is the Eastern Mediterranean Region, where the prevalence of insufficient physical activity is very high (WHO, 2008). This behavior is undesirable for good health but highly prevalent in many countries. Robbins *et al*. (2003) explain why physical activity levels remain low: as adolescents become older, it has been noted that the percentage of adolescents who achieved the recommended level of vigorous physical activity has decreased. Therefore, it is necessary to determine physical activity levels globally in order to identify common barriers to engaging in physical activity and promote a more active lifestyle.

Health Risks of Physical Inactivity

Physical inactivity has been identified as the fourth leading risk factor for global mortality, causing an estimated 3.2 million deaths globally (WHO, 2008). Physical inactivity is defined as not meeting any of the following three criteria: 30 minutes of moderate intensity physical activity on at least five days every week, 20 minutes of vigorous-intensity physical activity on at least three days every week, or an equivalent combination achieving 600 metabolic equivalents (MET)-min per week. Internationally, 31.1% of adults are physically inactive. In the United States, the physical inactivity levels are 35.5% for men and 50.6% for women, whereas Kuwaiti population groups were higher than these percentages. The finding from Kuwait showed that 58% of adult men and 71.3% of adult women were physically inactive (WHO, 2008). These percentages may increase in the next few years.

According to Klepfer (2013), health issues stemming from a lack of physical activity can severely reduce the quality of life for the individual. Hlaing, *et al.*(2007) explained that

heightened risks of chronic illnesses such as cardiovascular disease, breast and colon cancer, depression, Type 2 diabetes, and respiratory illnesses are due to a lack of physical activity and additional weight gain, indicating that these health issues are likely preventable with adequate exercise. The demographic with the most likelihood of establishing poor health habits are adults aged 18-29, and years of attendance at a university are typically marked by weight gain (Hlaing *et al*., 2007; Klepfer, 2013). Overall, it is essential to determine why young adults, particularly college students, do not participate in physical activity, in order to further prevent chronic illnesses arising from physical inactivity and help them establish healthy habits.

Because chronic illnesses caused by a lack of physical activity are likely preventable, modern prevention programs look to physical activity as one of the foremost health indicators (DHHS, 2000; Hlaing, *et al.*, 2007). Promoting physical activity has become a prime intervention strategy and goal (Crespo, *et al.*, 1996; Marcus *et al*., 2006).

Kuwait and the Need for Physical Activity

Stockton (2011) acknowledged that "adult obesity in Kuwait is among the highest in the Arab peninsula, and cardiovascular disease, for which obesity is a risk factor, is the leading cause of death" (p.51). The illnesses and negative effects associated with inadequate physical activity in Kuwait have escalated so much so that Ramadan, *et al.*, (2010) have proposed a "national physical activity plan" for Kuwait (p. 1). Because Kuwait has seen significant economic expansion in the past few decades and Kuwaitis typically do not engage in physical activity at work and use motorized vehicles for transportation, physical activity rates have gone down, even in leisure time.

The issues overwhelming Kuwaitis start with the prevalence of weight gain and obesity, which is only increasing. In men, weight gain and obesity rise from 53% during ages 20-24 to

93% during ages 60-65. In women, the numbers start with 51% and rise to 96%, with obesity being more common than weight gain (Ramadan, et al. 2010). Kabir, Zafar, and Waslien (2013) found that Kuwaiti women in particular have a high prevalence of obesity. Moreover, there was a correlation between weight gain and body dissatisfaction among these women. Therefore, it is imperative to discover perceived barriers to physical activity for this demographic and promote physical fitness.

Physical activity could greatly reduce risks of weight gain and obesity, as well as prevent chronic illnesses. Though the benefits of regular physical activity are well known, several barriers keep Kuwaitis from engaging in physical activity, including: the hot climate, few adequate facilities for women in particular, personal beliefs and attitudes based on a lack of education of physical activity, and little support from peers or family (Ramadan, *et al*., 2010). Addressing these barriers can help promote physical activity in Kuwait.

Public and Private Sectors of Recreation in Kuwait

Recreation in Kuwait is divided along the public sector and the private sector. The public sector includes parks for walking and sports, while the private sector is composed of private sport and recreation clubs available to those over the age of 18 and who can pay the fees to become a member. Although the State of Kuwait strives to provide sports and recreation services through both sectors for its citizens, these services are not commensurate with the growing population. Kuwait needs to invest in more public and private facilities, as well as regular maintenance for these facilities to encourage Kuwaitis to be more physically active.

The public sector of recreation, as mentioned above, denotes public parks which are spread in most residential areas to increase accessibility for citizens. There are two major obstacles to participating in physical activity in the public sector: the weather and maintenance of

parks and recreational centers. High temperatures in the summer and low temperatures in the winter are significant obstacles to utilizing the parks for physical activity and daily participation in sports. Seasonal temperatures have little variation or reprieve from extreme highs and lows; for example, temperatures are high in the summer even at night. The latter obstacle, public park and facility maintenance, hinders people from using public facilities because maintenance is infrequent. These public spaces are not routinely cleaned or taken care of, which results in neglect of the parks from both the government and the population.

To help alleviate the incidences of obesity and weight gain, the state of Kuwait also employs the Public Authority for Youth and Sports, which sponsors the youth through sports clubs and youth centers. The purpose of the Public Authority for Youth and Sports is to take care of kids and adolescents and further develop their physical, moral, mental, and technical proficiency. The group likewise provides the means for raising a good citizen that is both religiously and physically active and engaged in their society and culture, as well as strengthens their loyalty to their homeland. This nationally-affiliated group is important for Kuwaiti youth because it encourages them to establish healthy habits and gives them the opportunity to be physically active.

In regard to the private sector, there are many private health and fitness clubs that offer different sports such as swimming, weightlifting, martial arts games, and other aerobic activities. However, an individual must be at least 18 years old to become a member and these health and fitness clubs require a fee, making them exclusive and inaccessible for some subsets of the population. Though they are better maintained and offer more varieties of sports, the fees, which are typically ranging from $70 to $300 per month with average of $180 per month, discourage some people from using them as a resource for physical activity.

The public and private sectors of sports and recreations' obstacles are relevant for the students of Kuwait University as well. There are more services provided to them in the private sector, but while students are 18 and older, and therefore can join private sports clubs, the high fees can prevent them from becoming members and engaging in physical activity. The public parks for walking and exercising are a less enjoyable option for university students due to weather extremes and park maintenance. Kuwaiti students need recreational areas that are clean, in safe areas, and offer them many options for sports and exercise in order to encourage them to engage in physical activity.

Kuwait University and Physical Activity

Kuwait University has massive potential to positively influence its student body and their health behaviors. The university was established in 1966 and hosts 37,225 students. Kuwait University is composed of 16 colleges. The colleges are spread out among different campuses throughout the country and cover a broad array of disciplines, such as law, medicine, and education. It is the most prestigious college in the country, and consequently, has a responsibility to promote health and wellness throughout the university, as well as in the community.

Kuwait University offers intramural and other sport activities, but the programs they do offer are not large enough to meet the demands of their substantial student body. Moreover, the College of Education provides elective courses in physical education, such as foundations of the theory of physical education, introduction to physical education, and health education. However, the university does not offer an extensive physical education program. By expanding the intramural, sport, and recreational activities as well as offering more physical education classes, the university could have a significant impact on students' health behaviors and promote physical activity.

In addition to lacking opportunities and courses in physical activity and education, Kuwait University also lacks facilities for students to engage in physical activities and sports. The university does not have any recreation centers around any of the campuses, and playing fields are only available by reservation. This makes participating in physical activity difficult and inaccessible to the majority of the student body. For women, this is an especially difficult barrier. Al-Isa, Campbell, Desapriya, & Wijesinghe (2011) noted that "the lack of exercise facilities in Kuwait specifically for women is also a hindrance" (p. 4). Kuwait University should create strategies to encourage female students to engage in physical activity (Al-Isa *et al*., 2011).

Several studies confirm that schools and physical and health education curricula are an integral asset to decreasing physical inactivity and obesity (Castelli, Hillman, Buck, & Erwin, 2007; Grissom, 2005; Woods, Nelson, O'Gorman, Foley, & Moyna, 2009).Waldron and Dieser (2010) claimed that universities have the potential to promote healthy and active lifestyles. Furthermore, students tend to react positively to physical activity programs conducted by universities (Melton, Hansen, and Gross, 2010). Melton et al. (2010) found that students that participated in university sanctioned activities consistently rated the programs from "good" to "excellent". Al-Isa *et al*. (2011) assert that is necessary to give university students time to participate in physical activity each day even if that requires the university to adopt new academic policies. Educating university students about balancing physical activity and their other obligations should be a component in Kuwait University's curriculum because that has been proven to be an overall effective method of promoting health (Al-Isa *et al*., 2011). Because Kuwait University is such a large institution, incorporating a more extensive physical education program, installing accessible facilities for physical activity, and increasing intramural leagues could greatly influence this population to engage in a healthier lifestyle.

University Students and Physical Activity

University students' physical activity behaviors seemed no different than those of the general population in that most collegians remain sedentary (DHHS, 2000, Raynor, *et al*., 2010). Physical activity rates swiftly decline as students begin college due to their university obligations and time spent in sedentary activities such as computer use, sitting in class, and studying (Klepfer, 2013; Sailors *et al*., 2010). Kilpatrick, Hebert, and Bartholomew (2005) suggested that physical inactivity is a major health issue among college students. Even though students are aware of the importance of a healthy lifestyle, only a small percentage of them actively pursue it (Lee & Loke, 2005). Irwin (2004) found that the prevalence of insufficient physical activity among young adults (ages 18-24) attending college ranged from 30-60%. Despite being engaged in physical activity, 30-40% of college students failed to meet the physical activity recommendations necessary to accrue health benefits (Bray & Born, 2004; DHHS, 2000). Moreover, Yetter (2009) stated that regular engagement in physical inactivity was a causal factor in weight gain and obesity rates. Failing to maintain adequate physical activity levels could not only pose significant health risks, but worsen quality of life (Sidman, D'Abundo, & Hritz, 2009)

When college students fail to establish adequate physical activity patterns, the accompanying health benefits are greatly reduced. Raynor *et al*. (2010) examined college students' physical activity behaviors by calculating the number of daily steps taken to determine if college students were adhering to the physical activity recommendations. Their findings showed that a majority of college students (78%) failed to receive the maximum health benefits gained by participating in "sustained" (i.e., a minimum of 10 minutes) bouts of moderate to vigorous physical activity most days of the week.

For example, Abdullah *et al*. (2005) aimed to understand the prevalence and predictors of physical inactivity for students in a Hong Kong university, with 61% (1189/1849) of students participating. Currently, there is insufficient data on physical activity levels in Hong Kong, but the data that exists shows that physical activity levels are low (31%) among young people. Likewise, students tend to become more physically inactive with age, and if that trend continues, then physical activity levels among university students are predicted to become lower than physical activity levels among school students. Abdullah *et al.* used a questionnaire to determine the level of physical activity.

Likewise, Khera and Sharma (2012) conducted a study of college students in New Delhi, India, to determine physical activity levels among students, particularly those living in hostels. They surveyed a sample of 297 students (178 males, 119 females) using the Global Physical Activity Questionnaire (GPAQ) to determine levels of physical activity. They measured physical activity in work, transport, and recreation, and found that 173 (58.2%) students had high physical activity levels, 83 (27.9%) students had moderate physical activity levels, and 41 (13.8%) had low physical activity levels. Moreover, hostellers had lower levels of physical activity than day scholars. The results of this particular study are inconsistent with the other studies that this review examines in that students tended to be more active in this region than in most others. A possible explanation is the participant sample; Khera *et al*. attributes this to hostellers' lack of recreational facilities and means of transportation.

The obesity rate in Kuwait has increased from 28.4% to 43% between 1998 and 2009, and much of that can be attributed to obesity and weight gain among university students. More troubling is the fact that Kuwaiti college students exhibit very high levels of weight gain and obesity, especially by comparison of European countries. An earlier study conducted by Al

Majed *et al*. (2011) examined the obesity epidemic among college students from different campuses in the Public Authority of Applied Education and Training in Kuwait. Using a sample size of 484 students from the ages of 17-24, AlMajed *et al*. (2011) found that 30.6% of the students were overweight, and 19.8% were obese, which is consistent with the later study. Older data on the physical activity levels in Kuwaiti students were 45% in the article by Al-Isa *et al*. (2011). The most recent data about physical activity levels for university students in Kuwait reports that 30% of Kuwaiti college students are characterized as overweight, and another 19.8% are obese (Kabir, *et al*., 2013). Therefore, maintaining an appropriate level of exercise is often recommended for long-term treatment to ensure that a proper lifestyle is sustained throughout an individual's lifespan. Thus, future research is needed that assesses the current level of physical activity among Kuwait universality students.

Gender and Physical Activity

Globally, males tend to be more physically active than females. Sherwood and Jeffery have found that physical activity levels decrease with age, especially for women (2000). According to McArthur and Raedeke (2009) females reported less time spent in physical activity than males. Munford (2011) likewise found that there was a significant correlation between gender and level of physical activity; males were more physically active and reported fewer perceived barriers. Males engaged in higher levels of moderate and vigorous intensity physical activity than females. Females surpassed males in walking as physical activity but no other activities. This seems to be a common trend; for example, the prevalence rates of insufficient physical activity in women were almost 50%, while the prevalence for men was 36% in the Eastern Mediterranean Region (WHO, 2008).In their study of Portuguese adults, Gal, Santos, and Barros (2005) discovered, after accounting for daily energy expenditure and physical

activities, that females were more sedentary than males, with 74% of males being sedentary and 86% of females being sedentary. Gomez-Lopez *et al*. (2011) examined physical activity and the correlation to gender in Spanish university students and ultimately found that women were twice as likely to quit engaging in physical activity and have a more sedentary lifestyle as well.

Gender differences among university students have not been extensively studied, but studies that have examined gender relationships with physical activity among university students have found that reasons for participating in physical activity varies by gender. Two studies in particular name reasons for participating in physical activity for each gender. For example, Tergerson and King (2002) examined gender differences in physical activity participation among 245 males and 290 females from high schools in the United States. Female students tended to claim benefits such as staying in good shape, losing weight, and having more energy. Male students claimed benefits like getting stronger, staying in good shape, and being competitive.

The second study conducted by Weinfeldt and Visek (2009) examined 450 students who enrolled in fitness classes and found that the top rationales for taking fitness courses were similar among males and females. The three top reasons cited for men were enjoyment (85%), exercising frequently (81%), and improving fitness (80%). Women ranked improving fitness the highest (89%), followed by exercising frequently (86%) and finally enjoyment (82%). Differences were present among males and females, with men prioritizing improving their strength (75%), and women prioritizing staying active (84%). Their study indicates that males and females perceive separate sets of benefits and incentives when choosing to become physically active. Weinfeldt *et al.* (2009) neglected to study perceived barriers, which plays a significant role in gender differences and physical activity participation. These studies show gender as a significant variable for participation in physical activity, and therefore gender should

be researched more thoroughly among physically inactive college students in order to promote health for this subset of the population.

AlMajed (2011) studied weight gain and obesity in Kuwaiti university students and found that males had a higher prevalence of obesity, while females had a higher prevalence of overweight, but neglected to look at physical activity levels among genders. However, given the prevalence of weight gain in Kuwaiti female college students, it can be inferred that physical activity rates are higher among male Kuwaiti college students. On the other hand, while studying possible health risks for inactive students, Sullivan *et al*. (2008) discovered that females were more at risk for cardiovascular disease, and males were more at risk for pre-hypertension and hypertension. Furthermore, Sullivan *et al*. (2008) found no substantial gender differences in vigorous, moderate, and light leisure-time physical activity. This finding contradicts the previous studies, and more research is necessary to fully understand gender differences in physical activity.

Likewise, physical activity rates have decreased across the entire Kuwaiti population, with women more inactive than men (Ramadan, *et al.*, 2010). However, there is little information available on the physical activity rates of female and male university students (Munford, 2011), particularly in Kuwait, and needs to be examined further.

Leisure Time Physical Activity

Leisure Time Physical Activity (LTPA) denotes engaging in moderate LTPA for 30 minutes or more at least five times a week, or participating in vigorous LTPA for 20 minutes or more at least three times per week (CDC, 2011). As in Kerner's *et al*. (2003) study of Asian high school girls in Toronto, this study will likewise be using LTPA to refer to participation in physical activity outside the context of school, such as any sport or recreational physical activity.

However, many people, including college students, do not engage in LTPA, but choose to be sedentary instead. Gal *et al.* (2005) found that physical inactivity is a common practice during leisure time for both males and females. During the course of their research on 2,194 Australian adults, Cerin, Leslie, Sugiyama, and Owen (2010) discovered that those who did not participate in physical activity during their leisure time were more likely to cite perceived barriers. One example of how college students choose to spend their leisure time derives from a study of Brazilian university students. Ferreira de Sousa, Fonseca, and Barbosa (2013) surveyed 5,461 college students from a public university in Bahia and discovered that the barriers named in the survey correlated to physical inactivity in leisure time. More specifically, those who were cognizant of their resource barriers to physical activity consequently had a prevalence rate of 70.9% of physical inactivity during their leisure time.

Assessment of Physical Activity

Assessing physical activity levels among college students could aid in determining proper intervention methods and promoting active lifestyles. According to Dale, Welk, and Matthews (2002), there are seven common methods for determining physical activity: self-report, accelerometers, doubly labeled water, heart rate monitors, indirect calorimetry, direct observation, and pedometers. Understanding these methods is essential to identifying the degree of need for intervention, but there is no way to know which method is the most accurate (Dale, *et al*., 2002). Self-report instruments, such as the IPAQ and BPAQ used in this study, are the most prevalent due to large sample sizes (Dale, *et al*., 2002).

Theoretical Framework

Because physical inactivity is prevalent among industrialized countries, interventions are becoming more relevant (Spence & Lee, 2003). A theoretical framework is crucial to identifying

influences on physical activity behaviors, helping understand these behaviors, and ultimately planning successful interventions. By finding precursors or catalysts to certain behaviors, intervention strategies can be created and implemented to promote physical activity and healthy lifestyles. Munford (2011) noted that traditional psychological research on health and changing health behaviors has emphasized determinants such as substance use and abuse, nutrition, and some demographic factors, which has aided in the development of new theories. This study has chosen the Social-Ecological Model as a framework to determine what factors influence physical activity participation and perceived barriers to physical activity in university students at Kuwait University.

Social-Ecological Model

The theoretical framework utilized in this study was the Social-Ecological Model (SEM). The crux of the social-ecological model is that physical activity behaviors and practices are dictated by many intrapersonal, interpersonal, and physical environmental factors (Stanley, Boshoff, & Dollman, 2011). The SEM emphasizes the individual as the most important element; they attribute their own attitudes, capabilities, and knowledge to their behaviors. On the other hand, external elements affect the individual as well, and can also explain behavior (Walcott-McQuigg, Zerwic, Dan, & Kelley, 2001). Influences can be separated into two categories: intra-individual (personal beliefs, attitudes, and behaviors), and extra-individual (environment, social and cultural context) (Spence, *et al*., 2003). For this particular study, the SEM will help explain internal and external barriers to physical activity among university students.

Features of the SEM are mentioned in much of the literature on physical activity in that a broad view is taken of the individual's characteristics in conjunction with contextual variables (Sallis & Owen, 1999). Munford (2011) explains that "as a result, many of the limitations

observed with current behavior explanation models involve shifting toward a more comprehensive approach for explaining behavior, ultimately acknowledging the importance of observing the social context" (p. 28). The SEM offers a deeper explanation for behavior by introducing several areas of influence rather than just intrapersonal influences (Fleury & Lee, 2006). This model further enables an understanding of health behaviors and the creation of intervention programs for certain populations (i.e. university students) due to its emphasis on socio-ecological factors.

Universities have an insular environment, and it is important to assess the environment in the context of the SEM in order to explain why individuals engage in behaviors within that setting. There is little information that examines determinants of physical activity for those individuals who report different physical activity levels in the university (Munford, 2011). Fleury *et al*. (2006) maintain that physical activity interventions must be tailored to the demographic and relevant to their cultural identity.

