

## Research Article

# Social and Health Factors Associated with Physical Activity among Kuwaiti College Students

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Our aim was to explore the social and health factors that are associated with the level of physical activity among Kuwaiti college students. A random sample of 787 students (48% males and 52% females) was chosen and weight and height were measured to obtain body mass index (BMI, kg/m<sup>2</sup>). Associated social and health factors were obtained using a questionnaire. Those reporting being physically inactive numbered 354 and the remaining 433 were active. Obesity among males was 13% and was 10.5% among females. The social and health factors that were found to be significantly associated with physical activity among the students were gender ( $P < .001$ ), marital status ( $P < .05$ ), BMI category (obese or nonobese) ( $P < .05$ ), last dental and health checkup ( $P < .01$ ), desiring a higher degree ( $P < .001$ ), and countries preferred for visiting ( $P < .01$ ). Males significantly exceeded females in the practice of physical activity. In conclusion, behavioural modifications, intervention studies, and health education touting the benefits of being physically active should be instituted to increase the practice of sports and other physical activities in order to control and decrease obesity-related morbidity and mortality.

## 1. Introduction

Kuwaiti college students may face the risk of overweight and obesity due to dynamic changes in their level of physical activity and caloric intake [1–6]. The literature from the Middle East shows high levels of physical inactivity among adults [7, 8], so it is important to determine the influences on physical activity prior to adulthood in order to intervene appropriately.

There are several components of energy expenditure and each expends a portion of the total energy. These components include BMR or resting metabolic rate, which expends 60–70% of the total energy, the thermic effect of food, which expends 10–15% of the total energy, and physical activity which expends a range of zero to >50% in

accomplished athletes. The first two components (BMR and the thermic effect of food) are known to be constant. It has been concluded therefore, that physical inactivity, perhaps, accounts mainly for the surplus energy that is stored in the body as fat, in turn leading to obesity [9]. Physical activity must be increased and sedentary behaviour decreased in order to reduce BMI [10].

College students from other countries have been found to have poor physical activity habits [11], leading to unhealthy body mass indexes. Maintaining a healthy diet and appropriate level of exercise is often recommended for long-term treatment of overweight and obesity to ensure that a proper lifestyle is sustained throughout an individual's lifespan. Increased physical activity among college students would be helpful in preventing overweight and obesity and their

resulting chronic diseases such as noninsulin-dependent diabetes mellitus (NDDM), coronary heart disease (CHD), stroke, osteoporosis, some forms of cancer, and gall bladder disease [11–13].

The purpose of this study is to explore the social and health factors associated with physical activity among Kuwaiti college students in order to facilitate program and policy changes to reduce obesity in college student populations.

## 2. Methods

**2.1. Sample.** Kuwait has one University with a total of 20,000 students (Registrar Office, 2005). Kuwaiti college students coming in to register on the mornings of the first five days of registration in the spring semester were included in this study. These students came from various sociodemographic backgrounds of Kuwait. The total number of students studied was 787 out of 6500 who were eligible to register. They were assembled into a side room and asked by trained volunteer students to have their weight and height measured by a nurse and to fill out a questionnaire, which contained information on their social and health factors. This research focused on collecting opinions and knowledge about college students' social and health factors, and all participants were highly literate adult students from the College of Medical Sciences of the University of Kuwait. As such, our study was exempted from the University of Kuwait's institutional ethics approval due to its noninvasive nature. This study posed no risk to participants. In recent years, increasing attention has been given to the importance of protecting human subjects and to the "informed consent" process. Accordingly, we obtained "informed consent" from each participant prior to administering our survey—ensuring that the prospective subject appreciated the consequences of their participation. To ensure data confidentiality we did not collect any personal identifiers on participants.

