

Physical Activity Levels among Male and Female Undergraduate Students at Umm Al-Qura University

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Abstract

Physically inactive is a significant problem in modern society worldwide. One of the primary reasons for this problem is that technological advances have allowed a reduction in energy expenditure for most individuals in habitual daily tasks. This study aimed to assess the levels of physical activity among male and female students at Umm Al-Qura University (UQU) in the Kingdom of Saudi Arabia (KSA). This research is a cross-sectional study conducted at UQU between September and December 2019 that investigated the levels of physical activity in a sample of 968 male and female students (452 males and 516 females), (mean age \pm SD, 22.1 \pm 1.7 years). The Arabic short version of the International Physical Activity Questionnaire (IPAQ) was used to assess physical activity levels. The majority of students (54%) were observed to be at a light-intensity physical activity level (238.0 \pm 143 MET-minutes/week), 38.4% were achieving the recommended daily levels of moderate-intensity physical activity (1470 \pm 701 MET-minutes/week), and 7.6% were achieving vigorous-intensity physical activity (3903 \pm 1043 MET-minutes/week). The independent samples t-test indicated no significant differences in light-intensity physical activities between males (240.4 \pm 147 MET-minutes/week) and females (236.6 \pm 141 MET-minutes/week) $t(519) = .287$; $p < 0.167$. The present study concluded that 54% of the participants were failing to meet the physical activity recommendations of the WHO; this is a key public health concern. National campaigns with collaborations of various government and public sectors in KSA are needed to increase physical activity in different domains.

Keywords: IPAQ; body mass index, subjective assessment, metabolic equivalent of task, college students

Introduction

In modern society, physical inactivity poses a significant problem worldwide (Lee et al., 2012). A primary reason for this problem is that technological advances have reduced the energy expenditure required for everyday tasks. There is consensus across several areas of health that physical inactivity is one of the most important contributors to increased rates of numerous diseases (Grøntved & Hu, 2011). Physical inactivity is defined as a level of activity that does not meet one of three minimum standards: “30 minutes of moderate-intensity physical activity on 5 days or more every week, 20 minutes of vigorous-intensity physical activity on 3 days or more every week, or an equivalent combination achieving more than 600 metabolic equivalents (MET)-minutes/week” (Hallal et al., 2012). A recent study by Guthold et al. (2018) used countries’ measurements of local compliance with World Health Organization (WHO) guidelines for adults to examine the global prevalence of sufficient physical activity. The study, which ran from 2001 to 2016, included about two million participants, representing more than 90% of the world’s population. The study found that more than a quarter of all adults engaged in inadequate levels of physical activity; this means that more than 1.4 billion adults are at increased risk of chronic disease (Guthold et al., 2018). In contrast, an active lifestyle offers considerable protection from chronic disease, and this relationship may be dose-dependent. Strategies to prevent chronic disease must focus on lifestyle changes, beginning with encouraging physical activity among young people and extending to all ages.

A substantial body of literature confirms the positive relationship between daily physical activity and overall health benefits, including decreased risk of cardiovascular disease, high blood pressure, type 2 diabetes, and stroke (Dunstan, Howard, Healy, & Owen, 2012; Gill & Cooper, 2008). Moreover, otherwise healthy participants who are more physically active generally report higher total wellness. For example, Barwais et al. (2014) compared the total wellness of adults who engage in sufficient and insufficient physical activity and found that 72% of participants who self-reported high levels of physical activity also reported moderate to high levels of total wellness. Even half of the recommended level of physical activity may have significant health benefits (Warburton & Bredin, 2016). Wen et al. (2011) found that

participants who engaged in as little as 15 minutes a day (90 minutes a week) of moderately intense physical activity could increase their life expectancy by three years. Physical activity may also decrease the risk of increased body mass index (BMI) and of being overweight or obese, which can also pose severe health concerns (Sims et al., 2012).

Physical inactivity is one of the leading risk factors of disease in the Kingdom of Saudi Arabia (KSA); 60% of the Saudi adult population do not meet current WHO physical activity guidelines (WHO, 2017). A systematic review showed a low prevalence of physical activity in the KSA: 6.1% for males and 1.9% for females (Mabry, Koohsari, Bull, & Owen, 2016). Levels of physical activity in the KSA are lower than in other Gulf Cooperation Countries, where levels vary (males = 85%, females = 91%) depending on demographics and other statistical factors (Al-Hazzaa, 2018). A study of physical inactivity among students at King Khalid University in the KSA found that approximately 58% were inactive (Awadalla et al., 2014). Furthermore, physical activity declines significantly as young people transition from high school to university (Bray & Born, 2004); this is attributed to university requirements, which may include sitting for long periods.