Though the model has successfully addressed the many levels of influence on physical activity behaviors, it does neglect biological factors in individuals that affect behaviors (Spence *et al*., 2003). In addition, the researchers acknowledge that "the definition of a theoretical and conceptual framework to study the putative relationships between extra-individual causal mechanisms and behavior" (p. 9) for the SEM does not exist.

The SEM theoretical framework is guiding our research question concerning the most prevalent barriers to physical activity among students at Kuwait University. This model encompasses both the individual and the context in which the individual operates and could be useful in providing a larger picture for those who are physically inactive. The SEM will help establish multiple internal and external perceived barriers to physical activity and further reveal

the many factors that cause university students to choose not to participate in any type of physical activity.

Theory of Planned Behavior

This study also utilized the Theory of Planned Behavior due to its applicability to physical activity behaviors. Moreover, it can be used to predict behaviors and patterns for specific demographics (Munford, 2011). The Theory of Planned behavior assumes that subjects' behavior is dictated by attitude, perceived behavioral control, intention, and subjective norm (Ajzen & Fishbein, 1975). Altogether, this theory focuses on how individuals react to societal pressure and influence, their own assumed self-efficacy in regards to the activities and behaviors they engage in, and their motivation are important as well. These aspects are instrumental in calculating common behaviors within insular communities.

For the purpose of this study, the Theory of Planned Behavior was used to describe how perceived barriers to physical activity hinder students from engaging in physical activity and why they are relevant. This theoretical framework, which was used in tandem with the Social-Ecological Model, has helped determine the social constructs and influences that either encourage or discourage physical activity among male and female students at Kuwait University.

Perceived Barriers

Al-Otaibi (2013) maintained that it is essential to understand the barriers to physical activity in order to promote fitness and reduce chronic illnesses. Understanding why most people are inactive or having low level of physical activity is necessary toward curtailing this epidemic. One explanation for the declining levels of physical activity is the number of barriers that make it difficult to participate. Perceived barriers are defined as obstacles that prevent one's initiation or ability to maintain a desired behavior change (Allison, *et al*., 1999). In their extensive review of

the literature to assess behavioral determinants of participation in regular physical activity, Sherwood and Jeffery (2000) have categorized and analyzed determinants into two broad categories, individual characteristics and environmental characteristics, that could explain why adults participate or do not participate in exercise. Individual characteristics include motivation, self-efficacy, exercise history, skills, and other health behaviors, while environmental characteristics include accessibility, time barriers, cost, and social support.

Perceived barriers to physical activity may be broadly classified into two categories, internal and external (Allison, *et al*., 1999). Perceived barriers may represent more individual, psychologically based factors (internal barriers), such as a lack of motivation, other interests, or concerns about engaging in physical activity in public (Allison, *et al*., 1999). Moreover, perceived barriers may reflect environmental external factors, such as a lack of support from friends and family, safety concerns, limited transportation options, or a lack of time due to other responsibilities. Another example of an environmental barrier includes seasonal influences. This barrier consists of one's reluctance to participate in exercise or physical activity due to the influence of weather (Salmon, Crawford, Owen, Bauman & Sallis, 2003).

Internationally, many investigators have focused on the study of the external and internal barriers toward physical activity. Several studies reported lack of time as the most important external barrier to physical activity (Allison, Dwyer, Goldenberg, Fein, Yoshida, & Boutillier, 2005; Andajani-Sutjahjo, Ball, Warren, Inglis, & Crawford, 2004; Daskapan, *et al*., 2006). However, according to several researchers, lack of energy was the greatest obstacle to physical activity (Daskapan *et al*., 2006; Phillips, Flemming, & Tsintzas, 2009). In another study, Menon (2008) stated that lack of will power (98.5%) was the most commonly mentioned barrier to physical activity. Furthermore, lack of time (94%), lack of energy (91%), and social influence

(86%) were also some of the important difficulties cited by the participants. Menon concluded that internal barriers were more relevant as compared to external barriers in young sedentary adults.

In a different study, the Canadian Fitness and Lifestyle Research Institute [CFLRI] (1996) investigated the reasons of physical inactivity in young adults. Their classification included major, moderate, or minor reasons for not participating in physical activity. Both external and internal reasons were shown to influence physical activity. Lack of time, lack of energy, and lack of motivation were examples of the "major" reasons for physical inactivity among individuals. Whereas, excessive cost, illness or injury, feeling uncomfortable, lack of skill, and fear of injury were some of the "moderate" barriers to physical activity. Lack of safe places, lack of child care, lack of partner, insufficient programs, lack of support, and lack of transportation were some of the "minor" external barriers to physical activity.

The Arabic population faces three types of barriers: individual, cultural, and environmental barriers. In their extensive review of the literature, Benjamin and Donnelly (2013) looked at barriers to physical activity among Arabic adults. Using 15 studies published between 2002 and 2013 to guide their research, they found that on the individual level, lack of time was a major barrier, as well as pain when exercising. On the larger, organizational, cultural, and policy scale, women in particular had a difficult time participating in physical activity due to the need to preserve their modesty and lack of support from family. Use of housemaids was another major barrier to physical activity, because women could use housework as physical activity but were neglecting to do so due to employing housemaids. On an environmental level, the two most frequently cited barriers were "weather" and "lack of exercise facilities".

Cross-Cultural Study of Barriers to Physical Activity

In order to better understand perceived barriers to physical activity, it is essential to examine them holistically. Moreover, it will help identify common perceived barriers to physically activity across cultures and expand the knowledge of these obstacles to physical activity internationally. This study looks at several different countries to determine which barriers, categorized as either internal or external, are more prevalent around the globe, particularly for university students. These studies were chosen for review based on their representations of a broad array of cultures and demographics.

Internal Barriers

In 2011, Gomez-Lopez *et al.* studied why college students in Almeria University, Spain chose a sedentary lifestyle as opposed to practicing physical activity and identified several internal barriers for participating in physical activity. They determined reasons for abandoning physical activity by creating a questionnaire on the analysis of sports habits and lifestyles. Gomez-Lopez *et al*. used a sample of 1834 students. Most of the students (1061) were female, while the other 773 students were male. The internal barriers included not finding physical activity entertaining or enjoyable and choosing to do other activities.

In their study of barriers to physical activity among 134 students at Zagreb University in Croatia, Milanovic and Sporis (2011) used the IPAQ survey to identify 15 separate barriers to physical activity. They discovered that the most common internal barrier was laziness. The least cited barrier was exercise causing exhaustion. Cerin *et al*. (2010), on the other hand, found that "lack of motivation" was the most cited internal barrier and associated with weekly amount of leisure time physical activity.

In a cross-sectional study of 1084 university students from Bahia, Brazil, Ferreira de Sousa *et al*. (2012) identified the pervasiveness, socio-demographic signs, and program affiliation connected to perceived barriers for regular engagement in physical activity. The researchers classified barriers to leisure-time physical activity as situational, personal, and stemming from resources. Situational and resource barriers were classified as external barriers. Personal barriers relate to internal barriers, and constitute "tiredness, lack of desire, lack of motor skills, and lack of physical conditions". Ferreira de Sousa *et al.* (2012) further synthesized the information in relation to socio-demographic indicators such as gender and age, program affiliation such as university, and leisure-time physical inactivity. The results showed that situational barriers and personal barriers were more prevalent among university students (56.7% and 30.3%, respectively).

Abdullah *et al*. (2005) examined barriers to physical activity as well through asking students in Hong Kong whether or not they participated in physical activity recently. If the student did not participate in physical activity they were asked to specify using a given set of five barriers: "no time, no interest, no partner, tired/sickness, other (specify)." They found that one of the most common barriers physically inactive students referred to was "no interest."

Arab (2007) conducted the only available study in Kuwait that examined barriers toward physical activity participation. She investigated the barriers to exercise among Kuwaiti individuals with and without disabilities aged from 18 to 55 years. The Barriers to Physical Activity and Disability Survey were used to identify the top barriers to exercise. Again, the internal barriers differed depending on the gender of participants, but most commonly cited by people without disabilities were a lack of motivation. The most commonly cited barriers to

physical activity for people with disabilities were lack of motivation and discomfort at exercise facilities (men), and lack of motivation (women).

External Barriers

External barriers seem to consistently be more of a hindrance to physical activity than internal barriers. For example, Gomez-Lopez *et al*. (2011) found that the external barriers were more frequently cited by Spanish university students than internal barriers, such as a lack of time (most frequently mentioned), insufficient or inconveniently located (far away) sporting equipment and facilities, and prioritizing personal obligations. Further studies of Spanish university students found that physically inactive adults quit engaging in physical activity at approximately 17.5 years old, with the most common reasons for which being a lack of time and beginning their studies at the university level (Romaguera, *et al*., 2011).

Milanovic *et al.* (2011) discovered that the most common external barrier was interference with school obligations among university students in Zagreb. Not having enough time to engage in physical activity, or barriers related to that issue, was mentioned frequently as well. Likewise, Abdullah *et al*. (2005) found that students in Hong Kong typically referred to not having the time to engage in physical activity as one of their biggest barriers. In a different study of 2,194 Australian adults, Cerin *et al*. (2010) found that a "lack of time" was the most reported barriers among participants and greatly impacted the weekly amount of leisure time physical activity.

When studying barriers to physical activity for Brazilian university students, Ferreira de Sousa *et al.* (2012) classified external barriers as situational and resource barriers. Situational barriers refer to "uncomfortable climate, overwork, family obligations and study". Barriers related to resources refer to "distance to the place of practice, lack of facilities, lack of money,

and safety conditions" (p. 166). The results showed that situational barriers were the most common among university students at a rate 56.7% while resource barriers had a strong association with inactivity during leisure-time.

In the Eastern Mediterranean Region various studies have been conducted on different populations to identify the prevalence of specific barriers to physical activity participation. One study conducted by Al-Otaibi (2013) examined the association between the stages of change for physical activity and perceived barriers in a sample of Saudi adults in Al-Ahsa. She found that barriers differed between the two genders, and that women had fewer internal barriers than men. A similar study, conducted by Amin, Suleman, Ali, Gamal, and Al Wehedy (2011), showed that 65.9% of the Saudi adults mentioned weather as the main barrier to physical activity, followed by traditions and customs which cited by 60.0% of the responses, especially among females, lack of places appropriate for exercising was mentioned by 55.4%. Lack of time (44.7%) due to working office hours, work overload, and extra jobs among men, and household chores among women, were chiefly mentioned. Arab (2007) found that the most common external barrier cited by people without disabilities was a lack of time. Lacking time was also the most common external barrier for women with disabilities.

One of the common external barriers that many people face in the Eastern Mediterranean Region is weather. The weather can play an important role in increasing or decreasing the physical activity participation. Many researchers have identified weather as one of the perceived barriers to physical activity participation, especially, in the Middle Eastern countries. A similar study conducted by Amin *et al*., (2011) showed that 65.9% of the Saudi adults mentioned weather as the leading barrier to physical activity. In a similar case, Kuwait consists mostly of desert, and the summers (April to October) are extremely hot and dry with temperatures reaching

above 124°F. The hot weather of Kuwait makes it difficult for Kuwaiti individuals to participate in outdoor physical activities such as walking. Arab (2006) indicated the majority of the participants noted that the hot weather in Kuwait was considered as hinder to the regular practice of physical activity.

Weather can be a less significant barrier to physical activity depending on geographic region. In contrast with the Eastern Mediterranean Region, The Canadian Fitness and Lifestyle Research Institute [CFLRI] (1996) investigated the causes of physical inactivity in young adults. Weather showed a lesser relationship with physical activity. Humpel, Owen, and Leslie, (2002) investigated the relationship between physical environmental factors such as accessibility of facilities, opportunities for activity, weather, safety and aesthetic conditions to physical activity. The researchers found that weather showed less strong relationships with physical activity. The researchers recommended that future research should be conducted in order to identity possible casual relationships. Hence, creating positive environments for physical activity is of prime importance in encouraging physical activity participation.

Barriers to Physical Activity among University Students

On an academic level, numerous researchers have examined the existence of barriers associated with high school and university students' physical activity participation (Allison, *et al*., 1999; Daskapan *et al*., 2006; El-Gilany, Badawi, El-Khawaga and Awadalla, 2011; El-Gilany, and El- Masry, 2011; Youssef, Al Shafie, Al-Mukhaini, & Al-Balushi, 2013). Youssef *et al.* (2013) conducted a study in Oman to examine the patterns and determinants of physical activity among 439 secondary-school students. The results were that the most prominent internal barriers to students were a high interest in activities other than exercising (72.2%), having limited energy to exercise (43.3%) and thinking that exercise was difficult and too tiring

(40.1%). Only 18.0% were not thinking that exercise has positive health effects. Regarding the external barriers, a high proportion of students agreed that parents give priority to academic success (71.5%) or that they lacked leisure time due to academic responsibilities (65.4%). Other perceived external barriers were lack of exercise equipment in the home (53.5%) and lack of leisure time because of social and family responsibilities (39.6%).

El-Gilany *et al*. (2011) carried out a study to describe the pattern of physical activity, predictors of physical inactivity and perceived barriers on 1708 students from Mansoura University, Egypt. Regarding the activity levels, 11.3% of students were physically inactive, 52.0% had moderate and 36.7% had high physical activity levels. (3.7%) of the students reported no barriers to physical activity. The most frequent permanent barriers were time limitation, lack of accessible and suitable sporting places and lack of support and encouragement from others. The most cited temporary barriers were not being interested in sports, time limitation, unsuitable (hot or cold) weather and feeling tired due to physical activity. Abdullah *et al.* (2005) found that, for students in the university system in Hong Kong, the largest predictors in physical inactivity were being female, poor health status, and studying in the Faculty of Arts.

Daskapan *et al.* (2006) likewise assessed the exercise habits and perceived barriers to physical activity. The results revealed that lack of time due to a busy lesson schedule, and lack of time due to responsibilities related to the family and social environment were the most commonly cited barriers among the university Turkish students. In different study, El-Gilany, and El-Masry (2011) describe the pattern of physical activity, and perceived barriers to physical activity among a sample of 319 Egyptian (173 males, 146 females) and 297 Saudi (230 males, 76 females) medical students. The researchers found that physical inactivity was significantly higher among Saudi than Egyptian medical students (41.1% versus 15.4%, respectively). In addition,

both groups reported time limitation due to busy study schedule was the most frequently perceived barrier for not participating in physical activity, followed by non-interest in sports, having other priorities, lack of accessible and suitable sporting places, and lack of support or encouragement from others. Taken together, these studies showed that students, especially at the university level, encounter many different barriers that limit or enable participation physical activity.

Female university students in the Middle East face unique barriers to physical activity. Harkness (2012) looked at sport participation in the Middle East, more specifically Qatar, among females in particular. His participants included 25 female basketball players (ages 18-22), three coaches, and two former athletes from the Education City campuses in Qatar. Most were Muslims and ethnically diverse. To obtain data, Harkness observed games and practices. He found four major barriers to physical activity for female athletes: family, hijab, gender segregation, and reputation. In most cases, family dictated whether or not females participated in sports. The participants' families were supportive on the whole, but most females' families are not, meaning that sports are forbidden. The basketball players in this study were also markedly different from their peers in that they were not strict about wearing their hijab, whereas females who were strict Muslims wore their hijab and did not practice sports. Gender segregation, the third barrier, was an integral part of life in Qatar, and even the games and practices were closed to a male audience. Finally, reputation was a major barrier in discouraging women to participate sports, because most did not want to engage in an activity that was reserved for males. Literature examining barriers to physical activity among gender lines in university students could give insight into common themes for physical activity participation in students. However, there exists no data about students in Kuwait generally, and about Kuwait University students, in particular.

Gender and Perceived Barriers

Males and females differ regardless of culture in what they perceive to be their greatest obstacles in participating in physical activity. For example, Abdullah *et al.*(2005) found that females in a Hong Kong university were more likely than males to attribute physical inactivity to "no interest," while males were more likely than females to attribute physical inactivity to "no partner." Likewise, Romaguera *et al.* (2011) noted the tendency for females to cite a lack of time and beginning university studies, and for women to engage in physical activity for fitness and pleasure, while men engaged in physical activity for the social aspects and pleasure.

In a cross-sectional survey, Munford (2011) examined perceived barriers to physical activity among 412 male and female college students. He found significant differences between males and females and what they cited as barriers. Overall, determinants for higher levels of physical activity were being male, reporting good personal health, and reporting fewer barriers to physical activity. There was a notable correlation between gender and level of physical activity; males were more physically active and tended to cite fewer barriers. When surveyed about barriers to physical activity, the three most common were "exercise tires me", "I am fatigued by exercise", and "exercise is hard work for me." Munford (2011) further suggests that examining barriers to physical activity is helpful in revealing factors of physical activity among university students.

Milanovic *et al.* discovered little difference in common barriers to physical activity along gender lines (2011). Females tended to note laziness, lack of time, interference with school, being busy, and few facilities for physical activity. Males expressed the same concerns. Two barriers were perceived notably different along gender lines: health issues and family. Males placed more emphasis on being prohibited by their health or familial issues. Similarly, Gomez-

Lopez *et al.* (2011) found that men were more likely to cite internal barriers as a reason for dropping physical activity. Tergerson *et al*. (2002) likewise examined perceived barriers to physical activity divided by gender, and discovered three significant reasons for inactivity in females: lack of time, wanting to use their time in other activities, and tiredness. The main barrier for males is the belief that physical activity is unimportant.

Robbins *et al.* (2003) conducted a study of girls in two Midwestern middle schools in the U.S. to determine perceived barriers to physical activity among young girls to further validate the claim that women tend to be less physically active than men. To understand why adolescents, particularly girls, are physically inactive, they used a sample of 77 ethnically diverse girls from the ages of 11-14 and asked them to identify which barriers were most applicable to them on a scale from 1-5. Robbins *et al.* (2003) found that barriers with the highest percentage scores were "I am self-conscious about my looks when I exercise" and "I am not motivated to be active." Two other significant barriers were "I do not have anyone to do physical activities with me" and "Physical activity is hard work". The barrier "my schoolwork gets in the way of my physical activity" was also frequently reported. Another study completed in the United States among a sample of 180 Arabic women found that not enough time was the most frequently identified barrier followed by too stressed, takes time away from family, pain when exercising, exercise is boring, not enough money, and lack of support- family and friends (Qahoush, Stotts, Alawneh, Froelicher, 2010).

To understand the perceived barriers to physical activity and the practices that correlate to these barriers, Al-Otaibi interviewed 242 Saudi adults in Al-Ahsa (2013). Al-Otaibi conducted her research with special attention to gender and found that 48% of the females surveyed were overweight, over half were inactive, and their most common barrier to physical activity was not

having the time. A significant portion of males were physically active (39%), and 16.9% of males were obese. The largest barrier to physical activity for males was motivation, and they tended to have more internal barriers than females. The BMI classes were not considerably different between males and females. In other words, the major barrier among the females was lack of time and, among males, lack of motivation and females had less internal barriers comparable to the males (Al-Otaibi, 2013).

Arab (2007) found that the top barriers to exercise for Kuwaiti men without disabilities were lack of time, followed by feeling boredom when exercising, lack of motivation, and pain factor, while the top barriers to exercise for Kuwaiti men with physical disabilities were lack of motivation then feeling uncomfortable to exercise in fitness clubs, lack of interest, and health concerns. However, the most reported barriers to exercise for women without disability were lack of time, lack of energy, lack of motivation, and feeling boredom when exercising. Furthermore, the top barriers to exercise for Kuwaiti women with physical disabilities were lack of time, lack of motivation, lack of energy, and lack of interest. However, this study is not enough research to determine college students' perceived barriers along gender lines, and further research must be conducted to understand this population.

Summary

The literature review reveals that there is a significant decline in physical activity levels and that perceived barriers to physical activity prohibit college students from engaging in physical activity. The global literature that focuses on the association between gender and barriers to physical activity overwhelmingly indicates that women are less likely to engage in physical activity than men due to internal and external barriers. More research must be done in to determine why individuals, particularly university students, choose to be physically inactive.

Research Questions

The overarching research question guiding this study is "What are the factors associated with the barriers to physical activity as perceived by Kuwait University students?" The 13sub-questions addressed in this study using inferential statistics are defined in Table 1.