**2.2. Measurements.** The index of adiposity used in the study was the body mass index (BMI), which is the weight in kilograms divided by the height in meters squared ( $\text{kg}/\text{m}^2$ ). BMI categories were classified according to the WHO as follows: overweight ( $\text{BMI} > 25\text{--}30\text{ kg}/\text{m}^2$ ); obese ( $\text{BMI} > 30\text{ kg}/\text{m}^2$ ) (WHO, 1990). Weight and height were each measured three times and the average of each was taken to be used in the BMI calculation. The weights and heights were measured by an experienced nurse who was trained by the author on how to use the scale and the stadiometer. A precalibrated digital SECA scale was used to measure weight. A digital SECA scale was used to measure weight. The scale was periodically recalibrated with a known weight. Weight was measured to the nearest 0.1 kg with the subject in light indoor clothes, with emptied pockets and without shoes. A specially designed portable stadiometer was used to measure height. The stadiometer was provided with a spirit level to ensure that it is parallel to the flat hard floor during measurement. Height was taken while the subject was standing without shoes to the nearest 0.1 cm.

**2.3. Associated Factors.** Physical inactivity was defined as the state whereby the individual does not engage in regular physical activity for the sake of better health, self-reported by participants. Associated factors were selected based on related literature; both factors from similar studies as well as factors the authors felt may be relevant based on experience were included. Gender was divided into two categories: male, female. Age was divided into four categories:  $\leq 18$ , 19–20, 21–22,  $\geq 23$ . The following domains were broken into subfactors.

**Academics.** College major: nonscience, science; current college GPA: high for A, medium for B, low for C, or below; highest desired degree: college, higher.

**Health.** Body mass index ( $\text{BMI kg}/\text{m}^2$ ): nonobese, obese; Dental status: healthy, treated, unhealthy; suffering from a chronic disease: yes, no; last dental or physical checkup: do not remember, more than two years ago, a year ago, last few months; high school study: science, non-science; high school GPA: high for A, medium for B, low for C, or below.

**Family.** Marital status: never married, ever married; number of brothers and sisters:  $\leq 4$ , 5–6,  $\geq 7$ ; total number of siblings:  $\leq 4$ , 5–6,  $\geq 7$ ; number of obese brothers/sisters: none, 1–2,  $> 3$ ; number of obese relatives: number, none; parental obesity: neither, father, mother, both; parents' education: low for illiterate or elementary education, medium for intermediate and high school education, high for intermediate and higher education; parents' occupation: working, not working; relation between parents: first cousins, related, not related.

**Socioeconomics.** House type: private, government, rent; family monthly income into three: low ( $< \$1500$ ), medium ( $\$1500\text{--}\$3000$ ), high ( $> \$3000$ ); number of servants:  $\leq 1$ , 2–3,  $\geq 4$ ; number living at home: zero or none, few or 1–6, medium or 7–10, high or  $\geq 11$ .

**Activities and Interests.** Practice sport(s): yes, no; countries preferred for visiting: western, eastern, both, neither.

**Dieting and Nutrition.** Number of meals eaten per day: 1, 2, 3; eating between meals: yes, no, sometimes; dieting: yes, no.

**2.4. Data Analysis.** The SPSS (Statistical Package for the Social Sciences, Windows version 11.5, 2001; SPSS Inc., Chicago, Ill., USA) was used for data analysis. The chi-square test was used to assess the association between categorical variables. Logistic regression analysis was carried out using a binary variable: physically inactive or active as a dependent variable and the associated variables above as independent variables. Associated variables were entered into logistic regression simultaneously. The logistic regression approach provides an adjusted odd ratio (OR; estimated relative risk) attributed to the independent variable in relation to a reference group. A  $P$ -value of  $\leq .05$  was used as the criterion of statistical significance.

TABLE 1: Factors associated with physically active and inactive Kuwait University students ( $n = 787$ ). Chi-squared analysis for association.