Therefore, enhancing physical activity and encouraging healthy lifestyles is a prime intervention strategy in the KSA and one of the key performance indicators of Saudi Arabia's Vision 2030. Since June 2017, numerous projects and initiatives have been launched throughout the KSA via the Quality of Life Program. Increasing levels of physical activity is a primary goal of these initiatives. Therefore, the objective of this study was to assess the levels of physical activity among male and female undergraduate students at Umm Al-Qura University (UQU) in the KSA.

Methods

This research is a cross-sectional study conducted at UQU in the KSA between September and December 2019 that investigated the levels of physical activity (light-, moderate-, and vigorous-intensity physical activity) in a sample of 968 male and female students (452 males and 516 females) who were 18–28 years old (mean age \pm SD, 22.1 ± 1.7 years) and had a BMI range of 15.5–46 kg/m² (mean BMI \pm SD, 26.3 ± 5.1 kg/m²).

An online survey was randomly distributed through email invitations and WhatsApp groups. Participants took approximately 15 to 25 minutes to complete three sections (covering general characteristics, social status and educational level, and physical activity levels). Participation was completely voluntary, and the study was approved by the Officer of Graduate Studies and Scientific Research of the College of Education at UQU.

Measures

The Arabic short version of the International Physical Activity Questionnaire (IPAQ) was used to assess physical activity levels (light-, moderate-, and vigorous-intensity physical activity) following the IPAQ protocol, which is available at www.ipaq.ki.se. The IPAQ contains questions about the frequency (days per week), duration (hours and minutes), and level of intensity (light, moderate, and vigorous) of physical activity during the last seven days. This study used the metabolic equivalent of task (MET) method, in which different activities and levels of intensity are assigned different MET estimates. Weekly total physical activity (MET- minutes/week) of the students was calculated. According to the IPAQ protocol, participants were classified into three different categories: (1) light-intensity physical activity (< 600 MET-minutes/week), (2) moderate-intensity physical activity (\geq 600 to < 3000 MET-minutes/week), and (3) high-intensity physical activity (\geq 3000 MET-minutes/week). The IPAQ showed acceptable validity and reliability in previous research and has become widely used to assess 18 to 65- years old adults' physical activity levels (Al-Hazzaa, 2007; Craig et al., 2003).

Statistical Analyses

Data were entered into Google Forms before being transferred into Microsoft Excel sheets by an independent research assistant. To be included in the analyses, undergraduate students and students who returned a complete IPAQ or whose questionnaires had no missing values. All statistical analyses were carried out using SPSS statistical software version 26.0 for Windows (IBM SPSS Inc., Chicago, IL). Descriptive statistics (mean \pm SD) were initially calculated for all variables. The differences in physical activity levels between male and female students were tested using the independent samples t-test. Effect sizes for mean differences were expressed

as Cohen's *d* (difference in means divided by the standard deviation of the difference) and interpreted as small (i.e., negligible practical importance), moderate, (i.e., moderate practical importance), or large (i.e., crucial practical importance), based on values of 0.2, 0.5, and 0.8, respectively (Cohen, 1988).

Results

The general characteristics, social status, and educational levels (mean \pm SD and percentages) of the sample are shown in Table 1. A total of 968 students (452 males and 516 females) participated, and their age range was 18–28 years (mean age \pm SD, 22.1 \pm 1.7 years). The majority (60.6%) of students were in the 20–23 year age group. The BMI range was 15.5–46 kg/m² (mean BMI \pm SD, 26.3 \pm 5.1 kg/m²). Based on BMI categorization, 368 students (38.0%) were found to be of normal weight, whereas 331 (34.2%) were overweight and 228 (23.6%) were obese. More male students were found to be slightly overweight than female students (193 [37.4%] versus 138 [30.5%], respectively), and more female students (206 [45.6%]) were found to have a lower normal weight than male students (162 [31.4%]). More male students were found to be slightly obese (146 [28.3%]) compared with female students (82 [18.1%]). More than 91.3% of respondents reported that they were single at the time of the study, and 75 (7.7%) were married. Finally, 86% of respondents reported that they were bachelor's degree students, and 14% were in a diploma program.