Table 1

Research Questions

RQ1. Is there a difference between males and females regarding the strength of their internal barriers to physical activity?
RQ2. Is there a difference between males and females regarding the strength of their external barriers to physical activity?
RQ3. Is there an association between gender and membership in a sports club?
RQ4. Is there an association between gender and studying PE/health education?
RQ5. Is there a difference between males and females regarding their lack of knowledge as a barrier to physical activity?
RQ6. Is there a difference between males and females regarding their lack of skills as a barrier to physical activity?
RQ7. Do gender and studying PE/health education predict an individual's lack of knowledge as a barrier to physical activity?
RQ8. Do gender and membership in a sports club predict an individual's lack of skills as a barrier to physical activity?
RQ9. Is there a difference between males and females regarding their overall physical activity?
RQ10. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of walking activity?
RQ11. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of moderate physical activity?
RQ12. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of vigorous physical activity?
RQ13. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of overall physical activity?

CHAPTER III:

METHODS

Introduction

This study sought to build on previous methodologies and add to the literature based on barriers to physical activity among university students. This chapter has outlined the participants and the various instrumentations, particularly the International Physical Activity Questionnaire (IPAQ) and the Perceived Barriers to Physical Activity (PBAQ). In addition, the procedures and the statistical analysis have been discussed.

Participants

The participants for this study were selected based on the assumption that they are enrolled as students within any of the 16 colleges at Kuwait University. Furthermore, they had to fall into the appropriate age range (≥18 years of age). This sample was representative of the University's population as a whole. The population consisted of 1,123 enrolled in various academic classes. Participants were guaranteed full confidentiality and no risk, due to the survey format. No identifiable information was collected. This study was anonymous; participants' names were not included on the survey, and their responses have not been shared. Participation was voluntary, and only completed surveys have been included in the study. The participants did not receive either financial or academic compensation for their participation in the study. The protocol for this study has been approved by the Middle Tennessee State University Institutional Review Board and Kuwait University (See Appendix A).

Instrumentations

Participants completed a survey comprised of three sections measuring different dimensions. First, the demographic variable data (i.e. age, gender, college, marital status, memberships to sports clubs, etc.) was gathered. Second, physical activity level was measured

using the long version of the Internal Physical Activity Questionnaire (IPAQ) which is available in Appendix C. Finally, the Barriers to Physical Activity Questionnaire (BPAQ) was used to determine which perceived barriers were cited most frequently by Kuwait University students (Appendix D). The Arabic version of the instrument is available in (Appendix E). The following sections have further explained both instrumentations in detail.

International Physical Activity Questionnaire (IPAQ)

The International Physical Activity Questionnaire (IPAQ) was initially designed and piloted as a way to effectively assess and compare physical activity levels of young and middle-aged adults, ranging in age from 15–69 years, over the last seven days. The IPAQ project was formally initiated in 1996 when a group of physical activity researchers from 14 countries proposed an international effort to develop a standard questionnaire for the purpose of public health surveillance of physical activity. Two versions of the IPAQ were validated: a short version, usually administered by telephone interview or self-administration, and a longer, more detailed version (Craig, Marshall, Sjostrom, Bauman, Booth, Ainsworth, *et al*., 2003). The nine-item shorter version assesses time spent walking in vigorous and moderate intensity activity and in sedentary activity. The 31-item long version determined more detailed information within the areas of "household and yard work activities, occupational activity, self-powered transport and leisure-time physical activity as well as sedentary activity" (Craig *et al*., 2003, p. 1382).

In an attempt to establish psychometric properties of the IPAQ, Craig *et al*. (2003) obtained data from12 countries. Test re-test reliability was assessed, when the IPAQ administered at two different times and subsequent Spearman's correlation was calculated to determine agreement. Concurrent validity and criterion validity were also determined by comparing the results from two differing IPAQ forms that were administered the same day

(ascertaining the agreement between the long and short versions of the IPAQ) and by comparing the results from the IPAQ self-reported physical activity and sitting data to the CSA accelerometer measure of physical activity, where participants wore accelerometers for seven days during the validity testing of the instrument (Craig *et al*., 2003).

For the purpose of this study, part four of the official long-version IPAQ survey, which consisted of six self-report items, has been used to assess the average daily and weekly walking time, recreation, sports, and other leisure-time physical activities done during the seven days prior to receiving the survey. This study used the same scoring for leisure-time physical activity as the official long-version of the IPAQ survey. Part four of the IPAQ survey was chosen due to its relevance to Kuwait University Students. This part of the IPAQ survey asked participants about time that they spent in physical activities they chose to do for pleasure during the last seven days. There are not many opportunities for Kuwait University students to be physically active due to different barriers. Therefore, part four enabled the researcher to identify levels of physical activity and provided a foundation for measuring perceived barriers to physical activity. The four other parts of the survey were inappropriate for this study's purpose.

Part one of the IPAQ survey asked the participants about their level of physical activity while at work. They broadly defined work as paid and unpaid labor or volunteering. This does not apply to Kuwait University students because the Kuwait Ministry of Education enforces the policy that those attending university or studying cannot hold a job or work at the same time. Therefore, university students did not have anything to report about job related physical activity. Part two inquired about participants' transportation to places such as home, work, and stores, and whether or not that transportation included physical activity. Most Kuwaitis own a car and use their vehicles as their primary means of transportation. Kuwait University students typically

drive their cars to the university, rendering this question unrelated to their lifestyle and this study.

Part three of the IPAQ survey asked the participants about their housework and family obligations. These included gardening, yard work, maintenance work, and taking care of relatives. The Kuwaiti culture encourages hiring several maids to contribute to maintaining the homes, and most Kuwaitis have to do very little housework themselves. Finally, part five asked participants about their time spent sitting. This part wanted to measure how often participants sat while they were doing daily tasks, such as working or doing course work. Activities that required sitting included: sitting at a desk, visiting friends, reading, or watching television. This part was not relevant to this study. Participants were asked about their physical activity level during leisure time and specific barriers they encountered when participating in physical activity. Moreover, time spent sitting was not a component of this study.

Barriers to Physical Activity Questionnaire (BPAQ)

The Perceived Barriers Inventory has been used to determine the participants' perceptions of barriers toward physical activity. The inventory consisted of 26 statements, each statement including internal barriers (e.g., lack of confidence, lack of motivation, and lack of energy) or external barriers to physical activity (e.g., lack of transportation, lack of safe places, and lack of partner). Respondents were asked whether or not each of the twenty six barriers applied to them by marking a number 1-10, with 1 denoting not a barrier and 10 as a major barrier. These barriers were drawn from previous research and were thought to be experienced by university students (El-Gilany & El-Masry, 2011).

Procedure

The IPAQ and the BPAQ were combined and presented to the participants as a single document written in Arabic which is available in Appendix E. Students responded to the IPAQ to estimate the students' physical activity level. Then, they responded to the BPAQ to assess their perceptions of barriers toward physical activity. The questionnaire has been administered during the month of June. It was conducted away from the period of exams since that could negatively influence the participants' emotional state and skew our findings. The survey was done during the usual class time, with previous approval given from the corresponding professor. After receiving approval for data collection, the researcher introduced himself to the students in each classroom and informed them about the purpose of the study and about guarantees of anonymity and confidentiality. Consent forms were administered and verbal assent was given by each participant (Appendix F). The information was collected by the researcher in the presence of each classroom's professor. Approximate time to completion for the survey was 10-15 minutes. Participation was entirely voluntary after giving verbal consent. After the conclusion of the study, the researcher debriefed the participants about the details of the study and answered the questions participants had.

Variables

The scores for the responses to each item were imported into the data editor of IBM SPSS version 20.0. The variables were operationalized from these scores. The sources, operational definitions, and measurement levels of the variables are outlined in Table 2. The operational definitions indicate how the variables were computed or coded in the SPSS data editor. The measurement levels are those specified in the SPSS data editor.

Table 2

Sources, Functional and Operational Definitions, and Measurement Levels of Variables

Variable	Source [a]	Operational Definition	Measurement Level
Gender	DCQ	1 = Male 2 = Female	Nominal
Internal Barriers	BPAQ	Scores for Items 4, 6, 9, 10, 11, 13, 15, 23, 24, and 26. Scored from 1 to 10, where 1 = not a barrier; 10 = major barrier. Scores may be composited if internal consistency reliability is good.	Interval Scale
External Barriers	BPAQ	Scores for Items 1, 2, 3, 5, 7, 8, 12, 14, 16, 17, 18, 19, 20, 21, 22, and 25. Scored from 1 to 10, where 1 = not a barrier; 10 = major barrier. Scores may be composited if internal consistency reliability is good.	Interval Scale
Lack of Knowledge	BPAQ	Item 5, scored from 1 to 10, where 1 = not a barrier; 10 = major barrier	Interval Scale
Lack of Skills	BPAQ	Item 7, scored from 1 to 10, where 1 = not a barrier; 10 = major barrier	Interval Scale
Sports Club Membership	DCQ	1 = Member of Sports Club 2 = Not member of Sports Club	Nominal
PE/Health Education	DCQ	1 = Studied PE/Health Education 2 = Not studied PE/Health Education	Nominal
Walking Activity	IPAQ	3.3 x walking minutes per day x walking days per week . Scored in MET minutes/week.	Interval Scale
Moderate Physical Activity	IPAQ	4.0 x moderate activity minutes per day x moderate activity days per week. Scored in MET minutes/week.	Interval Scale
Vigorous Physical Activity	IPAQ	8.0 x vigorous activity minutes per day x vigorous activity days per week scores in MET minutes/week	Interval Scale
Overall Physical Activity	IPAQ	Sum of scores for Walking + Moderate + Vigorous in MET minutes/ week	Interval Scale

Note: [a] DCQ = Demographic Characteristics Questionnaire (see Appendix A); IPAQ = International Physical Activity Questionnaire (see Appendix B); BPAQ = Barriers to Physical Activity Questionnaire (see Appendix C).

Two of the research questions (RQ7 and RQ8) assumed that gender was a moderating variable (see Table 1). A moderating variable (MV) is defined as one which controls the direction and/or strength of the correlation between an independent variable (IV) and a dependent variable (DV). The analysis of moderation, using Baron & Kenny's (1986) moderator model, outlined in Figure 1, is included as integral part of the research questions of this study.

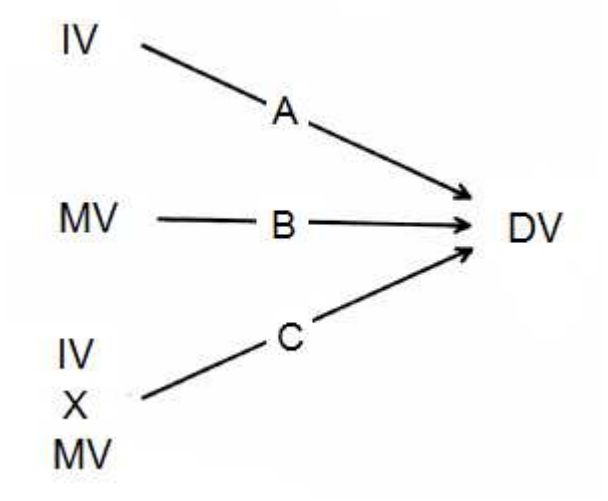

Figure 1. The moderator model (adapted from Baron& Kenny, 1986)

Moderation means that the correlation between an IV and a DV is inconsistent. For example, the correlation may be weak when the moderator has a low value, but strong when the magnitude of the moderator has a high value. The moderator model assumes that if the IV is linked to the DV (indicated by Path A) and the MV is also linked to the DV by Path B, then the moderating effect is the product of the MV and the IV (indicated by Path C).

Statistical Analysis

Statistical analysis was conducted with SPSS using the protocols described by Field (2009). The demographic characteristics of the participants measured with the DCQ were summarized as the frequencies within each nominal or ordinal category). The scale/interval level

variables measured with the BPAQ and IPAQ were summarized using means and standard deviations, assuming they were normally distributed (checked using Kolmogorov-Smirnov tests). The variables and tests used to address the thirteen research question are outlined in Table 3.

Table 3

Variables and Statistical Tests Used to Address the Research Questions

Research Question	DV	IV	MV	Analysis
RQ1. Is there a difference between males and females regarding the strength of their internal barriers to physical activity?	Internal Barriers	Gender		Reliability analysis t-test
RQ2. Is there a difference between males and females regarding the strength of their external barriers to physical activity?	External Barriers	Gender		Reliability analysis t-test
RQ3. Is there an association between gender and membership in a sports club?	Sports Club Membership	Gender		Chi-Square test
RQ4. Is there an association between gender and studying PE /health education?	PE/Health Education Class	Gender		Chi-Square Test
RQ5. Is there a difference between males and females regarding their lack of knowledge as a barrier to physical activity	Lack of Knowledge as a Barrier to Physical Activity	Gender		t-test
RQ6. Is there a difference between males and females regarding their lack of skills as a barrier to physical activity?	Lack of Skills as a Barrier to Physical Activity	Gender		t-test

Table 3 continued

Research Question	DV	IV	MV	Analysis
RQ7. Do gender and studying PE /health education predict an individual's lack of knowledge as a barrier to physical activity?	Lack of Knowledge as a Barrier to Physical Activity	PE/Health Education Class	Gender	Partial Least Squares regression (PLS)
RQ8. Do gender and membership in a sports club predict an individual's lack of skills as a barrier to physical activity?	Lack of Skills as a Barrier to Physical Activity	Sports Club Membership	Gender	Partial Least Squares regression (PLS)
RQ9. Is there a difference between males and females regarding their overall physical activity?	Linear combination of Walking + Vigorous + Moderate Activities	Gender		Multivariate Analysis of Variance (MANOVA)
RQ10. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of walking activity?	Walking Activity	Gender Internal Barriers External Barriers		Partial Least Squares regression (PLS)
RQ11. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of moderate physical activity?	Moderate Physical Activity	Gender Internal Barriers External Barriers		Partial Least Squares regression (PLS)

Table 3 continued

Research Question	DV	IV	MV	Analysis
RQ12. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of vigorous physical activity?	Vigorous Physical Activity	Gender Internal Barriers External Barriers		Partial Least Squares regression (PLS)
RQ13. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of overall physical activity?	Overall Physical Activity	Gender Internal Barriers External Barriers		Partial Least Squares regression (PLS)

Internal Consistency Reliability

The Internal Consistency Reliability of the scores used to measure the internal and external barriers (i.e., the extent to which the scores collectively measured a unifying construct) was tested using Cronbach's alpha. If the Internal Consistency Reliability was good (indicated by Cronbach's alpha > .7) then it was justified to summarize the scores by averaging, resulting in a composite score for each type of barrier, ranging from 1 to 10. If the Internal Consistency Reliability was not good, because the scores were not correlated with each other, then it was not justified to compute composite scores.

T-Tests

Independent samples *T*-Tests, assuming equal variance (depending on the results of Levene's test) were used to address RQ1 and RQ2 at the $\alpha = .05$ significance level.

Chi-Square Tests

Cross-tabulations (2 x 2) were constructed, and Pearson's Chi-Square Tests were conducted, at the $\alpha = .05$ significance level to address RQ3 and RQ4. The tests assumed that the frequencies in each cell of the cross-tabulations were greater than five. If not then the statistical inferences could be compromised, and so Fisher's Exact test was used as an alternative to Chi Square.

Multivariate Analysis of Variance (MANOVA)

MANOVA was used to address RQ9 at the $\alpha = .05$ significance level, assuming that Walking Activity, Moderate Physical Activity, and Vigorous Activity were positively correlated with each other, and could be linearly combined into a single dependent variable. Pearson's r coefficients were used to determine if the three measures of physical activity were correlated with each other. Hotelling's T-Square (a type of multivariate *t*-test statistic) was used as the inferential test statistic because there were only two groups formed by the independent variable (males and females). MANOVA assumed that the dependent variables exhibited equal levels of variance and covariance across the two levels of the independent variable (checked with Levene's and Box's M tests).

Regression

Several types of regression analysis could be used to address RQ5, RQ6, RQ7, RQ8, and RQ10. Because the dependent variables were measured at the scale/interval level, binary logistic regression was not justified. Although the interval level scales could potentially be converted into binary scales, reducing the measurement level in this way would result in a loss of precision, causing a loss of information, and lead to wrong interpretations (Lang, 2004).

Multiple linear regression equations were constructed with the following general form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 (X_1 . X_2) + \varepsilon$$

Where: Y is the predicted job value of the dependent variable; X_1 is an independent variable and X_2 is a moderating variable. β0 is a constant (the predicted value of Y when X_1 and X_2 are zero); β_1 and β_2 are the standardized partial regression coefficients for X_1 and X_2 respectively; β_3 is the standardized partial regression coefficient for the interaction or moderating effect (i.e., the product of X_1 and X_2); and ε is the standardized residual (i.e., the difference between the predicted and measured value of the dependent variable).

The β coefficients indicated the relative strengths and directions (positive or negative) of the relationships between the dependent variable, the predictor variable, and the moderator variables. The statistical significance of each coefficient was tested at the $\alpha = .05$ significance level using a *t*-test. The adjusted R^2 value (i.e., the explained proportion of the variance in the dependent variable provided an estimate of the effect size. $R^2 = .04$ was taken as "the minimum effect size representing a practically significant effect for social science data", whereas $R^2 = .25$ was taken as a "moderate effect", and $R^2 = .64$ as a "strong effect" (Ferguson, 2009, p. 2).

The theoretical assumptions of multiple regression analysis were checked to ensure that accurate predictive models were constructed. These assumptions were (a) the independent and moderator variables must not be multicollinear (i.e., correlated with each other) as determined by variance inflation factor (VIF) statistics; (b) the residuals must be normally distributed, and reflect homogeneity of variance (i.e., the variance in the dependent variable must be equal across the predictor variables) as indicated visually by residual plots. If the multiple linear regression models were compromised by violation of the theoretical assumptions, particularly multicollinearity, then another modeling method was used to address the research questions. SPSS conventionally uses ordinary least squares (OLS) to compute multiple linear regression

statistics; however, an alternative computational algorithm is also available in SPSS, using partial least squares (PLS). The advantage of PLS regression is that, unlike OLS regression, it does not fail when there is multicollinearity among the X values (Haenlein & Kaplan, 2004).

CHAPTER IV:

RESULTS

This chapter presents the results in four sections as follows: (a) Characteristics of Participants; (b) Reliability Analysis; (c) Descriptive Statistics; and (d) Research Questions.

Characteristics of Participants

The characteristics of the participants, in terms of the frequency distributions of the categories of gender, age, marital status, college, studying PE/health education, sports club membership, and participating or attending workshops about sport or health, are summarized in Table 4. The total sample size was $N = 1123$ participants, of which the majority ($n = 805$, 71.7%) were female. The age of the participants ranged from 18 to 26 years or older, but most of the participants ($n = 930$, 82.8%) were between 18 and 22 years old. Over three quarters of the participants ($n = 864$, 76.9%) reported their marital status as single, whilst only about one fifth of the participants ($n = 226$, 20.1%) reported that they were married. The participants were drawn from 12 colleges (Education, Engineering, Social Sciences, Arts, Life Sciences, Science, Sharia & Islamic Studies, Business Administration, Allied Health Science, Computer Science, Medicine, and Architecture. The colleges represented by the highest proportions of students were the College of Education ($n = 383$, 34.1%); the College of Engineering ($n = 177$, 15.8%); the College of Social Sciences ($n = 177$, 15.8%) and the College of Arts ($n = 135$, 12.0%). Participants from four other colleges (Dentistry, Pharmacy, Law, and Public Health) were excluded because these colleges did not offer classes to their students.

Less than one third of the participants ($n = 334$, 29.7%) reported that they were members of a sports club, whilst over one third ($n = 408$, 36.3%) reported that they studied PE/health

education, and over one half (*n* = 594, 52.9%) had participated in or attended workshops about sport or health.