Table 1: Participants' demographic characteristics (*n* = 968)

Variables	Males (<i>n</i> = 452)	Female (<i>n</i> = 516)	Overall (<i>n</i> = 968)
Age (years) mean \pm SD	21.94 \pm 1.5	22.22 \pm 1.7	22.1 \pm 1.7
Height (cm) mean \pm SD	173.81 \pm 10.5	171.90 \pm 8.4	172.82 \pm 9.5
Weight (kg) mean \pm SD	75.96 \pm 10.5	80.20 \pm 14.7	78.22 \pm 13.1
BMI (kg·m ⁻²) mean \pm SD	25.41 \pm 4.7	27.24 \pm 5.2	26.38 \pm 5.2
Age groups (years) <i>n</i> (%)			
18 – 20	123 (27.2 %)	118 (22.9 %)	241 (24.9 %)
21– 23	276 (61.1 %)	311 (60.3 %)	587 (60.6 %)
24 – 26	49 (27.2 %)	118 (22.9 %)	130 (13.4 %)

> 27	4 (0.9 %)	6 (1.2 %)	10 (1.0 %)
Body mass index category n (%)			
Underweight	26 (5.8 %)	15 (2.9 %)	41 (4.2 %)
Normal weight	206 (45.6 %)	162 (31.4 %)	368 (38.0 %)
Overweight	138 (30.5 %)	193 (37.4 %)	331 (34.2 %)
Obese	82 (18.1 %)	146 (28.3 %)	228 (23.6 %)
Social status			
Single	411 (90.9 %)	473 (91.7 %)	884 (91.3 %)
Married	41 (9.1 %)	34 (6.6 %)	75 (7.7%)
Other	0 (0 %)	9 (1.7 %)	9 (1.7 %)
Educational level			
Bachelor	373 (82.5 %)	459 (89.0 %)	832 (86.0 %)
Diploma	79 (17.5 %)	57 (11.0 %)	136 (14.0 %)

Table 2 shows that, as determined by IPAQ physical activity levels, the majority (54%) of students were observed to be at a light-intensity physical activity level (238.0 ± 143 MET-minutes/week), 38.4% were achieving the recommended daily levels of moderate-intensity physical activity (1470 ± 701 MET-minutes/week), and 7.6% were achieving vigorous-intensity physical activity (3903 ± 1043 MET-minutes/week).

Table 2: Physical activity levels as reflected by MET-minutes/week (n = 968).

Physical activity levels	Males	Female	Overall
	n (Mean \pm SD)	n (Mean \pm SD)	n (Mean \pm SD)
Light-intensity	199 (240.4 \pm 147)	322 (236.6 \pm 141)	521 (238.0 \pm 143)
Moderate-intensity	191 (1632.6 \pm 742)	184 (1301 \pm 613)	375 (1470 \pm 701)
Vigorous-intensity	62 (4017 \pm 1068)	10 (3193.7 \pm 218)	72 (3903 \pm 1043)

Table 3 shows the differences in the total MET-minutes/week of physical activity between male and female students. The independent samples t-test indicated no significant differences in light-intensity physical activities between males (240.4 ± 147 MET-minutes/week) and females (236.6 ± 141 MET-minutes/week) $t(519) =$

.287; $p < 0.167$, with a small effect size ($d = 0.03$). However, a significant difference in moderate-intensity physical activity was found between males (1632.6 ± 742 MET-minutes/week) and females (1301 ± 613 MET-minutes/week) $t(373) = 4.694$; $p < 0.001$, with a medium effect size ($d = 0.50$). Likewise, there was a significant difference in vigorous-intensity physical activities between males (4017 ± 1068 MET-minutes/week) and females (3193.7 ± 218 MET-minutes/week) $t(70) = 2.417$; $p < 0.001$, with a large effect size ($d = 1.28$).

Table 3: Differences in total MET-minutes/week of physical activity levels between male and female students.