Table 4

Frequency Distributions of Participant Characteristics (N = 1123)

Characteristic	Category	Frequency	Percent
Gender	Male	314	28.0%
	Female	805	71.7%
	Missing values	4	0.4%
Age (Years)	18-22	930	82.8%
	23-26	129	11.5%
	>26	53	4.7%
	Missing values	11	1.0%
Marital Status	Single	864	76.9%
	Married	226	20.1%
	Divorced	11	1.0%
	Missing values	22	2.0%
College	Education	383	34.1%
	Engineering	177	15.8%
	Social Sciences	177	15.8%
	Arts	135	12.0%
	Life Sciences	79	7.0%
	Science	59	5.3%
	Sharia & Islamic Studies	49	4.4%
	Business Administration	41	3.7%
	Allied Health Science	10	0.9%
	Computer Science	4	0.4%
	Medicine	2	0.2%
	Architecture	2	0.2%
	Missing values	5	0.4%
Sports Club Membership	Yes	334	29.7%
	No	788	70.2%
	Missing values	1	0.1%
Enrolled in PE/Health Education classes	Yes	408	36.3%
	No	713	63.5%
	Missing Values	2	0.2%
Participated in or attended workshops about sport or Health	Yes	594	52.9%
	No	524	46.7%
	Missing Values	5	0.4%

Reliability Analysis

The results of reliability analysis for the BPAQ items are presented in Table 5.

Table 5

Reliability Analysis for External Barriers (N = 1123)

Items Reflecting External Barriers	Cronbach's Alpha if Item Deleted
BPAQ 1-Previous negative experience with physical activity	.791
BPAQ 2-Lack of time	.795
BPAQ 3-Cost of activity	.788
BPAQ 5-Lack of knowledge	.784
BPAQ 7-Lack of skills	.776
BPAQ 8-Feeling uncomfortable (intimidated in exercise surroundings)	.778
BPAQ 12-Failure to achieve goals in previous attempts to become active	.779
BPAQ 14-Lack of access to opportunities such as nearby facilities	.776
BPAQ 16-Lack of safe places	.774
BPAQ 17-Lack of child care	.780
BPAQ 18-Lack of a partner	.778
BPAQ 19-Lack available and suitable programs at my level	.773
BPAQ 20-Lack of support from others	.777
BPAQ 21-Lack of transportation	.780
BPAQ 22-Have other areas in my life that I feel must take priority in my day	.788
BPAQ 25- Unsuitable (hot or cold) weather	.784
Items Reflecting Internal Barriers	
BPAQ 4-Lack of energy	.774
BPAQ 6-Lack of motivation	.782
BPAQ 9-Fear of injury/re-injury	.778
BPAQ 10-Fear of making an existing illness worse	.770
BPAQ 11-How I see my body	.770
BPAQ 13-Know that I can't achieve the results I want so why bother	.780
BPAQ 15-Keep talking myself out of it	.786
BPAQ 23-Don't feel that I have the ability to exercise at a sufficient level	.767
BPAQ 24-Pain when I exercise	.767
BPAQ 26- Lack or low physical power	.784

The internal consistency reliability for the 16 items reflecting external barriers to physical activity was good (Cronbach's alpha = .792) and was not improved if any of the items were

deleted. The internal consistency reliability for the 10 items reflecting internal barriers to physical activity was also good (Cronbach's alpha = .794) and was not improved if any of the items were deleted. Internal consistency reliability describes the extent to which the specified items measure a unidimensional construct, and indicates the level of inter-relatedness and inter-changeability of the items. If the specified items were correlated with each other, then value of Cronbach's alpha would be high (.7 to 1). All of the estimates of internal consistency reliability recorded in Tables 5 were high. Consequently, it was justified for the researcher to operationalize two unidimensional variables (External Barriers and Internal Barriers) by averaging the specified item scores, and also to test hypotheses using the reliably measured variables.

Descriptive Statistics

All the participants (N = 1123) answered all of the questions in the BPAQ, with no missing values. The frequency distributions of the scores reflected the consistent tendency of the majority of the respondents to mainly endorse the lower end of the 10-point item scales, between 1 and 5. The median scores for each item, stratified by gender, are presented in Table 6. Moreover, the median scores for external items and internal items, stratified by gender, are presented in Table 7 and 8. The highest scoring items, reflecting the most important barriers (*Mdn*>4) were "Lack of time;" "Unsuitable (hot or cold) weather;" "Lack of motivation;" "Lack of access to opportunities such as nearby facilities;" "Have other areas in my life that I feel must take priority in my day;" and "Lack or low physical power." The lowest scoring items, reflecting the least important barriers (*Mdn*< 1.7) were "How I see my body", "Previous negative experience with physical activity", "Lack of transportation", and "Lack of child care".

Table 6

Comparison of Grouped Median Scores for 26 Items in BPAQ Stratified by Gender

Item	*Mdn*			Mann-Whitney test	
	Male	Female	Total	Z	p
02-Lack of time	5.40	5.14	5.21	-0.11	.278
25-Unsuitable (hot or cold) weather	4.09	4.87	4.65	-3.17	.002*
06-Lack of motivation	4.29	4.63	4.54	-2.16	.031*
14-Lack of access to opportunities such as nearby facilities	3.29	4.64	4.40	-4.02	<.001*
22-Have other areas in my life that I feel must take priority in my day	4.84	4.18	4.37	-2.76	.006*
26- Lack or low physical power	4.02	4.13	4.10	-0.85	.395
09-Fear of injury/re-injury	3.79	3.74	3.75	-0.20	.838
07-Lack of skills	2.23	3.90	3.57	-4.09	<.001*
20-Lack of support from others	2.70	3.95	3.54	-2.72	.007*
04-Lack of energy	2.13	3.84	3.42	-4.41	<.001*
18-Lack of a partner	2.64	3.19	3.03	-1.55	.120
24-Pain when I exercise	1.96	2.69	2.48	-2.56	.011*
19-Lack available and suitable programs at my level	1.95	2.12	2.03	-0.61	.539
16-Lack of safe places	1.56	2.79	1.99	-6.50	<.001*
05-Lack of knowledge	1.84	2.16	1.98	-2.29	.022*
15-Keep talking myself out of it	1.85	1.94	1.91	-0.77	.442
08-Feeling uncomfortable	1.79	1.94	1.90	-0.13	.220
13-Know that I can't achieve the results I want so why bother	1.87	1.88	1.88	-0.17	.862
03-Cost of activity	1.85	1.79	1.81	-0.75	.451
23-Don't feel that I have the ability to exercise at a sufficient level	1.66	1.87	1.81	-1.88	.060
10-Fear of making an existing illness worse	1.68	1.81	1.77	-1.63	.102
12-Failure to achieve goals in previous attempts to become active	1.63	1.71	1.69	-0.98	.329
11-How I see my body	1.44	1.76	1.66	-4.02	<.001*
01 Previous negative experience with physical activity	1.68	1.61	1.63	-0.88	.379
21-Lack of transportation	1.36	1.75	1.62	-5.56	<.001*
17-Lack of child care	1.36	1.69	1.58	-4.85	<.001*

*Note: * Significant at p < .05*

Mann-Whitney tests indicated significant differences at $p < .05$ between males and females with respect to "Unsuitable (hot or cold) weather;" "Lack of motivation"; "Lack of access to opportunities, such as nearby facilities;" "Lack of skills;" "Lack of support from others;" "Lack of energy;" "Pain when I exercise"; "Lack of safe places;" "Lack of knowledge;" "How I see my body;" "Lack of transportation," and "Lack of child care." Females generally

perceived these items to be greater barriers than males. However, males perceived item 22 “Have other areas in my life that I feel must take priority in my day” to be greater barrier than females.

Table 7

Comparison of Grouped Median Scores for 16 External Items in BPAQ Stratified by Gender

External Barriers Items	*Mdn*			Mann-Whitney test	
	Male	Female	Total	Z	p
02-Lack of time	5.40	5.14	5.21	-0.11	.278
25-Unsuitable (hot or cold) weather	4.09	4.87	4.65	-3.17	.002*
14-Lack of access to opportunities such as nearby facilities	3.29	4.64	4.40	-4.02	<.001*
22-Have other areas in my life that I feel must take priority in my day	4.84	4.18	4.37	-2.76	.006*
07-Lack of skills	2.23	3.90	3.57	-4.09	<.001*
20-Lack of support from others	2.70	3.95	3.54	-2.72	.007*
18-Lack of a partner	2.64	3.19	3.03	-1.55	.120
19-Lack available and suitable programs at my level	1.95	2.12	2.03	-0.61	.539
16-Lack of safe places	1.56	2.79	1.99	-6.50	<.001*
05-Lack of knowledge	1.84	2.16	1.98	-2.29	.022*
08-Feeling uncomfortable	1.79	1.94	1.90	-0.13	.220
03-Cost of activity	1.85	1.79	1.81	-0.75	.451
12-Failure to achieve goals in previous attempts to become active	1.63	1.71	1.69	-0.98	.329
01 Previous negative experience with physical activity	1.68	1.61	1.63	-0.88	.379
21-Lack of transportation	1.36	1.75	1.62	-5.56	<.001*
17-Lack of child care	1.36	1.69	1.58	-4.85	<.001*

*Note: * Significant at $p < .05$*

Table 8

Comparison of Grouped Median Scores for 10 Internal Items in BPAQ Stratified by Gender

Internal Barriers Items	*Mdn*			Mann-Whitney test	
	Male	Female	Total	Z	p
06-Lack of motivation	4.29	4.63	4.54	-2.16	.031*
26- Lack or low physical power	4.02	4.13	4.10	-0.85	.395
09-Fear of injury/re-injury	3.79	3.74	3.75	-0.20	.838
04-Lack of energy	2.13	3.84	3.42	-4.41	<.001*
24-Pain when I exercise	1.96	2.69	2.48	-2.56	.011*
15-Keep talking myself out of it	1.85	1.94	1.91	-0.77	.442
13-Know that I can't achieve the results I want so why bother	1.87	1.88	1.88	-0.17	.862
23-Don't feel that I have the ability to exercise at a sufficient level	1.66	1.87	1.81	-1.88	.060
10-Fear of making an existing illness worse	1.68	1.81	1.77	-1.63	.102
11-How I see my body	1.44	1.76	1.66	-4.02	<.001*

*Note: * Significant at $p < .05$*

The descriptive statistics for four of the variables used to analyze barriers to physical activity (ranging from 1 to 10) and for the four variables used to analyze walking, moderate, vigorous, and overall activity (in MET minutes) are summarized in Table 9. The scores measuring the barriers to physical activity were positively skewed, with mean scores higher than the median scores. The median scores for the 26 items in the BPAQ were used, as opposed to the mean scores. Because mean scores are only designated for normally distributed data, and because this data deviated from normality, the mean scores were biased and unusable. Therefore, median scores were used to prevent skewing the data.

All the questions in the IPAQ concerning physical activity were not answered by the participants. The IPAQ data processing rules stated that if data were missing then that case must be removed from the analysis. Consequently, the descriptive statistics excluded the participants with missing values, recorded in the third column of Table 9. The characteristic feature of the IPAQ variables was very strong positive skewness (Skewness statistic = 2.76 to 6.66). The most

frequent responses were at the lower ends of the scales. Consequently, the mode was on the left hand side, and the mean values were much higher than the median values. The patterns of positive skewness are visualized using histograms in Figure 2. The skewed distributions implied that parametric statistics (e.g., mean (M), standard deviation (SD), t-test, MANOVA, and regression) that assume normality could be biased. A logarithmic ($\log_{10}$ or logt) transformation was applied to reduce the skewness, so that parametric statistics could be applied without bias. The descriptive statistics after logt transformation are summarized in Table10. The effect of the logarithmic transformation on the patterns of skewness is visualized in Figure 3.

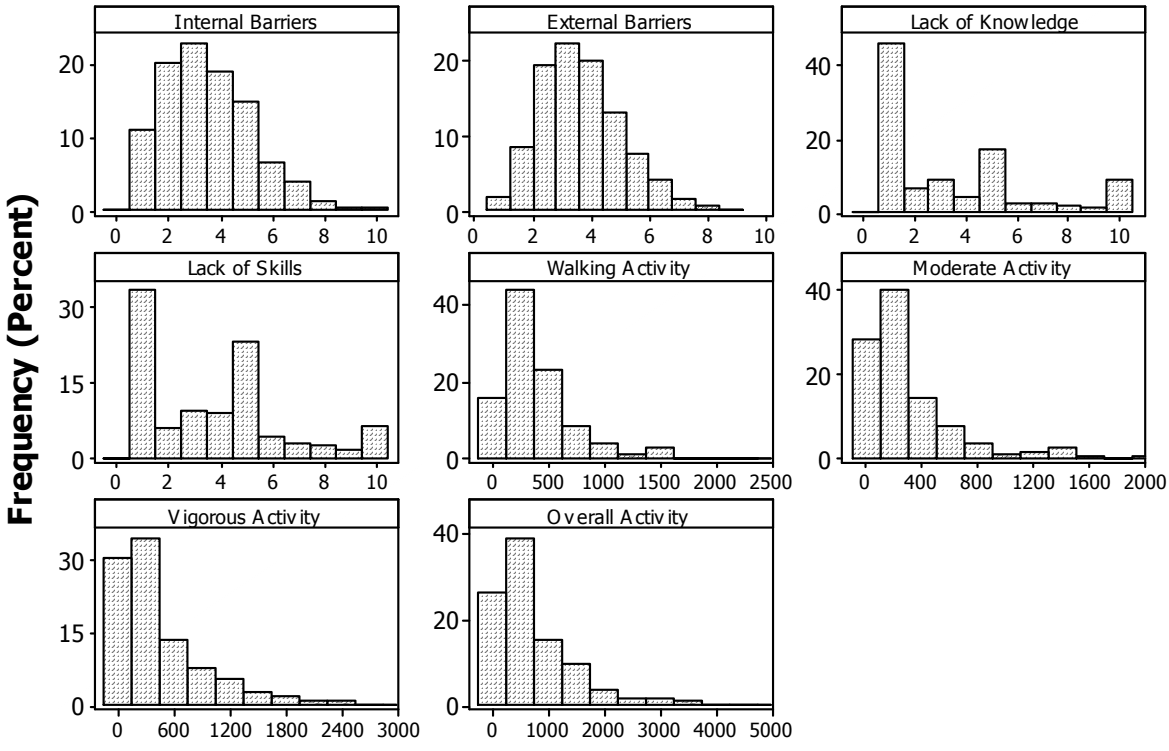

Figure 2. Frequency distribution histograms of variables measuring barriers and activities

Table 9

Descriptive Statistics for Variables Measuring Barriers and Activities (N = 1123)

Variable	*N*		*M*	*Mdn*	*SD*	Skewness statistic
	Answered all questions	Missing values				
Internal Barriers	1123	0	3.50	3.30	1.67	0.69
External Barriers	1123	0	3.63	3.50	1.41	0.52
Lack of knowledge	1123	0	3.43	2.00	2.92	1.04
Lack of Skills	1123	0	3.79	3.79	2.69	0.76
Walking Activity	729	394	438.14	297.00	505.99	4.82
Moderate Activity	503	620	343.27	198.00	491.45	6.66
Vigorous Activity	334	789	505.13	297.00	603.18	2.86
Overall Activity	827	296	795.64	495.00	899.01	2.97

Table 10

Descriptive Statistics for Normalized Variables Measuring Barriers and Activities (N = 1123)

	N					
Variable	Answered all questions	Missing	*M*	*Mdn*	*SD*	Skewness
Logt Internal Barriers	1123	0	0.49	0.52	0.22	-0.36
Logt External Barriers	1123	0	0.53	0.54	0.18	-0.52
Logt Lack of Knowledge	1123	0	0.37	0.30	0.37	0.31
Logt Lack of Skills	1123	0	0.45	0.58	0.35	-0.16
Logt Walking Activity	729	394	2.46	2.47	0.41	-0.66
Logt Moderate Activity	503	620	2.30	2.30	0.47	-0.49
Logt Vigorous Activity	334	789	2.44	2.47	0.52	-0.51
Logt Overall Activity	827	296	2.67	2.69	0.47	-0.36

The variables were approximately normalized, indicated by (a) the mean values were closer to the median values and (b) the skewness statistics were closer to zero. All further statistical analysis was conducted using the logarithmically transformed variables.

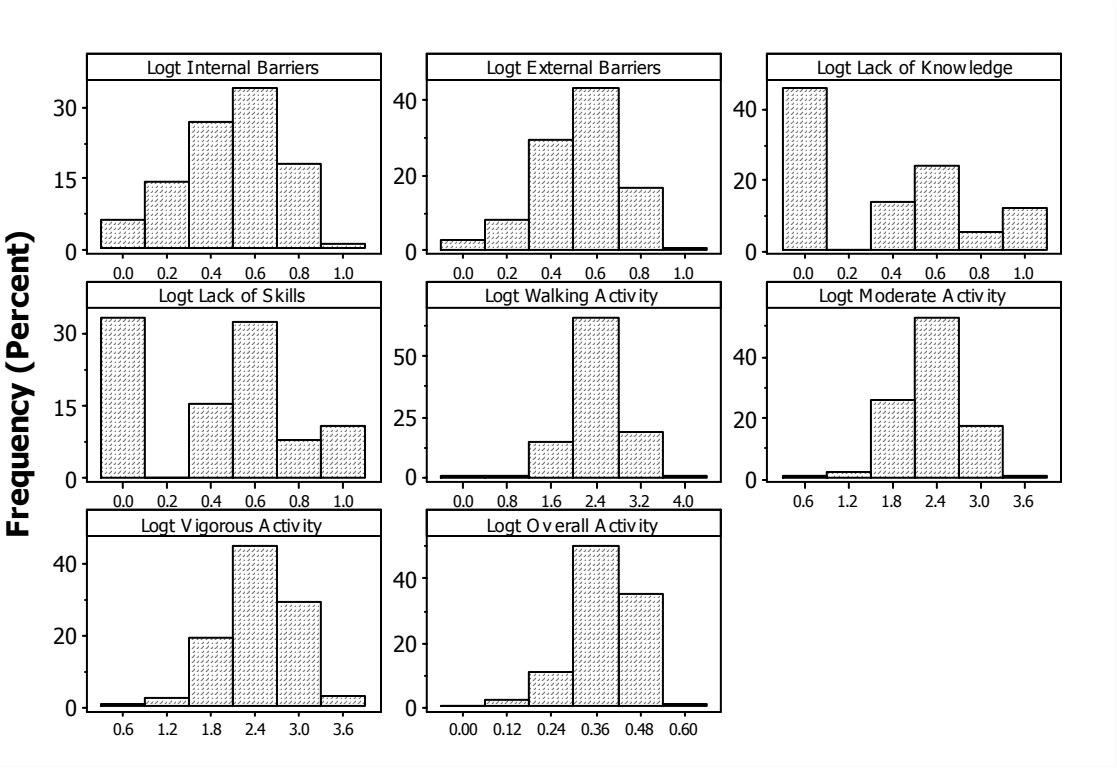

Figure 3. Frequency distribution histograms of logarithmically transformed variables measuring barriers and activities

RQ1. Is there a difference between males and females regarding the strength of their internal barriers to physical activity?

The mean score for logt internal barriers was higher among $n = 805$ females ($M = .502$, $SD = .224$) than among $n = 314$ males ($M = .467$, $SD = .217$) with a mean difference of -.035. A one-tailed independent samples *t*-test assuming equal variances indicated that the mean score for the females was significantly greater than the mean score for the males at $\alpha = .05$ ($t\ (1117) = -2.37$, $p = .007$). Although the effect size was small (Cohen's d = 0.159) the strength of internal barriers to physical activity was significantly greater among the females than the males.

RQ2. Is there a difference between males and females regarding the strength of their external barriers to physical activity?

The mean score for logt external barriers was higher among $n = 805$ females ($M = .539$, $SD = .177$) than among $n = 314$ males ($M = .491$, $SD = .186$) with a mean difference of -.048. A one-tailed independent samples *t*-test assuming equal variances indicated that the mean score for the females was significantly greater than the mean score for the males at $\alpha = .05$ ($t\ (1117) = -4.05$, $p < .001$). Although the effect size was small (Cohen's d = 0.264) the strength of external barriers to physical activity was greater among the females than the males.

RQ3. Is there an association between gender and membership in a sports club?

The cross-tabulation of the frequencies of gender vs. frequencies of membership in a sports club is presented in Table 11.

Table 11

Cross-tabulation of Gender vs. Membership of Sports Clubs (N = 1118)

			Male	Female	Total
Membership of Sports Clubs	Yes	Frequency	151	181	332
		Expected Frequency	92.9	239.1	332.0
		% within Gender	48.2%	22.5%	29.7%
	No	Frequency	162	624	786
		Expected Frequency	220.1	565.9	786.0
		% within Gender	51.8%	77.5%	70.3%
Total		Frequency	313	805	1118
		Expected Frequency	313.0	805.0	1118.0
		% within Gender	100.0%	100.0%	100.0%

A significant association at $\alpha = .05$ was indicated by Pearson's Chi-Square (1) = 71.62, $p < .001$). The effect size was relatively small (Cramer's V = 0.253). The significant association arose because (a) frequency of males with membership of sports clubs ($n = 151$) was greater than expected by chance; whereas the frequency of females with membership ($n = 181$) was less than

expected by chance; and (b) the frequency of males with no membership of sports clubs (*n* = 162) was less than expected by chance; whereas the frequency of females with no membership (*n* = 624) was more than expected by chance.

RQ4. Is there an association between gender and studying PE /health education?

The cross-tabulation of the frequencies of gender vs. frequencies of studying PE/health education is presented in Table 12. A significant association at α = .05 was indicated by Pearson's Chi-Square (1) = 12.02, *p* = .001). The effect size was relatively small (Cramer's V = 0.104).

Table 12

Cross-tabulation of Gender vs. Participation in PE/Health Education (N = 1117)

			Male	Female	Total
Participation in PE/Health Education	Yes	Frequency	89	318	407
		Expected Frequency	114	293	407
		% within Gender	28.40%	39.60%	36.40%
	No	Frequency	224	486	710
		Expected Frequency	199	511	710
		% within Gender	71.60%	60.40%	63.60%
Total		Frequency	313	804	1117
		Expected Frequency	313	804	1117
		% within Gender	100.00%	100.00%	100.00%

The significant association arose because (a) frequency of males who studied PE/health education (*n* = 89) was less than expected by chance; whereas the frequency of females who studied PE/health education (*n* = 318) was more than expected by chance; and (b) the frequency of males who did studPE/health education (*n* = 224) was greater than expected by chance; whereas the frequency of females who did study PE/health education (*n* = 486) was less than expected by chance.

RQ5. Is there a difference between males and females regarding their lack of knowledge as a barrier to physical activity?

The mean score for logt lack of knowledge (where 0 = No barrier and 1 = major barrier) was higher among n = 805 females (M = 0.385, SD = 0.376) than among n = 314 males (M = .326, SD = .365) with a mean difference of -0.059. A one-tailed independent samples t-test assuming equal variances indicated that the mean score for the females was significantly greater than the mean score for the males at $\alpha = .05$ (t (1117) = -2.65, p = .004). Although the effect size (Cohen's d = 0.159) was small, a lack of knowledge was a greater barrier to physical activity for females than for males.

RQ6. Is there a difference between males and females regarding their lack of skills as a barrier to physical activity?

The mean score for logt lack of skills (where 0 = No barrier and 1 = major barrier) was higher among n = 805 females (M = 0.478, SD = 0.343) than among n = 314 males (M = .375,SD = .369) with a mean difference of -0.103. A one-tailed independent samples t-test assuming equal variances indicated that the mean score for the females was significantly greater than the mean score for the males at $\alpha = .05$ (t (1117) = -4.42, p<.001. Although the effect size (Cohen's d = 0.289) was small, a lack of skills was a greater barrier to physical activity for females than for males.

RQ7. Do gender andstudying PE /health education predict an individual's lack of knowledge as a barrier to physical activity?

The results of a multiple linear regression analysis to predict logt lack of knowledge using gender and studying PE/health education as predictors, assuming gender x PE/health education had a moderating effect, are presented in Table 13. This model based on ordinary least squares (OLS) was compromised by very high levels of multicollinearity (VIF = 14.43 to 27.90) therefore the results are extremely difficult to interpret. For this reason, the results of a partial

least squares (PLS) analysis, which was not as sensitive to multicollinearity, are presented in Table 14.

Table 13

Multiple Linear Regression Model to Predict Logt Lack of Knowledge Using Gender and Studying PE/Health Education as Predictors

Predictor	β	t	p	VIF	R^2
Constant	.349	2.03	.043*		.006
Gender	.059	0.62	.533	14.43	
PE/Health Education	-.043	-0.44	.661	17.59	
Gender x PE/Health Education	-.004	0.08	.940	27.90	

Note: * Significant predictor at $p < .05$

Table 14

Partial Least Squares (PLS) Regression Model to Predict Logt Lack of Knowledge Using Gender and Studying PE/Health Education as Predictors

Predictor	β	*T*	*P*	R^2
Gender	0.071	0.64	.522	.009
PE/Health Education	-0.055	0.46	.645	
Gender x PE/Health Education	-0.012	0.09	.928	

The *p* values > .05 in the PLS regression model, and the low effect size ($R^2 = .009$) provided no significant evidence to indicate that gender and studying PE/health education predicted an individual's lack of knowledge as a barrier to physical activity

RQ8. Do gender and membership in a sports club predict an individual's lack of skills as a barrier to physical activity?

The results of a multiple linear regression analysis to predict logt lack of skills using gender and membership in sports club aspredictors, assuming gender x sports club membership had a moderating effect, are presented in Table 15. This model based on OLS was compromised by very high levels of multicollinearity (VIF = 8.48 to 38.10). For this reason, the results of a PLS analysis are presented in Table 16.

Table 15

Multiple Linear Regression Model to Predict Logt Lack of Skills Using Gender and Sports Club Membership as Predictors

Predictor	β	*t*	*P*	VIF	R^2
Constant	.134	1.14	.254		.026
Gender	.103	1.38	.169	26.61	
Sports Club Membership	.129	2.06	.040*	8.48	
Gender x Sports Club Membership	-.029	-0.73	.464	38.10	

Table 16

Partial Least Squares (PLS) Regression Model to Predict Logt Lack of Skills Using Gender and Sports Club Membership as Predictors

Predictor	β	*T*	*P*	R^2
Gender	0.212	2.59	.009*	.009
Sports Club Membership	0.179	2.78	.005*	
Gender x Sports Club Membership	-0.135	2.01	.045*	

Note: * Significant predictor at $p < .05$

Although the effect size was low ($R^2 = .009$) the PLS model provided significant evidence at the .05 level to indicate that gender and sports club membershippredicted an individual's lack of skillsas a barrier to physical activity. Gender was a significant positive predictor ($p = .009$). When gender changed from male (coded as 1) to female (coded as 2) the lack of skills as a barrier to physical activity increased by $\beta = 0.212$. Sports club membership was also a significant positive predictor ($p = .005$). When an individual changed from being a member of a sports club (coded as 1) to not being a member of a sports club (coded as 2) the lack of skills as a barrier to physical activity increased by $\beta = 0.179$. The moderating effect of gender x sports club membership was a marginally significant negative predictor ($p = .045$). The strength of the correlation between sports club membership and lack of skills decreased by $\beta = -.135$ when the gender was female (coded as 2) relative to when the gender was male (coded as 1).

RQ9. Is there a difference between males and females regarding their overall physical activity?

The IPAQ had a high number of missing values. This was based on the make-up of the questionnaire where if the participant indicated zero days of activity at any of the three levels there would then be no associated minutes for those days. Consequently, analysis could only be completed on those participants who indicated at least one day in each category. The only way to eliminate this issue might be to manually assign zero to missing categories but, "If you manually apply 0 for the missing values then the data set will be dominated by hundreds of zeroes, and it will not be possible to do logarithmic transformation to normalize the data, and to conduct regression analysis assuming a normal distribution (bearing in mind that you cannot compute a logarithm of zero) (Fisher, 2014 personnel communication)". Thus, analysis was completed only on complete data and therefore this indicated an overestimate of actual activity in this given population.

The mean score (MET minutes) for logt overall physical activity (i.e., the sum of walking, moderate, and vigorous activity) was higher among $n = 244$ males ($M = 2.88$, $SD = 0.51$) than among $n = 579$ females ($M = 2.59$, $SD = 0.43$) with a mean difference of 0.29. A one-tailed independent sample *t*-test assuming equal variances indicated that the mean overall activity of the males was significantly greater than the mean overall activity of the females at $\alpha = .05$ ($t(1117) = 8.24$, $p<.001$). Although the effect size was small (Cohen's d = 0.06) males tended to have higher levels of overall physical activity than females.

A total of $N = 227$ participants provided a complete set of responses to the IPAQ (96 male and 131 female) recording their MET minutes for walking, moderate, and vigorous activity as separate events. This data were also used to address RQ9. The matrix of Pearson's *r* coefficients in Table 17 indicates that the logarithmically transformed measures of walking,

vigorous, and moderate physical activities were significantly positively correlated with each other (r = .307 to .493; p< .05). The implications were that the three variables could be linearly combined into a single variate for purposes of MANOVA.

Table 17

Pearson's Correlations between Walking, Moderate, and Vigorous Activity

	Logt Walking Activity	Logt Moderate Activity	Logt Vigorous Activity
Logt Walking Activity	1		
Logt Moderate Activity	.307*	1	
Logt Vigorous Activity	.328*	.493*	1

* Significant correlation at p < .05

The descriptive statistics (see Table 18) indicated that the mean walking activity and vigorous activity tended to be higher among males than females, whereas the mean moderate activity tended to be lower among males than among females. The results of Levene's test (p > .05) in Table 19 indicated that the variances of the activity variables were homogeneous with respect to gender, justifying the use of MANOVA.

Table 18

Descriptive Statistics for Logt Walking, Moderate, and Vigorous Activity by Gender (N = 227)

Variable	*N*	Gender	*M*	*SD*
Logt Walking Activity	96	Male	2.57	0.42
	131	Female	2.55	0.41
	227	Total	2.56	0.41
Logt Moderate Activity	96	Male	2.31	0.53
	131	Female	2.38	0.47
	227	Total	2.35	0.49
Logt Vigorous Activity	96	Male	2.54	0.64
	131	Female	2.31	0.44
	227	Total	2.41	0.54

Table 19

Levene's Test for Homogeneity of Variance

Variable	*F*	df1	*df2*	*p*
Logt Walking Activity	.726	1	225	.395
Logt Moderate Activity	.609	1	225	.436
Logt Vigorous Activity	1.284	1	225	.192

The multivariate statistics to test the effect of gender on a linear combination of walking, moderate, and vigorous activity are presented in Table 20, of which only Hotelling's Trace is relevant, because it applies specifically to a comparison with two groups (i.e., male and female).

Table 20

Multivariate Statistics for Effect of Gender on Walking, Moderate, and Vigorous Activity

Effect	MANOVA statistics		Multivariate *F*	Hypothesis df	Error df	*p*	*Eta* ^{2}
Gender	Pillai's Trace	.085	6.94	3	223	<.001*	.09
	Wilks' Lambda	.915	6.94	3	223	<.001*	.09
	Hotelling's Trace	.093	6.94	3	223	<.001*	.09
	Roy's Largest Root	.093	6.94	3	223	<.001*	.09

Note: Significant effect at $p < .05$

MANOVA indicated a significant effect of gender (Hotelling's Trace (3, 223) = .093, p <.001) although the effect size (Eta ^{2} = .09) was small. The univariate ANOVA statistics for the separate effects of gender on walking, moderate, and vigorous activity are presented in Table 21. These statistics identified vigorous activity as the most important activity that differed between males and females (F (1, 225) = 10.68, p< .001) but with a small effect size (Eta ^{2} = .05).

Table 21

Univariate Statistics for Effect of Gender on Walking, Moderate, and Vigorous Activity

Source	Dependent Variable	Type III SS	Df	MS	*Univariate F*	*P*	*Eta* ^{2}
Gender	Logt Walking Activity	0.01	1	0.01	0.08	.781	0.00
	Logt Moderate Activity	0.27	1	0.27	1.09	.297	0.01
	Logt Vigorous Activity	3.02	1	3.02	10.68	.001*	0.05
Error	Logt Walking Activity	38.12	225	0.17			
	Logt Moderate Activity	56.00	225	0.25			
	Logt Vigorous Activity	63.68	225	0.28			

Note: * Significant effect at $p < .05$

RQ10. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of walking activity?

The results of a multiple linear regression analysis to predict logt walking activity using gender and logt barriers to physical activity as predictors are presented in Table 22. This model was not compromised by multicollinearity (VIF = 1.01 to 2.32). The *p* values > .05 for the β coefficients indicate that gender and barriers to physical activity did not predict an individual's amount of walking activity, with a negligible effect size ($R^2 = .002$).

Table 22

Multiple Linear Regression Model to Predict Logt Walking Activity Using Gender and Logt Barriers as Predictors

Predictor	β	T	p	VIF	R^2
Constant		37.524	<.001*		.002
Gender	-0.051	-1.370	0.171	1.01	
Logt Internal Barriers	-0.040	-0.712	0.477	2.30	
Logt External Barriers	-0.014	-0.254	0.800	2.32	

Note: * Significant predictor at $p < .05$

RQ11. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of moderate physical activity?

The results of a multiple linear regression analysis to predict logt moderate activity using gender and logt barriers to physical activity as predictors are presented in Table 23. This model was not compromised by multicollinearity (VIF = 1.00 to 2.50). The *p* values > .05 for the β coefficients indicated that gender and barriers to physical activity did not predict an individual's amount of moderate physical activity, with a negligible effect size (R^2 = .001).

Table 23

Multiple Linear Regression Model to Predict Logt Moderate Activity Using Gender and Logt Barriers as Predictors

Predictor	B	T	p	VIF	R^2
Constant		23.871	.<.001*		.001
Gender	.006	.130	.896	1.00	
Logt Internal Barriers	-.106	-1.503	.133	2.50	
Logt External Barriers	.102	1.448	.148	2.51	

Note: * Significant predictor at p < .05

RQ12. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of vigorous physical activity?

The results of a multiple linear regression analysis to predict logt vigorous activity using gender and logt barriers to physical activity as predictors are presented in Table 24. This model was not compromised by multicollinearity (VIF = 1.03 to 2.76). Gender was a statistically significant predictor of vigorous activity (t = -6.06, p< .001) as previously indicated by MANOVA (see Table 19). The model predicted that when gender changed from male (coded as 1) to female (coded as 2) the amount of vigorous physical activity decreased by β = -0.321. The *p* values > .05 for the β coefficients indicated that barriers to physical activity did not predict an individual's amount of vigorous activity. The effect size (R^2 = .093) was relatively small.

Table 24

Multiple Linear Regression Model to Predict Logt Vigorous Physical Activity Using Gender and Barriers as Predictors

Predictor	β	*T*	*p*	VIF	R^2
Constant	2.863	27.74	<.001*		.093
Gender	-0.321	-6.06	<.001*	1.03	
Logt Internal Barriers	-0.016	-0.19	.851	2.71	
Logt External Barriers	0.094	1.09	.278	2.75	

Note: * Significant predictor at p < .05

RQ13. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of overall physical activity?

The results of a multiple linear regression analysis to predict logt overall physical activity using gender and logt barriers as predictors are presented in Table 25. This model was not compromised by multicollinearity (VIF = 1.01 to 2.25) but the effect size was small (R^2 = .090). The *p* value > .05 indicated that logt external barriers did not predict an individual's amount of overall activity, with a negligible effect size (R^2 = .001). Gender was a statistically significant predictor of a linear combination of walking, moderate, and vigorous activity (*t* = -6.06, *p*< .001) as previously indicated by MANOVA in Table 18. The regression model predicted that when gender changed from male (coded as 1) to female (coded as 2) the amount of vigorous physical activity decreased by β = -0.321. Logt external barriers was also a significant predictor of overall physical activity (*t* = 1.09, *p* = .015). The regression model predicted that the amount of overall physical activity increased by β = -.122 when the logt external barriers increased by one unit (on the 10-point measurement scale ranging from 0(logt 1) = no barrier to 1 (logt 10) = major barrier). (Consequently, an increase in external barriers predicted a decrease in overall physical activity.)

Table 25

Multiple Linear Regression Model to Predict Logt Overall Physical Activity Using Gender and Logt Barriers as Predictors

Predictor	β	*T*	*p*	VIF	R^2
Constant	3.314	46.17	<.001*		.090
Gender	-0.263	-7.86	<.001*	1.01	
Logt Internal Barriers	-0.008	-0.01	.868	2.24	
Logt External Barriers	-0.122	-2.45	.015*	2.25	

Note: * Significant predictor at p < .05

Correlation analysis using Pearson's *r* coefficients indicated that the specific external barriers that were significantly ($p< .05$) negatively correlated with overall physical activity were (a) lack of access to opportunities, such as nearby facilities ($r = -.118$, $p = .002$); (b) lack of support from others ($r = -.097$, $p = .010$);(c) have other areas in my life that I feel must take priority every day ($r = -.107$, $p = .005$); and unsuitable (hot or cold) weather ($r = -.119$,$p = .002$).

Summary

A summary of the answers to the research questions is presented in Table 26.

Table 26

Summary

Research Question	Answer
RQ1. Is there a difference between males and females regarding the strength of their internal barriers to physical activity?	The strength of internal barriers to physical activity was greater among the females than the males.
RQ2. Is there a difference between males and females regarding the strength of their external barriers to physical activity?	The strength of external barriers to physical activity was greater among the females than the males.
RQ3. Is there an association between gender and membership in a sports club?	The frequency of males with membership of sports clubs was significantly greater than expected by chance; whereas the frequency of females with membership was less than expected by chance.

Table 26 continued

Research Question	Answer
RQ4. Is there an association between gender and studying PE /health education?	The frequency of males who studied PE/health education was significantly less than expected by chance; whereas the frequency of females who studied PE/health education was more than expected by chance.
RQ5. Is there a difference between males and females regarding their lack of knowledge as a barrier to physical activity	A lack of knowledge was a significantly greater barrier to physical activity for females than for males.
RQ6. Is there a difference between males and females regarding their lack of skills as a barrier to physical activity?	A lack of skills was a significantly greater barrier to physical activity for females than for males.
RQ7. Do gender and studying PE /health education predict an individual's lack of knowledge as a barrier to physical activity?	Gender and studying PE/health education did not predict an individual's lack of knowledge as a barrier to physical activity.
RQ8. Do gender and membership in a sports club predict an individual's lack of skills as a barrier to physical activity?	Gender and sports club membership predicted an individual's lack of skills as barrier to physical activity. Being female and not being a member of a sports club predicted more lack of skills as a barrier to physical activity.
RQ9. Is there a difference between males and females regarding their overall physical activity?	Males tended to have significantly higher levels of overall physical activity than females.
RQ10. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of walking activity?	Gender and barriers to physical activity did not predict an individual's amount of walking activity.
RQ11. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of moderate physical activity?	Gender and barriers to physical activity did not predict an individual's amount of moderate physical activity
RQ12. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of vigorous physical activity?	Gender but not barriers to physical activity predicted an individual's amount of vigorous physical activity. Being female predicted less vigorous physical activity.
RQ13. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of overall physical activity?	Gender and external barriers to physical activity predicted an individual's amount of overall physical activity. Being female and having external barriers predicted less overall physical activity.

CHAPTER V:

DISCUSSION

This chapter has addressed four areas. The first section interrupted the two main research questions: what are the activity levels of students at Kuwait University, and what are the most commonly perceived barriers to physical activity among this demographic? The discussion section also covered the findings of the thirteen questions that addressed issues concerning the prevalent barriers to physical activity as perceived by Kuwait University students. The second section presented the strengths and limitations of the study. The third section discussed the study's implications, and the fourth section provided recommendations for future research.

Gender and Barriers to Physical Activity Levels

RQ 1, 2, 3, 4, 5, 6, 7 and 8 all addressed gender and barriers to physical activity levels and have been discussed together in this section.

RQ1. Is there a difference between males and females regarding the strength of their internal barriers to physical activity?

In this study, there were ten internal barriers listed in the questionnaire. The most frequently cited barriers in order from major barrier to not a barrier for females and males were "lack of motivation", "lack or low physical power", "fear of injury/re-injury", "lack of energy", "pain when I exercise", "keep talking myself out of it", "know that I can't achieve the results I want so why bother", "don't feel that I have the ability to exercise at a sufficient level", "fear of making an existing illness worse", and "how I see my body". The study found that the strength of internal barriers in relation to physical activity was significantly greater among the females than the males, meaning that females reported more internal barriers. Female university students perceived the barriers "lack of motivation", " lack of energy", "pain when I exercise", and "how

I see my body" significantly greater than male university students. This result was consistent with Abdullah *et al.* (2005) study which found that females were more likely to be disinterested in physical activity. However, this finding was inconsistent with Milanovic *et al.* study (2011) that found that males and females expressed the same concerns and barriers for neglecting to participate in physical activity, with the internal barrier being laziness. Gomez-Lopez *et al.* (2011) also discovered that men were more likely to mention internal barriers as reasons for not participating in physical activity. Al-Otaibi (2013) likewise found that Saudi women had less internal barriers than men.