Physical activity levels	Males (N = 452)	Female (N = 516)	t	p-value	Cohen
Light-intensity	199 (240.4 ± 147)	322 (236.6 ± 141)	.287	$p < 0.167$	$d = 0.03$
Moderate-intensity	191 (1632.6 ± 742)	184 (1301 ± 613)	4.69	$p < 0.001$	$d = 0.50$
Vigorous-intensity	62 (4017 ± 1068)	10 (3193.7 ± 218)	2.41	$p < 0.001$	$d = 1.28$

Discussion

The purpose of this study was to assess the physical activity levels of male and female students at UQU in the KSA. The results of this study showed that 54% of students engaged in light-intensity physical activity. No significant differences in light-intensity physical activity between males and females were found. The findings of the current study are consistent with Awadalla et al.'s (2014) study, which evaluated the pattern of physical activity among 1257 health college students (426 males and 831 females) in King Khalid University in southwestern KSA by using the Arabic short version of the IPAQ; that study found that 58.0% of the students were physically inactive, with no statistically significant difference between males and females. Likewise, a recent study that assessed the physical activity level of 278 health science students (205 males and 73 females) at King Faisal University in Al-Ahsa in KSA using the Global Physical Activity Questionnaire found that 44.6% of the students were physically inactive, with higher physical activity among female students (51.71%) than male students (24.66%) (Al-Hassan, Fabella, Estrella, Al-Ramadan, & Bujbara, 2020). The results of this study support previous research into the prevalence of physical inactivity among university-age students in KSA. Additionally, since

2005, physical inactivity has been highly prevalent in the Saudi population—67.6%, according to a national study conducted by the Saudi Ministry of Health, which involved 3,547 males and females aged 18–64 (Saudi Ministry of Health, 2005).

No significant difference ($p < 0.167$) with a small effect size ($d = 0.03$) was observed between males (240.4 ± 147 MET-minutes/week) and females (236.6 ± 141 MET-minutes/week) for light-intensity physical activities. These results were not in line with previous research, which has shown that females are relatively more physically inactive than males, with inactivity levels reaching 43%–91% versus 26%–85%, respectively (Al-Hazzaa, 2018). The different result with the current study may relate to the measurement instrument, the range of ages, and the region of Saudi Arabia. However, a more recent study that assessed levels of physical activity among 505 participants from UQU in KSA found no significant difference between males (48.5%) and females (45.1%) for light-intensity physical activities (Bardisi et al., 2020).

The results indicated that 54% of participants were failing to meet the WHO's physical activity recommendations; this is a key public health concern. In the general population, physical inactivity has been identified as an independent risk factor for diabetes, cardiovascular disease, weight gain, and obesity. This study indicates a rising physical inactivity trend in KSA that contrasts starkly with the WHO's worldwide goal to see a 10% decrease in the prevalence of physical inactivity by 2025 and a 15% decrease by 2030 (WHO, 2018).

Results showed that 38.6% of students were engaged in moderate-intensity physical activity and there were significant differences between males and females. Moreover, results showed that 7.4% of students were engaged in vigorous-intensity physical activity and that there were significant differences between males and females, with large effect sizes ($d = 1.28$). Recent systematic review research by Sharara et al. (2018) showed that males were more engaged in moderate- to vigorous-intensity physical activity than females. They found that lower physical activity among females has been attributed to socio-cultural factors that discourage physical activity (Sharara et al., 2018). Similarly, numerous studies have indicated that females were less likely to engage in moderate- and vigorous-intensity physical activities than were males (Al-Hazzaa, Abahussain, Al-Sobayel, Qahwaji, & Musaiger, 2011; Awadalla et al., 2014;

Irwin, 2004). Health education efforts and collaborations of various government and public sectors in KSA are needed to make people physically active in different domains (work, transportation, home, schools, universities, and leisure time).

Limitations of the Study

Although this is a cross-sectional study on physical activity levels and it used a sample of 968 males and female student respondents, certain limitations are present. The IPAQ, which was used to measure levels of physical activity, has some limitations. Students may have had difficulty recalling and describing their behaviors. All responses were self-reported, which may have resulted in biased conclusions. Multiple precautions were taken to minimize bias, including deleting participants with unrealistic responses and incomplete questionnaires. Future studies should include objective measures (e.g., accelerometer) directly assess physical activity levels. Data collected should include details of the academic path and socio-economic level, which affect differences in physical activity levels.

Conclusions

The present study concluded that no significant difference was observed between males and females for light-intensity physical activities and that 54% of the participants were failing to meet the WHO's physical activity recommendations; this is a key public health concern. National campaigns with collaborations of various government and public sectors in KSA are needed to increase physical activity in different domains.

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