"Lack of motivation" could be a more significant barrier among females because they are not encouraged to engage in physical activity due to Kuwaiti society. They also have fewer avenues to explore physical activity, as many sports clubs and recreation centers do not allow female membership. "Lack of energy" could stem from habits of physical inactivity or school and familial obligations for females, who already have higher rates of physical inactivity and are expected to maintain the home. For females, experiencing pain when exercising could be significant because of the aforementioned patterns of physical inactivity or due to attempting strenuous exercise before they are ready, causing previous injury or pain. This could also be due to not knowing how to begin a physical activity regimen, therefore attempting difficult exercise too quickly. "How I see my body" was a significant barrier among females, whereas it was insignificant among males. This could be a result of feminine beauty standards. Female students are less likely to want to gain muscle, instead wishing to be thin. Because physical activity affects muscle gain and thinness can be achieved through cosmetic surgery, females may want to avoid exercise and instead choose the quicker option of liposuction or other cosmetic surgery.

"Lack of motivation" was most frequently cited by both male and female university students. This is consistent with several other studies (Arab, 2007; Cerin, *et al*., 2010). Arab (2007) likewise found that a lack of motivation was a top internal barrier for both Kuwaiti men and women and further claimed that getting individuals to become physically active was not an easy task. Exercise and physical activity was not the first option, especially for females, and many of them did not understand the benefit of being physically active. A "lack of motivation" was the primary internal barrier among Australian adults as well (Cerin *et al*., 2010). A lack of motivation was intertwined with many other barriers: lack of physical power, lack of access to facilities, lack of support, and lack of a partner. For instance, people are more likely to be motivated to engage in physical activity when they have a supportive partner to exercise with and if the activity is enjoyable for them.

"Lack or low physical power" was the second most common internal barrier among Kuwait University students. This finding contrasted with El-Gilany *et al.* (2011) study which listed "lack or low physical power" as an unimportant barrier for university students in Mansoura, Egypt. Kuwaiti students could be daunted by strenuous exercise because they do not regularly engage in physical activity. Kuwaiti culture is sedentary, and most Kuwaitis have maids in the home to do housework and errands for them. For example, maids will get drinks and food for the family members while they are talking or watching television. This encourages sedentary behavior and leads family members to have lower physical power when they choose to engage in physical activity.

"Fear of injury/re-injury" was the third most cited internal barrier for Kuwait University students. Unlike this study, the Canadian Fitness and Lifestyle Research Institute (1996) (CFLRI) listed fear of injury as a moderate barrier to physical activity as opposed to a major

barrier in their study of young adults. El-Gilany *et al.* (2011) likewise found a fear of injury to be a moderate barrier, but students in Mansoura still prioritized that fear over physical activity. Students at Kuwait University could fear injury or re-injury because physical activity is foreign to them. If they begin an exercise program, they could mistake muscle soreness for injury. Past injuries can create anxiety for students who do not want to experience injury again and can deter them from physical activity.

RQ2. Is there a difference between males and females regarding the strength of their external barriers to physical activity?

This study listed 16 external barriers to physical activity. In order from major barriers to not a barrier, males and females cited, “lack of time”, “unsuitable (hot or cold) weather”, “lack of access to opportunities such as nearby facilities”, “have other areas in my life that I feel must take priority in my day”, “lack of skills”, “lack of support from others”, “lack of a partner”, “lack of available and suitable programs at my level”, “lack of safe places”, “lack of knowledge”, “feeling uncomfortable”, “cost of activity”, “failure to achieve goals in previous attempts to become active”, “previous negative experience with physical activity”, “lack of transportation”, and “lack of child care”. The results concluded that the strength of external barriers to physical activity was greater among females, meaning that females cited more external barriers. The most significant external barriers for females were “unsuitable (hot or cold) weather”, “lack of access to opportunities such as nearby facilities”, “lack of skills”, “lack of support from others”, and “lack of safe places” “Lack of knowledge;” “Lack of transportation,” and “Lack of child care.” However, males perceived item 22, “Have other areas in my life that I feel must take priority in my day” to be greater barrier than females. Tergerson *et al.* (2002) likewise found that females tended to cite more external barriers, with the top two being lack of time and wanting to use their time in other

activities. Al-Otaibi, (2013) also found that females cited more external barriers, primarily "lack of time". These results were not reaffirmed by previous studies done by Abdullah *et al*. *(*2005) and Milanovic *et al.* (2011). Abdullah *et al.* (2005) found that males were more likely to cite the external barrier "no partner" for not engaging in physical activity, and Milanovic *et al.* (2011) found that there was very little difference between barriers in males and females, with the exception that males cited "health and familial issues" more frequently.

"Unsuitable (hot or cold) weather" is a more prevalent barrier among females, possibly due to a lack of indoor facilities and female relegation to public, outdoor areas (parks) for physical activity. This barrier is correlated to the second most commonly cited barrier for females "lack of access to opportunities, such as nearby facilities", and the fifth most commonly cited barrier for females, "lack of safe places". Again, females do not have as many designated sports clubs or recreation centers as males do, and they are located in urban centers. "Lack of safe places" and "lack of transportation" can also be attributed to a sense of protectionism from male family members. Some families in Kuwait do not prefer their wife, sisters, or daughters to drive due to safety, so they hire drivers for the family. Females share these drivers with their families, and therefore are not able to go out any time they want, whereas males typically have their own cars. "Lack of child care" was also a significant barrier among female students, because in general, they are responsible for taking care of their children in their homes. Kuwaiti society mandates that females clean the home and educate their children. The third and fifth most cited barriers for females respectively, "lack of skills" and "lack of knowledge" could again be due to a lack of encouragement for female participation in sports and physical activity. "Lack of support from others" could also be due to cultural emphasis on females' household obligations.

"Lack of time" was the most major barrier for both male and female students. Several studies indicated a lack of time as a significant barrier (Allison *et al*., 2005; Andajani-Sutjahjo *et al*., 2004; Cerin *et al*., 2010; Daskapan *et al*., 2006; El-Gilany *et al.,* 2011). For example, Daskapan *et al.* (2006) revealed that lack of time due to a busy lesson schedule and social and familial responsibilities were the most commonly cited barriers among Turkish university students, which was no different from the Kuwaiti university students. The barrier, "lack of time" was most commonly reported among Australian adults and had a significant association with the amount of leisure time physical activity (Cerin *et al*., 2010). University students in particular have many obligations, such as classes and family demands, which severely restricts their leisure time and could hinder them from going to recreation centers in the evening. There are limited open hours for public and private recreation centers and facilities. Many recreation centers in Kuwait do not open until 4:00 p.m. and only stay open for a few hours. Religion has a significant impact on time as well. Most Kuwaitis are Muslims and they pray five times a day; however, some sport and recreation facilities do not have a place for prayer set aside. This makes it difficult for those who prefer to pray in the mosque to go to a sport or recreation center.

"Unsuitable (hot or cold) weather" has been listed as a major barrier in studies done in the Middle East and remains a major barrier in this study as well. This finding was consistent with other studies; Amin *et al.* (2011), noted that 65.9% of Saudi adults cited the weather as a major barrier. Similarly, Arab (2007) discussed weather conditions and their impact on practicing physical activity for Kuwaitis and found that it was a significant barrier. This could be due to extreme temperatures, which peak at around 124°F in the summer. Other environmental impacts in Kuwait are dust storms, humidity, and wind. Moreover, there are only two seasons in Kuwait, and summer lasts for eight or nine months, making it too hot to engage in outdoor activities. The

winters get extremely cold and rainy, which makes Kuwait's environment unconducive to outdoor sports and recreation. In addition to the hot weather, Kuwait's customs make it very difficult for women in particular to participate in physical activity because they wear Hijabs and Abayas which cover the head and the entire body.

"Lack of access to opportunities such as nearby facilities" was the third most commonly cited barrier for males and the second most commonly cited for females. Ferreira de Sousa *et al.* (2012) named "lack of access to facilities" as one of the foremost external barriers to physical activity. The results from this study confirmed a lack of accessibility for females in Kuwait. Facilities are separated for males and females, and a majority of the fitness and recreation facilities are allocated for male use. In addition to fewer facilities for females, these facilities are also located in city centers and urban areas, which are further away from residential areas. This makes transportation another issue, as many females in Kuwait do not drive due to the culture and safety. Instead they use a driver, who works for the entire family. Therefore, getting to a recreation facility is very difficult for females. Furthermore, using public outdoor spaces to practice physical activity (jogging or walking) is not an option for some women due to the culture, safety issues, or weather. For example, some male family members do not allow their sisters, wives, daughters, or mothers to leave the home without another male family member in order to keep them safe. If the females do not have anyone willing to go with them, they cannot go outside and exercise.

The fourth most cited external barrier for both males and females was "Have other areas in my life that I feel must take priority in my day". Moreover, this barrier to physical activity was the only significant barrier among males, which could be a result of their gendered responsibilities. In addition to classes, males are expected to be actively social and attend dewanyhs, lunches and dinners, weddings, and other events. They are also obligated to take care

of the family, because they are one of the men of the household. This was consistent with El-Gilany *et al.* (2011) who studied barriers to physical activity among university students in Mansoura, Egypt. The barrier "having other important priorities" was one of the most significant external barriers in that study. University students are typically focused on their studies, work, and families as opposed to regularly engaging in physical activity. Students have many demands on their time, and many could feel as though exercising is not their first choice or the most important way to spend their leisure time. For example, most Kuwaitis choose to sit with family and socialize in the afternoons over exercising. Many males prefer to spend their leisure time in dewanyhs to have conversations about their lives, work, politics, and other general topic, whereas females prefer to have midday tea with neighbors and friends.

RQ3. Is there an association between gender and membership in a sports club?

Males did have a higher rate of membership at sports clubs than was expected by chance. Conversely, females had a lower rate of membership at sports clubs than was expected by chance. Behbehan and Hashem (1996) reported that there was only one girls club which offered a variety of sports in Kuwait. Low membership rates for females are again due to the fact that females have significantly less sports clubs and facilities. Out of the 16 sport federations in Kuwait, only one is for women (the Union of Kuwaiti Women's Sports), whereas the other 15 offer different sport clubs for men. In the private sector of fitness and recreation, a majority of fitness clubs are for males, and the focus is on bodybuilding. Bodybuilding is not a priority for females, who are more concerned with being thin and losing weight. In recent years, increasing wealth for Kuwaitis has encouraged them to seek cosmetic surgery as opposed to becoming physically active. Females can achieve weight loss through cosmetic surgery, which is a more accessible option and provides quicker results. In addition to limited facilities and the prevalence

of cosmetic surgery, the results from research questions 1 and 2 (females have a significantly greater rate of internal and external barriers than males) provide some explanation as to why males have higher membership rates at sports clubs than females.

RQ4. Is there an association between gender and studying PE /health education classes?

The results showed that the frequency of males who studied physical education and health education was significantly less than was expected by chance. Conversely, the frequency of females who studied physical education and health education was more than expected by chance. This finding was expected, taking into account that most of the students surveyed (34.1%) were from the college of education, which offers four physical education classes. The College of Education provides elective courses in physical education, such as foundations of the theory of physical education, introduction to physical education, and health education which are all well-known to students enrolled in the college of education, but not well-known in the other 15 colleges. In addition to those four electives, one course, "motor learning," is mandatory for the early childhood major, which accepts only female students. Furthermore, most students in the College of Education are female, so they are more likely to enroll in these physical education electives. Although male students are more interested in physical activity or sport classes, the requirements expected from the PE professor is higher for their male students than it is for their female students because of the customs, so many male students are deterred from taking physical education courses.

RQ5. Is there a difference between males and females regarding their lack of knowledge as a barrier to physical activity?

This study discovered that a lack of knowledge was a significantly greater barrier to physical activity for females than for males. Lack of knowledge also was not major for both male

and female. This result was similar to Montasser, El-Fattah, and Helal (2011) study where they found that lack of knowledge was cited by only 17.3% of the participant in the mild and moderate physical activity category, whereas 8.2% of the students in the vigorous category cited lack of knowledge as a barrier to physical activity. This result did not reflect the result in RQ 4 which stated that more female students were enrolled in PE classes than male students. To clarify, "knowledge" was determined by the participants' perception of their own knowledge of physical activity, as opposed to any sort of measurable or objective level of knowledge. It seems as though male students are not as affected by this barrier because they become more knowledgeable from practicing sports and getting more opportunities to be physically active, unlike female students. Another possibility is that the curriculum in Kuwait University does not encourage students to get engaged in physical activity and overcome their perceived barriers. Perhaps female students are merely disinterested in sports and do not care to learn more about them due to Kuwaiti culture, which provides more opportunities for males to engage in sports and be more physically active than females.

RQ6. Is there a difference between males and females regarding their lack of skills as a barrier to physical activity?

Lacking the skills was a greater barrier to physical activity for females than for males in this particular study. This result was in line with study done by the Canadian Fitness and Lifestyle Research Institute [CFLRI] (1996) which found that women between the ages 18-24 had lack of skills as a barrier to physical activity more than men. As stated in RQ3, male students had a higher rate of sport club memberships than female students. Sports clubs typically provide free personal trainers who can guide members through exercises, which benefits males greatly. Previous experience with sports and physical education classes in public schools (k-12) also

benefit males and help them become more skillful than females, due to the emphasis on PE for male students. Moreover, various sports competitions mainly focus on male participation rather than female participation. Males are encouraged to compete in different sports competitions such as soccer, volleyball, handball, and basketball.

RQ7. Do gender and studying PE/health education predict an individual's lack of knowledge as a barrier to physical activity?

The results found that gender and studying physical education and health education did not predict an individual's lack of knowledge as a barrier to physical activity. This question was a combination of RQ 4 and 5. Being female heightened chances of taking physical education/ health classes over being male. However, females perceived a lack of knowledge as a barrier to physical activity, unlike males. Gender and studying PE/ health, therefore, did not predict a lack of knowledge as a barrier to physical activity because females, who have to take at least one physical education course ("motor skills") for the early childhood education major which is only composed of females, are not retaining as much information from mandatory and elective PE/ health courses. The professors who teach PE/health courses also have more rigorous requirements for males than females, so the male students retain more knowledge. Females, on the other hand, have very little incentive to apply what they have learned in physical education courses. Males also receive knowledge of physical activity and sports from different sources, such as sport clubs, soccer competitions, and intramural sports. To summarize, more females take PE/Health courses because they are a requirement, and less males take PE/Health courses because they are not enrolled in the Early Childhood Education major (which only accepts females), or do not know about the elective courses if they are enrolled in a different college. Additionally, those electives have too many strict demands for males. Males who choose to take

PE/Health courses engage in the material both theoretically and practically. Due to internal barriers, females have the same opportunity to engage theoretically in course material but have a more limited practical experience. As a result, gender and studying physical education and health education did not predict an individual's lack of knowledge as a barrier to physical activity.

RQ8. Do gender and membership in a sports club predict an individual's lack of skills as a barrier to physical activity?

Gender and sports club membership predicted an individual's lack of skills as barrier to physical activity. Being female and not being a member of a sports club predicted more lack of skills as a barrier to physical activity. This question was a combination of RQ 3 and 6. The frequency of males with memberships to sports clubs was significantly greater than expected by chance; whereas the frequency of females with memberships was less than expected by chance. This is due to the fact that males have more facilities and sport clubs available to them, and women are turning more towards cosmetic surgery for quick weight loss results rather than going to a fitness or recreation center. Sport club membership is less appealing for females who have more internal and external barriers to physical activity. As a result, females also feel as though a lack of skills is a major barrier to practicing physical activity. Males have more opportunity to gain skills through practicing sports and recreation, as well as through utilizing personal trainers offered by sports clubs. They also engage in more sports competitions than females due to culture. Males' higher rates of sports club membership predicts that they consider a lack of skills an irrelevant barrier.

Gender and Physical Activity Levels

RQ 9, 10, 11, 12, and 13 all addressed gender and physical activity levels and have been discussed together in this section.

RQ9. Is there a difference between males and females regarding their overall physical activity?

Males tended to have significantly higher levels of overall physical activity than females, as seen in this study. Similar studies supported the findings of this particular study, indicating that mean overall activity of males was significantly greater than the mean overall activity of females (Gomez-Lopez *et al*., 2011; McArthur *et al.*, 2009; Munford, 2011; Sherwood *et al.*, 2000; Tergerson *et al.*, 2002). The finding in this study illustrated that Kuwaiti male university students could be benefitting significantly from the opportunities that enable them to engage in physical activity in the Kuwaiti society. These benefits include more sport and recreation facilities and greater opportunities for males over females to participate in sports competitions provided by private and public sport sectors. Another explanation for overall physical activity levels being higher for male students is that they have less internal and external perceived barriers to physical activity.

Furthermore, the study revealed that mean walking activity along with vigorous activity were higher among males than females, whereas the mean moderate activity tended to be lower among males than among females. This finding contradicted with two previous studies (Munford, 2011; Sullivan, *et al.* 2008). Munford (2011) found that females exceeded their male counterparts in walking. However, males exceeded females in both vigorous and moderate physical activity. Additionally, Sullivan *et al*. (2008) reported no significant gender differences between the three categories (vigorous, moderate, light) of leisure-time physical activity.

Another finding from the current study showed vigorous activity level was the most important activity level that differed between males and females. The discrepancy in results between this study and the two previous studies could be due to sport preference differences

between males and females. Males in Kuwait tended to prefer vigorous sports such as weightlifting, which makes them appear physically fit and strong. Females, on the other hand, did not want to gain muscle mass or sweat in order to be considered more feminine within Kuwaiti society. Surprisingly female students engaged in moderate activity at a higher rate than male students. This finding could be attributed to the above reason, which claims that females could want to maintain health but appear feminine.

RQ10. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of walking activity?

The findings showed that gender and internal and external barriers to physical activity did not predict an individual's amount of walking activity. This could be attributed to the accessibility of walking; it is an easy sport which demands no equipment and can be done at the moderate level with little effort. Moreover, walking requires no specialized skills or knowledge, which makes it easier for all individuals at any physical fitness level.

RQ11. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of moderate physical activity?

The results found that gender and barriers to physical activity did not predict an individual's amount of moderate physical activity. Moderate physical activity is not very physically demanding for most individuals to participate in. Therefore, gender and strength of both internal and external barriers to physical activity do not predict the amount of moderate physical activity that an individual engages in.

RQ12. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of vigorous physical activity?

The result found that gender but not barriers to physical activity predicted an individual's amount of vigorous physical activity, meaning that being female predicted less vigorous physical activity. As mentioned in the result of RQ 9, vigorous activity was the most important activity that differed between males and females. Female students tended to do less vigorous physical activities than male students. This could be explained again by the sport preferences between males and females, which are dictated by societal norms. Females are criticized by their community for participated in vigorous physical activity, which is seen as masculine. Additionally, females get significantly less attention than males from the public and private sport sectors, resulting in fewer facilities and less sports competitions for females.

RQ13. Do gender and strength of internal and external barriers to physical activities predict an individual's amount of overall physical activity?

Gender and external barriers to physical activity predicted an individual's amount of overall physical activity; being female and having external barriers predicted less overall physical activity. This research question was a combination of RQ's 1, 2, and 9. In this study, females cited more internal and external barriers to physical activity than males and had significantly more external barriers than their male counterparts. This result was supported by several studies which showed that external barriers deterred more individuals from engaging in physical activity than internal barriers (Al-Otaibi, 2013; Daskapan, 2006; Gomez-Lopez *et al*., 2011; Munford, 2011). As a result, this study found that females had lower overall rates of physical activity than males. Consequently, it's unsurprising, given the results of RQs 2 and 9, that being female and having external barriers to physical activity predicted less overall physical

activity. This could be due to the culture and environment that surround females in Arabic countries, particularly Kuwait. Females are discouraged from participating in physical activity and as a result, experience more external barriers to physical activity.

Summary

The objective of this study and the subsequent research questions were to determine the physical activity level of students at Kuwait University and perceived barriers to physical activity among that subset of the population. Females cited more barriers to physical activity than males and overall had more internal and external barriers. The most commonly cited internal barriers to physical activity were "lack of motivation", "lack or low physical power", and "fear of injury/re-injury". The most commonly cited external barriers were "lack of time", "unsuitable (hot or cold) weather", and "lack of access to opportunities such as nearby facilities".

Strengths and Limitations

There were several strengths of this research study that should be repeated in future studies. The first strength was the Barriers to Physical Activity Questionnaire (BPAQ). The BPAQ is formatted in such a way that makes it straightforward and simple for students to complete and directly engages participants about their opinion. The BPAQ instrumentation yielded complete responses from the large pool of participants, perhaps because the barriers listed were easily recognizable for the participants.

In addition to employing a strong instrumentation, this was the first Kuwaiti study to look at barriers to physical activity among university students. Therefore, this research provides a foundation of knowledge for this demographic. Through this study, policy makers could plan interventions that engage this population and encourage physical activity and health behaviors as a priority among this subset of the population.

Lastly, the guiding frameworks, the Theory of Planned Behavior and the Social-Ecological Model put this research in the perspective of the participants and their social, cultural, academic, and physical environments. Both frameworks placed emphasis on internal and external influences when calculating strength of perceived internal and external barriers to physical activity among male and female university students. In particular, the Theory of Planned Behavior was used to predict physical activity behaviors that were to be tested by the study. On the other hand, the Social-Ecological Model looked closely at the individual and levels of influence, such as the university environment and the social environment.

There were three limitations in this research study. The first limitation was the ten-point scale for the BPAQ. The ten-point scale confused students who did not know what sort of gradation each point represented. It would be easier to understand for participants if the ten-point scale was converted to a five-point scale, where 1 indicates “not a barrier” and 5 indicates “major barrier”. The BPAQ also lacked a more comprehensive listing of external barriers, which could have been made specifically for Kuwaiti university students. For example, a new list should include items about clothing (hijab and abaya for females, dishdasha, ghutra, and headband for males), family, and tradition or reputation. Another limitation is the season in which the research took place. The study was conducted during the summer term (June), and as a result, four of the major colleges (Dentistry, Pharmacy, Law, and Public Health) were omitted because summer courses are not available to their students. Physical activity levels might be affected in this study because students tend to engage in more sports and exercise during this season in preparation for vacation. Another reason students tend to participate in more physical activity during this time is due to minimum hour requirements for the summer term, which is only three hours. Conducting the study during the summer term, therefore, may not accurately reflect physical activity levels

among university students in Kuwait. In fact, the results were over the original estimation, because students tend to do more physical activity in this season.

A third limitation of this study is one of the instrumentation responses, in particular the data gathered from the International Physical Activity Questionnaire (IPAQ). Out of a total of 1,123 participants, only 823 finished some parts of the survey, and 227 participants fully responded to the survey. Conversely, all of the participants completed and offered full responses to the BPAQ, making this instrumentation a significant strength of the research.

Implications of the Study

Recently, more information has emerged about public health in Kuwait. Kuwait is now launching public health initiatives to decrease rates of chronic illnesses and enhance the quality of life for Kuwaitis (Ramadan *et al*, 2010). To curb the rising rate of health issues incurred by unhealthy lifestyles, it is imperative that research be done on different subsets of the Kuwaiti population to address general levels of health and find factors affecting Kuwaitis' health behaviors. The research done for this study will help find a subjective norm for Kuwaiti university students in regards to their physical activity levels. It will also offer a foundation for intervention and policy with the express purpose of encouraging physical activity, particularly among Kuwait university students. Currently, Kuwaiti adults are neglecting physical activity and Kuwait is experiencing a severe upward trend in obesity and weight gain (Ramadan *et al.*, 2010). Additionally, cardiovascular disease is the largest cause of death in Kuwait (Stockton, 2011). In order to alleviate these health epidemics, understanding determinants of physical activity is essential in policy development and a societal shift towards better health behaviors.

The results from this study will fill in knowledge gaps on the physical activity levels of university students in Kuwait and further aid in handling low physical activity levels among

certain subsets of the population. University students have the potential to affect the greater population after obtaining their degrees, making it imperative that they are applying and then modeling what they have learned at a higher educational level. It is vital that they get exposure to the benefits of physical activity firsthand and continue to practice physical activity. As a result, understanding major perceived barriers toward physical activity can shape effective interventions for this demographic.

These findings aim to illustrate why Kuwait University students are neglecting physical activity and to further motivate policy development at the Kuwait Ministry of Education in regards to physical education requirements. This study could further be used to improve physical education curricula by analyzing barriers to physical activity that hinder university students from increasing their physical activity and marketing a program that minimizes these barriers.

Health initiatives and interventions can be marketed toward university students in Kuwait, particularly females, with guidance from this research. Females, who tend to participate more in moderate physical activity, could benefit from courses or programs that focus mainly on the moderate level sports, such as jogging, soccer, swimming, and tennis to increase females' participation toward these moderate activities. University facilities can be utilized and adjusted to promote regular physical activities and increase accessibility for both male and female students. For example, culturally appropriate facilities could enhance participation in physical activity. Furthermore, physical education and health programs can be more effective if they are designed for each specific gender, due to the Kuwaiti culture. Females could have a safe facility to practice physical activity and learn sport skills separate from the males, which could increase their participation in physical activity. By increasing physical activity rates for university

students, the university could help them establish lifelong physical activity patterns and ultimately decrease the likelihood of developing chronic illnesses later in life.

Recommendations for Future Research

For future studies, there are a few modifications to the methods used in this research that would yield more objective data. The theoretical frameworks (the Theory of Planned Behavior and the Social-Ecological Model) utilized in this study are recommended for future research due to their emphasis on cultural aspects and impacts on individual behavior. It would be helpful if, during the course of physical activity behavioral research, a national instrument and standard was developed to accurately gauge physical activity patterns unique to Kuwaitis. Researchers should take into account earlier stages of education, such as high school, when looking at physical activity behaviors. It is also recommended to use a five-point Likert scale in the BPAQ in order to make the survey more straightforward for participants. Conducting the research during the fall or spring term also might give a more holistic representation of students' perceived barriers to physical activity because all colleges, including the colleges of Law, Pharmacy, Dentistry, and Public Health, offer courses during those terms. Surveying all 16 colleges at Kuwait University will give a clearer depiction of the university's activity levels and barriers as a whole. Finally, using a more objective assessment tool for physical activity, such as a pedometer or heart rate monitor, could enable the collection of more precise data about daily physical activity levels.

Conclusion

The objective of this study was to determine physical activity levels among Kuwait University students and subsequently the perceived barriers that impede students from participating in physical activity. This study found that internal and external barriers were higher among females than males. Males also had a higher frequency of sports club memberships, but

females had a higher frequency of enrollment in PE/health education courses. Despite higher enrollment in PE/health education courses, females cited lack of knowledge and skills more frequently than males. Therefore, gender and studying PE/health education did not predict and individual's lack of knowledge as a barrier to physical activity. Gender and sports club membership, on the other hand, did predict an individual's lack of skills as a barrier. Lack of skills as a barrier to physical activity was predicted by being female and not having a membership to a sports club.

It is unsurprising that males had significantly higher levels of overall physical activity than females and engaged in more vigorous physical activity and walking activity. Females did have a higher frequency of moderate activity than males, so gender and barriers to physical activity did not predict the amount of walking activity or moderate activity. Conversely, gender but not barriers to physical activity could accurately predict amount of vigorous physical activity. Finally, it was discovered that gender and external barriers to physical activity predicted an individual's amount of overall physical activity. The theoretical frameworks, the Theory of Planned Behavior and the Social-Ecological Model, both enabled the researcher to make accurate predictions for most of the research questions, and further clarified the gender disparity in barriers to physical activity and physical activity levels.

This study contributed to both the Theory of Planned Behavior and the Social-Ecological Model by adding a cultural, more specifically Middle Eastern, perspective to the narrative of each framework. Both models are predicated on attention to levels of influence, starting with larger environmental and organizational levels and narrowing to individual levels. As found in this study on Kuwaiti university students and their perceived barriers, external barriers have impacted and influenced individual behaviors. External barriers that are catalyzed by culture and

societal effects can range from prioritizing males in the public and private sectors of sports and recreation to the Kuwaiti customs and traditions that inhibit female participation in physical activity. The Theory of Planned Behavior and the Social-Ecological Model can address the issue of encouraging active participation in physical activity in all subsets of the population without compromising cultural identity.

It is recommended, based on the results of this study, that policy makers and social opinion leaders consider tailoring physical activity interventions and strategies to university students with respect to ideas stated in the Theory of Planned Behavior and the Social-Ecological Model. For example, policy makers should take into account the insular environment of a university, the role their professors and peers play, cultural norms, and individual attitudes when designing interventions and programs for college students. More specifically, future research should address cultural issues that hinder physical activity.

One way to increase physical activity levels and minimize perceived barriers, particularly a lack of knowledge and skills, is to make physical education mandatory for all students enrolled at Kuwait University. This will enhance students' participation in physical activity and perhaps help them establish lifelong active lifestyles and behaviors, as well as heighten students' awareness of the benefits of physical activity. A broader range of physical education classes could make physical activity more enjoyable and eliminate a lack of motivation. "Lack of time" was the most commonly cited internal barrier, so program designers should take a behavioral approach to planning interventions that offer workshops addressing time management skills on the Kuwait University campus, which will encourage physical activity behaviors and reduce the barrier "lack of time". Programs that expand on opportunities can help manage current issues.

Program planners should consider developing courses that require a moderate level of physical activity, such as swimming bicycling, or tennis, for females and courses that require a vigorous level of physical activity for males, such as aerobics, running or weightlifting, because females engage in more moderate physical activity whereas males engage in more vigorous physical activity to increase students' participation and at the same time not neglecting others levels of activities. Adjusting courses or designing courses for those with physical conditions, disabilities, or health issues could make physical activity less intimidating for those students as well. Kuwait University should also establish facilities such as recreation centers or gyms that are culturally appropriate, which gives females their own area to exercise and includes an area for prayer.

REFERENCES

Abdullah, A., Wong, C., Yam, H., & Fielding, R. (2005). Factors related to non-participation in physical activity among the students in Hong kong. *International Journal of Sports Medicine*, *26*(7), 611-615.

Adams, T., Moore, M., & Dye, J. (2007). The relationship between physical activity and mental health in a national sample of college females. *Women & Health, 45,* 69-85.

Al-Isa, A., Campbell, J., Desapriya, E., & Wijesinghe, N. (2011). Social and health factors associated with physical activity among Kuwaiti college students. *Journal of Obesity, 25,* 1-6. doi:10.1155/2011/512363.

Allison, K., Dwyer, J., Goldenberg, E., Fein, A., Yoshida, K., & Boutilier, M. (2005). Male adolescents' reasons for participating in physical activity, barriers to participation, and suggestions for increasing participation. *Adolescence, 40,* 155-170.

Allison, K., Dwyer, J., & Makin, S. (1999). Perceived barriers to physical activity among high school students. *Preventive Medicine, 28,* 608-615.

AlMajed, H. T., AlAttar, A. T., Sadek, A. A., AlMuaili, T. A., AlMutairi, O. A., Shaghouli, A. S., & AlTorah, W. A. (2011). Prevalence of dyslipidemia and obesity among college students in Kuwait. *Alexandria Journal Of Medicine*, *47*(1), 67-71. doi:10.1016/j.ajme.2010.12.003

Al-Otaibi, H. (2013). Measuring stages of change, perceived barriers and self efficacy for physical activity in Saudi Arabia. *Asian Pacific Journal of Cancer Prevention, 14,* 1009-1016.

Amin, T., Suleman, W., Ali, A., Gamal, A., & Al Wehedy, A. (2011). Pattern, prevalence, and perceived personal barriers toward physical activity among adult Saudis in Al-Hassa, KSA. *Journal of Physical Activity & Health, 8,* 775-784.

Andajani-Sutjahjo, S., Ball, K., Warren, N., Inglis, V., & Crawford, D. (2004). Perceived personal, social and environmental barriers to weight maintenance among young women: A community survey. *The International Journal of Behavioral Nutrition And Physical Activity, 1,* (15), 1-7.

Arab, M. (2007). Barriers to exercise: Kuwaiti individuals with and without physical disabilities. (Order No. 3247817, Oregon State University). *ProQuest Dissertations and Theses*, 154. Retrieved fromhttps://ezproxy.mtsu.edu:3443/login?url=http://search.proquest.com /docview/304819452?accountid=4886. (304819452).

Ajzen, I., & Fishbein, M. (1975). A Bayesian analysis of attribution processes. *Psychological Bulletin*, 82261-277.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Behbehan, K., & Hashem, J. (1996). Leisure and recreation in Kuwait. *Journal of The International Council For Health, Physical Education, Recreation, Sport, And Dance*, *33*(1), 10-19.

Benjamin, K., & Donnelly, T. T. (2013). Barriers and facilitators influencing the physical activity of Arabic adults: A literature review. *Avicenna (2220-2749)*, *2013*(1), 1-16. doi:10.5339/avi.2013.8.

Blaber, A. (2005). Physical fitness. Exercise: who needs it? *British Journal of Nursing, 14,* 973-975.

Bray, S., & Born, H. (2004). Transition to university and vigorous physical activity: Implications for health and psychological well-being. *Journal of American College Health, 52,* 181-188.

Brody, J. E. (1995, October 4). Personal health: More of the elderly seek the benefits of exercise. *The New York Times*. Retrieved from http://www.nytimes.com/1995/10/04/us/personal -health-more-of-the-elderly-seek-the-benefits-of-exercise.html?module=Search&mab Reward=relbias%3Ar%2C{%222%22%3A%22RI%3A16%22}.

Canadian Fitness and Lifestyle Research Institute (1996, June). Sources of progress in prevention (Issue Brief No. 1205-7029).

Castelli, D. M., Hillman, C. H., Buck, S. M., & Erwin, H. E. (2007). Physical fitness and academic achievement in third- and fifth-grade students. *Journal of Sport Exercise Psychology, 29*(2), 239-252.

Centers for Disease Control and Prevention (2006). Missed opportunities in preventive counseling for cardiovascular disease – United States, 2006. *MMWR.1998, 47,* 91–95.

Centers for Disease Control and Prevention (2011). Leisure time physical activity. Retrieved on Nov. 5, 2014 from http://www.cdc.gov/nchs/data/nhis/earlyrelease/201103_07.pdf#page=2&zoom=auto,0,293. 46-51.

Cerin, E., Leslie, E., Sugiyama, T., & Owen, N. (2010). Perceived barriers to leisure-time physical activity in adults: An ecological perspective. *Journal of Physical Activity and Health*, *7*, 451-459.

Craig, C., Marshall, A., Sjostrom, M., Bauman, A., Booth, M., Ainsworth, B., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine And Science In Sports And Exercise*, *35*(8), 1381-1395.

Crespo, C. J., Keteyian, S. J., Heath, G. W., & Sempos, C. T. (1996). Leisure time physical activity among US adults: Results from the Third National Health and Nutrition Examination Survey. *Archives of Internal Medicine*, *156*(1), 93-98.

Dale, D., Welk, G. J., & Matthews, C. E. (2002). Methods for assessing physical activity and challenges for research in G.J. Welk (Ed.), *Physical activity assessments for health-related research* (pp.19-34). Champaign, IL: Human Kinetics.

Daskapan, A., Tuzun, E.H., & Eker, L. (2006). Perceived barriers to physical activity in university students. *Journal of Sports Science and Medicine, 5,* 615-620.

Davidson, L. (2009). Should doctors recommend a specific exercise program for elderly patients? *Aging Health*, *5*(3), 263-264.

El-Gilany, A. H., Badawi, K. K., El-Khawaga, G. G., & Awadalla, N. N. (2011). Physical activity profile of students in Mansoura University, Egypt. *Eastern Mediterranean Health Journal, 17,* 694-702.

El-Gilany, A., & El-Masry, R. (2011). Physical inactivity among Egyptian and Saudi medical students. *TAF Preventive Medicine Bulletin, 10,* 35-44.

Ferguson, C.F. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*, 532-538.

Field, A.P. (2009). *Discovering statistics using SPSS*. (3rd ed.). London: Sage.

Fleury, J., & Lee, S. M. (2006). The social ecological model and physical activity in African American women. *Am J Community Psychol*, *37*(1-2), 129-140.

Gómez-López, M., Granero-Gallegos, A., Baena-Extremera, A., & Ruiz-Juan, F. (2011). The abandonment of an active lifestyle within university students: Reasons for abandonment and expectations of re-engagement. *Psychologica Belgica*, *51*(2), 155-175. doi:10.5334/pb-51-2-155.

Grissom, J. B. (2005). Physical fitness and academic achievement. *Journal of Exercise Physiology Online*, *8*(1), 11-25.

Haenlein, M.K. & Kaplan, M. (2004). A beginner's guide to partial least squares analysis. *Understanding Statistics, 3*, 283–297. doi:10.1207/s15328031us0304.

Harkness, G. (2012). Out of bounds: Cultural barriers to female sports participation in Qatar. *The International Journal of the History of Sport*, *29*(15), 2162-2183, DOI:10.1080/09523367.2012.721595.

Hlaing, W., Nath, S., & Huffman, F. (2007). Assessing overweight and cardiovascular risks among college students. *American Journal of Health Education, 38*(2), 83-90. Retrieved from ERIC database.

Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults' participation in physical activity. *American Journal of Preventive Medicine, 22,* 188-199. doi:10.1016/S0749-3797(01)00426-3.

Irwin, J. D. (2004). Prevalence of university students' sufficient physical activity: A systematic review. *Perceptual And Motor Skills*, *98*(3,Pt1), 927-943. doi:10.2466/PMS.98.3.927-943.

Kemper, K. A., & Welsh, R. S. (2010). Physical activity behaviors of students of a rural historically black college. *Journal of American College Health, 58*(4), 327-334.

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54,* 87-94.

Klepfer, S. D. (2013). College students' perceptions of wellness and physical activity. (Order No. 3595799, Walden University). *ProQuest Dissertations and Theses*, 139. Retrieved from https://ezproxy.mtsu.edu:3443/login?url=http://search.proquest.com/docview/1446485265?accountid=4886. (1446485265).

Lang T. (2004). Twenty statistical errors even you can find in medical research articles. *Croatian Medical Journal, 45*, 361-70.

Lee, R. T., & Loke, A. (2005). Health-Promoting Behaviors and Psychosocial Well-Being of University Students in Hong Kong. *Public Health Nursing, 22,* 209-220. doi:10.1111/j.0737-1209.2005.220304.x.

Marcus, B. H., Williams, D. M., Dubbert, P. M., Sallis, J. F., King, A. C., Yancey, A. K., et al. (2006). Physical activity intervention studies: What we know and what we need to know: A scientific statement from the American Heart Association Council on nutrition, physical activity, and metabolism (Subcommittee on Physical Activity); Council on Cardiovascular Disease in the Young; and the Interdisciplinary Working Group on Quality of Care and Outcomes Research. *Circulation, 114*(24), 2739-2752.

Marshall, S.J., Gorely, T., & Biddle, S. J. H. (2006). A descriptive epidemiology of screen-based media use in youth: A review and critique. *Journal of Adolescence, 29*, 333-349.

Mead, A. S. (2009). Gender differences in food selections of students at a historically black college and university (HBCU). *College Student Journal, 43*(3), 800-806.

Melton, B., Hansen, A., & Gross, J. (2010). Trends in physical activity interest in the college and university setting. *College Student Journal*, *44*(3), 785-789. Retrieved from EBSCOhost.

Montasser, N.A., El-Fattah, A.E.A., & Helal, R.M. (2011). Pattern of vigorous physical activity among Egyptian freshmen university students. *South African Journal of Sports Medicine, 4,* 111-116.

Munford, S. N. (2011). Gender differences in barriers to physical activity among college students reporting varying levels of regular physical activity. (Order No. 3468233, Walden University). *ProQuest Dissertations and Theses, 186*. Retrieved from https://ezproxy.mtsu.edu:3443/login?url=http://search.proquest.com/docview/887711895?accountid=4886. (887711895).

Pate, R., O'Neill, J., & Lobelo, F. (2008). The evolving definition of "sedentary". *Exercise & Sport Sciences Reviews*, *36*(4), 173-178.

Phillips, M., Flemming, N., & Tsintzas, K. (2009). An exploratory study of physical activity and perceived barriers to exercise in ambulant people with neuromuscular disease compared with unaffected controls. *Clinical Rehabilitation, 23,* 746-755. doi:10.1177/0269215509334838.

Ramadan, J., Vuori, I., Lankenau, B., Schmid, T., & Pratt, M. (2010). Developing a national physical activity plan: The Kuwait example. *Global Health Promotion*, *17*(2), 52-57. doi:10.1177/1757975910365230.

Raynor, U., & Jankowiak, N. (2010). Accelerometry-determined adherence to the 2008 physical activity guidelines for Americans among college students. *American Journal of Health Education, 41,* 353-362.

Regan, A., & Heary, C. (2013). Patterns of sedentary behaviours in Irish female adolescents. *Journal of Adolescence*, *36* (2), 269-278.

Robbins, L. B., Pender, N. J. & Kazanis, A. S. (2003). Barriers to physical activity perceived by adolescent girls. *Journal of Midwifery & Women's Health, 48*, 206–212. doi: 10.1016/S1526-9523(03)00054-0.

Romaguera, D., Tauler, P., Bennasar, M., Pericas, J., Moreno, C., Martinez, S., & Aguilo, A. (2011). Determinants and patterns of physical activity practice among Spanish university students. *Journal of Sports Sciences*, *29*(9), 989-997.doi:10.1080/02640414.2011.578149.

Sailors, M. H., Jackson, A. S., McFarlin, B. K., Turpin, I., Ellis, K. J., Foreyt, J. P., & Bray, M. S. (2010). Exposing college students to exercise: The training interventions and genetics of exercise response (TIGER) study. *Journal of American College Health*, *59* (1), 13-20. Retrieved from EBSCOhost.

Sallis, J. F., & Owen, N. (1999). *Physical activity & behavioral medicine*. Thousand Oaks, Calif.: Sage Publications.

Salmon, J., Owen, N., Crawford, D., Bauman, A., & Sallis, J. F. (2003). Physical activity and sedentary behavior: A population-based study of barriers, enjoyment, and preference. *Health Psychology, 22,* 178-188. doi:10.1037/0278-6133.22.2.178.

Salmon, J., Tremblay, M. S., Marshall, S. J., & Hume, C. (2011). Health Risks, Correlates, and Interventions to Reduce Sedentary Behavior in Young People. (Report). *American Journal of Preventive Medicine*, *2*, 189-196. doi:10.1016/j.amepre.2011.05.001.

Sherwood, N., & Jeffery, R. (2000). The behavioral determinants of exercise: Implications for physical activity interventions. *Annual Review of Nutrition, 20,* 21-44.

Sidman, C. L., D'Abundo, M., & Hritz, N. (2009). Exercise self-efficacy and perceived wellness among college students in a basic studies course. *International Electronic Journal of Health Education*, *12,* 162-174. Retrieved from EBSCOhost.

Sousa, T., Fonseca, S., & Barbosa, A. (2013). Perceived barriers by university students in relation the leisure-time physical activity. *Brazilian Journal of Kineanthropometry & Human Performance, 15,* 164. doi:10.5007/1980-0037.2013v15n2p164.

Spence, J. C., & Lee, R. E. (2003). Toward a comprehensive model of physical activity. *Psychology of Sport & Exercise*, *4*(1), 7. doi:10.1016/S1469-0292(02)00014-6.

Stanley, R. M., Boshoff, K., & Dollman, J. (2012). Original Research: Voices in the playground: A qualitative exploration of the barriers and facilitators of lunchtime play. *Journal of Science and Medicine in Sport*, *15,* 44-51. doi:10.1016/j.jsams.2011.08.002.

Stockton, K. D. (2011). Increasing physical activity of adolescents in Kuwait: An exploration of the conditions that foster and inhibit the process of change. *Educational & Child Psychology, 28*(4), 51-65.

Sullivan, S. L., Keating, X. D., Chen, L., Guan, J., Delzeit-McIntyre, L., & Bridges, D. (2008). Physical education and general health courses and minority community college student risk levels for poor health and leisure-time exercise patterns. *College Student Journal*, *42*(1), 132-151.

Tyson, P., Wilson, K., Crone, D., Brailsford, R., & Laws, K. (2010). Physical activity and mental health in a student population. *Journal of Mental Health, 19*, 492-499. doi:10.3109/09638230902968308.

U.S. Department of Health and Human Services. (2000). Healthy People 2010: Understanding and improving health. Washington, D.C.

U.S. Department of Health and Human Services (2008). 2008 Physical Activity guidelines for Americans. Washington, DC: Government Printing Office. Retrieved from http://www.health.gov/paguidelines/pdf/paguide.pdf.

U.S. Department of Health and Human Services (2000). Healthy people 2010: Understanding and improving health. 2nd Ed. Washington, DC: US Government Printing Office.

Walcott-McQuigg, J. A., Zerwic, J. J., Dan, A., & Kelley, M. A. (2001). An ecological approach to physical activity in African American women. *Medscape Womens Health, 6*(6), 3.

Waldron, J. J., & Dieser R. B. (2010). Perspectives of fitness and health in college men and women. *Journal of College Student Development, 51*(1), 65-78. Retrieved from EBSCOhost.

Weinfeldt, J. A., & Visek, A. J. (2009). Why college students enroll in exercise and sport activity classes: An exploratory investigation. *Missouri Journal of Health, Physical Education, Recreation & Dance*, *19,* 64-76.

Woods, C. B., Nelson, N. M., O'Gorman, D. J., Foley, E., & Moyna, N. M. (2009). The Take PART study (Physical Activity Research for Teenagers): Rationale and methods. *J Phys Act Health, 6*(2), 170-177.

World Health Organization (2006). BMI classification. Retrieved from http://apps.who.int/bmi/index.jsp?introPage=intor_3.htm.

Youssef, R. M., Al Shafie, K., Al-Mukhaini, M. M., & Al-Balushi, H. H. (2013). Physical activity and perceived barriers among high-school students in Muscat, Oman. *Eastern Mediterranean Health Journal, 19*, 759-768.

APPENDICES

APPENDIX A:

IRB Approval Forms

MIDDLE TENNESSEE STATE UNIVERSITY

5/22/2014

Investigator(s): Sultan Alsahli, Dr. Don Belcher
Department: Health and Human Performance
Investigator(s) Email Address: sma4f@mtmail.mtsu.edu, Don.Belcher@mtsu.edu

Protocol Title: BARRIERS TO PHYSICAL ACTIVITY AMONG KUWAITI UNIVERSITY STUDENTS

Protocol Number: #14-369

Dear Investigator(s),

Your study has been designated to be exempt. The exemption is pursuant to 45 CFR 46.101(b)(2) Educational Tests, Surveys, Interviews, or Observations.

We will contact you annually on the status of your project. If it is completed, we will close it out of our system. You do not need to complete a progress report and you will not need to complete a final report. It is important to note that your study is approved for the life of the project and does not have an expiration date.

The following changes must be reported to the Office of Compliance before they are initiated:

- Adding new subject population
- Adding a new investigator
- Adding new procedures (e.g., new survey; new questions to your survey)
- A change in funding source
- Any change that makes the study no longer eligible for exemption.

The following changes do not need to be reported to the Office of Compliance:

- Editorial or administrative revisions to the consent or other study documents
- Increasing or decreasing the number of subjects from your proposed population

If you encounter any serious unanticipated problems to participants, or if you have any questions as you conduct your research, please do not hesitate to contact us.

Sincerely,

Kellie Hilker, Compliance Officer
Office of Compliance
615-494-8918

قسم المناهج وطـرق التدريـس
Curriculum and Teaching Methods Dept.

كليـة التربيـة
College of Education

جامعة الكويـت
Kuwait University

30/4/2014

To: Middle Tennessee State University IRB
Dr. Kellie Hilker – Compliance Officer
Sam H. Ingram Bldg. 011B
Murfreesboro, TN 37132

According to Mr. Sultan Mohammed Alsahli request, we are glad to let you know that Mr. Alsahli can get his IRB approval from your university. Moreover, Kuwait University would like to provide to you that Mr. Alsahli does not need IRB approval from us to conduct his study in Kuwait.
If you have questions or concerns feel free to contact me.

Sincerely,

Maadi Alajmi
The Head of Curriculum and Teaching Methods Dept.
College of Education – Kuwait University

د/ معدي مهدي العجمي
رئيس قسم المناهج و طرق التدريس
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APPENDIX B:

Demographic Characteristics

1- Sex: **(1)**Female **(2)**Male.

2- Age: **(1)** 18-22 **(2)** 23-26 **(3)** Older than 26.

3- Marital status: **(1)** Single **(2)** Married **(3)** Divorced.

4- College: **(1)** College of Education **(2)** College of Arts **(3)** College of Science **(4)** College of Medicine **(5)** College of Engineering and Petroleum **(6)** College of Allied Health Science **(7)** College of Law **(8)** College of Sharia and Islamic Studies **(9)** College of Business administration **(10)** College of Pharmacy **(11)** College of Dentistry**(12)** College of Social sciences **(13)** College of Life Sciences **(14)** College of Architecture **(15)** College of College of Public Health **(16)** College of Computer Science and Engineering.

5- Membership of sports clubs: **(1)** Yes **(2)** No.

6- Studied physical education or health education class: **(1)** Yes **(2)** No.

7- Participated or attended workshop about sport or health class: **(1)** Yes **(2)** No.

APPENDIX C:

International Physical Activity Questionnaire (IPAQ)

RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVIITY

Think about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

1. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

   _____ Days per week
   _____ Don'twalk during leisure time [skip to Question 3]

2. How much time did you usually spend on one of those days **walking** in your leisure time?
   _____ Minutes per day

Now think about other physical activities you did in your leisure time for at least 10 minutes at a time.

Vigorous activities make you breathe much harder than normal.

3. During the **last 7 days**, on how many days did you do **vigorous** physical activities **in your leisure time**?
   _____ Days per week
   _____ Don'tdo vigorous activities [skip to Question 5]

4. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

   _____ Minutes per day

Now, think about activities which take *moderate* physical effort that you did in your leisure time. Examples include bicycling at a regular pace, swimming at a regular pace, and doubles tennis. Again, include only those moderate activities that you did for at least 10 minutes at a time.

Moderate physical activities make you breathe somewhat harder than normal.

5. During the **last 7 days**, on how many days did you do **moderate** physical activities **in your leisure time**?
   _____ Days per week
   _____ *Don't do moderate activities [skip Question 6]*

6. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?
   _____ Minutes per day

APPENDIX D:
Barriers to Physical Activity Questionnaire (BPAQ)

Perceived Barriers	**1 (Not a Barrier)**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 (Major Barrier)**
1-Previous negative experience with physical activity										
2-Lack of time										
3-Cost of activity										
4-Lack of energy										
5-Lack of knowledge										
6-Lack of motivation										
7-Lack of skills										
8-Feeling uncomfortable (intimidated in exercise surroundings)										
9-Fear of injury (or re-injury)										
10-Fear of making an existing illness worse										
11-How I see my body										
12-Failure to achieve goals in previous attempts to become active										
13-Know that I can't achieve the results I want so why bother										
14-Lack of access to opportunities such as nearby facilities										
15-Keep talking myself out of it										
16-Lack of safe places										
17-Lack of child care										
18-Lack of a partner										
19-Lack available and suitable programs at my level										
20-Lack of support from others										
21-Lack of transportation										
22-Have other areas in my life that I feel must take priority in my day										
23-Don't feel that I have the ability to exercise at a sufficient level for it to be worthwhile										
24-Pain when I exercise										
25- Unsuitable (hot or cold) weather										
26-Lack or low physical power										

APPENDIX E:

Arabic Version of the Survey

استبانة النشاط البدني الدولية

(هذه البيانات سوف تستخدم بغرض البحث العلمى فقط ولا داعى لكتابة الإسم)

(فضلاً أقرأ هذه المقدمة بدقة قبل الإجابة على الأسئلة ولاتتردد فى الاستفسار عن أى سوأل)

نحن مهتمون بقياس النشـــاط البدني لطلبة جامعة الكويت. ســـوف أســـالك بعض الأســـئلة عن الوقت الذى قضـــيته فى ممارسةالأنشطة البدنية فى وقت فراغك (بغرض الترويح أو التمرين أو الرياضة فقط) على مدى الأيام السبعة الماضية.

[أ]البيانات الشخصية

1- نوع الجنس: (1) ذكر (2)انثى

2- السن: (1) 18-21 (2) 22- 25 (3) 25 فأكثر

3- الحالة الأجتماعية: (1) أعزب (2) متزوج (3) مطلق (ة)

4- الكلية:(1) التربية. (2) الآداب. (3) العلوم. (4) الطب. (5) الهندسة والبترول.

(6) العلوم الطبية المساعدة. (7) الحقوق. (8) الشريعة والدراسات الإسلامية. (9) إدارة الأعمال.

(10) الصيدلة. (11) طب الأسنان.(12) العلوم الاجتماعية. (13) العلوم الحياتيه.

(14) الهندسة المعمارية. (15) الصحة العامة. (16) علوم الحاسب الآلي والهندسة.

5- هل لك عضوية فى احد الأندية الرياضية أو الصحية؟ (1) نعم (2) لا

6- هل درست مادة تتعلق بالتربية الرياضية أو التربية الصحية؟ (1) نعم (2) لا

7- هل شاركت أو حضرت ندوة أو دورة أو محاضرة تتعلق بالرياضة أو الصحة؟ (1) نعم (2) لا

[ب]البيانات الخاصة بالنشاط البدني

فضلاً أجب عن كل سؤال من الأسئلة التالية حتى وان كنت تعتبر نفسك غير رياضي. فكر في الأنشطة البدنية التى تمارسها في وقت فراغك بغرض الترويح أو التمرين أو الرياضة فقط.

فكر في جميع الأنشطة البدنية العنيفة (مرتفعة الشدة) والمعتدلة(المتوسطة الشدة) والتى قمت بممارستها خلال السبعة أيام الماضية و لمدة 10 دقائق على الأقل فى كل مرة.

الأنشــطة البدنية مرتفعة الشــدة: هي التى تطلب جهدا بدنياً شــاقاً وتجعلك تتنفس أعلى بكثير من المعدل المعتاد، مثل رفع أشياء ثقيلة أو الجرى أو ممارسة كرة القدم أو كرة السلة أو السباحة أو نط الحبل.

الأنشطة البدنية المتوسطة الشدة: تشير الى الانشطه التي تأخذ جهد بدني متوسط وتجعلك تتنفس بعض الشيء (قليلاً) أعلى من المعتاد.

هذا القسم يتعلق بالأنشطة البدنية التى قمت (ي) بها خلال السبعة أيام الماضية فقط للأستجمام وممارسة الرياضة او الترفيه

1- خلال الأيام السبعة الماضية كم يوماً مشيت فيها لمدة عشرة دقائق على الأقل فى وقت الفراغ والترفية؟
---------- أيام في الاسبوع لا أمشي في أوقات الفراغ (اذهب إلى سؤال 3)

2- خلال السبعة أيام الماضية ، فى المتوسط كم من الوقت قضيته فى المشي للترفيه؟
---------- دقيقة يومياً

3-الأن فكر فقط فى الأنشطة البدنية التى مارستها لمدة لاتقل عن 10 دقائق في كل مرة،خلال السبعة أيام الماضية كم يوماً مارست فيه نشاط بدني عنيف (شديد القوة) مثل التمارين الرياضية ، الجري، قيادة الدراجات بسرعة عالية ، السباحة السريعة في وقت الفراغ؟
---------- أيام في الاسبوع لا أمارس أنشطة عنيفة فى أوقات الفراغ (اذهب إلى سؤال 5)

4-خلال السبعة أيام الماضية ، فى المتوسط كم من الوقت قضيته فى ممارسة نشاط بدني عنيف (شديد القوة) مثل التمارين الرياضية ، الجري، قيادة الدراجات بسرعة ، السباحة السريعة في وقت الفراغ؟
---------- دقيقة يومياً

5- مرة أخرى ، فكر فى الأنشطة البدنية التى مارستها لمدة لا تقل عن 10 دقائق في كل مرة، خلال السبعة أيام الماضية كم يوماً مارست فيه نشاط بدني معتدل (متوسط الشدة) مثل التمارين الرياضية الخفيفة ، قيادة الدراجات بسرعة عادية ، السباحة العادية في وقت الفراغ؟
---------- أيام في الاسبوع لا أمارس أنشطة معتدلة فى أوقات الفراغ.

6-خلال السبعة أيام الماضية ، فى المتوسط كم من الوقت قضيته فى ممارسة نشاط بدني معتدل (متوسط الشدة) وقت الفراغ؟
---------- دقيقة يوميا

[ج]معوقات (موانع) النشاط البدني

(ضع علامة صح أسفل الرقم الذي سوف تختاره)

معوقات النشاط البدني	لا يعتبر عائق 1	2	3	4	5	6	7	8	9	عائق قوي 10
1- تجربة سابقة سيئة مع النشاط البدني										
2-قلة (ضيق) الوقت										
3-التكلفة العالية (مكلف)										
4-إنعدام (قلة) الطاقة الجسمانية										
5-عدم المعرفة بأهمية النشاط البدني										
6-عدم وجود الدوافع										
7-إنعدام المهارات الرياضية										
8-عدم الإحساس بالراحة عند ممارسة الرياضة										
9-الخوف من الإصابات										
10الخوف من تدهور الحالة الصحية(مرض مزمن)										
11-جسمي ضعيف لايحتمل ممارسة الرياضة										
12-الفشل فى تحقيق الإهداف (الفوز) فى تجارب سابقة										
13-الشعور بالإحباط نتيجة عدم الفوز وتحقيق ما اتطلع اليه										
14-عدم توافر الاماكن الرياضية المناسبة و القريبة										
15 لديّ الرغبة فى البعد عن أماكن النشاط البدني										
16-عدم توفرالأمان في أماكن ممارسة النشاط البدني										
17-لايوجد من يعتني بالأطفال آثناء غيابي										
18-لايوجد صديق يشجعني لممارسة النشاط البدني										
19 إنعدام البرامج التى تناسب قدراتي البدنية										
20-إنعدام الدعم والتشجيع من الأخرين										
21-إنعدام وسائل النقل أوالمواصلات										
22-لديّ أولويات أخرى فى حياتي أهم من الرياضة										
23-لا أجد فى نفسي المقدرة على ممارسة الرياضة بالشكل المطلوب										
24-النشاط البدني يسبب ألم فى جسمي										
25- شدة حرارة أو برودة الجو (الطقس)										
26- أشعر بكسل أو خمول لأداء النشاط البدني										

APPENDIX F:

Student Assent Form

Student Assent Form

To be read out loud prior to the study for all participants.

Hello. My name is Sultan Alsahli. I am a graduate student under the direction of Dr. Don Belcher in the Department of Health and Human Performance at Middle Tennessee State University.

I am conducting a dissertation study to estimate the amount of physical activity among college students at Kuwait University and to determine the most common barriers to physical activity among college students at Kuwait University.

I am recruiting participants to fill out the International Physical Activity Questionnaire (IPAQ) and the Barriers to Physical Activity Questionnaire (BPAQ) which will be presented to the participants as a single document written in Arabic. Students will respond to the IPAQ to determent the students' physical activity level. Then, they will respond to the BPAQ to assess their perceptions of barriers toward physical activity. The questionnaire will be administered during the month of June. It will be conducted away from the period of exams since that could negatively influence the participants' emotional state and skew our findings. The survey will be done during the usual class time, with previous approval given from the corresponding professor. After receiving approval for data collection, the researcher will introduce himself to the students in each classroom and inform them about the purpose of the study and about guarantees of anonymity and confidentiality. The information will be collected by the researcher in the presence of each classroom's professor. The survey will require approximately 10 of your time.

Your participation is voluntary. If you choose to not participate or withdraw from participation at any time, you will not be penalized (i.e., it will not affect your grade. The results of this study may be published but your name will not be identified because data is collected anonymously.

Please contact either myself and/or Dr. Don Belcher if you have any questions at: (917) 293-4778 or sma4f@mtmail.mtsu.edu.

Sincerely,
Sultan Alsahli