Factor	$n$	Physical activity level				$P$ -value
		Active		Inactive		
		$n$	(%)	$n$	(%)	
Gender						<.001
Male	378	251	(58.0)	127	(35.9)	
Female	409	182	(42.0)	227	(64.1)	
Marital status						<.05
Never married	695	392	(90.5)	303	(85.6)	
Ever married	92	41	(9.5)	51	(14.4)	
BMI (Body mass index, kg/m <sup>2</sup> )						<.05
Nonobese ( $\leq 30$ )	695	393	(90.8)	302	(85.3)	
Obese	92	40	(9.2)	52	(14.7)	
Last dental checkup						<.01
Do not remember	433	215	(49.7)	218	(61.6)	
About 2 years ago	82	48	(11.1)	34	(9.6)	
About a year ago	128	82	(18.9)	46	(13.0)	
About a month ago	144	88	(20.3)	56	(15.8)	
Last health checkup						<.01
Do not remember	556	283	(65.4)	273	(77.1)	
About 2 years ago	71	48	(11.1)	23	(6.5)	
About a year ago	82	56	(12.9)	26	(7.3)	
About a month ago	78	46	(10.6)	32	(9.0)	
Being in science or non-science college						<.05
Science	417	244	(56.4)	173	(48.9)	
Non-science	370	189	(43.6)	181	(51.1)	
Desiring higher degree						<.001
Yes	331	156	(36.0)	175	(49.4)	
No	456	277	(64.0)	179	(51.1)	
Countries preferred for visiting						<.01
Western	261	154	(35.6)	107	(30.2)	
Eastern	130	72	(16.6)	58	(16.4)	
Do not visit	122	50	(11.5)	72	(20.3)	
Like to visit both	274	157	(36.3)	117	(33.1)	

### 3. Results

Those reporting to be physically inactive were 354 (45%) and the remaining 433 (55%) participants self-identified as active. Obesity was 13% among males and 10.5% among females. Table 1 displays the social and health factors that were significantly associated with physical activity after chi square analysis of the predicted associated factors. These include gender ( $P < .001$ ), marital status ( $P < .05$ ), level of BMI or being nonobese or obese ( $P < .05$ ), last dental and health checkup ( $P < .01$ ), desiring a higher degree ( $P < .001$ ), and countries preferred for visiting ( $P < .01$ ). The remainder of the associated factors listed under methods were not significantly associated with physical activity.

Table 2 shows the risk factors associated with physical activity from logistic regression analysis of the associated factors. Those showing significance are gender ( $P < .001$ , OR = 2.6), BMI ( $P < .05$ , OR = 1.6) desiring a higher degree ( $P < .05$ , OR = 1.5), and not visiting other countries

( $P < .01$ , OR = 1.9). Marital status and last dental and health checkup, although associated with physical activity are not risk factors.

### 4. Discussion

This study was completed using data from a group of college students who should be at the height of their youthful energy; however, many of them do not expend much energy on exercise and lead sedentary lifestyles—a finding not isolated to Kuwait [14]. Physical activity and maintaining a healthy diet play an important role in lowering the risk of chronic diseases [11], thus should be prioritized in the lives of college students. Moreover, physical activity also plays an important role in the mental health of undergraduate students [15]. Academic campuses where students spend the bulk of their time have a responsibility to promote weight management,

TABLE 2: Sociodemographic and health-related risk factors associated with physical inactivity of Kuwait University students ( $n = 787$ ). Logistic regression analysis results.

Factor	Adjusted OR (95% CI)	P-value
Gender		
Male (reference)	1.0	
Female	2.6 (1.9–3.5)	<.001
Marital status		
Never married	1.0	
Ever married	1.2 (0.7–1.9)	
BMI (Body mass index, kg/m <sup>2</sup> )		
Nonobese ( $\leq 30$ )	1.0	
Obese	1.6 (1.0–2.6)	<.05
Last dental checkup		
About a month ago	1.0	
About a year ago	0.9 (0.5–1.4)	N.S
About 2 years ago	1.2 (0.7–2.1)	N.S
Do not remember	1.3 (0.9–2.0)	N.S
Last health checkup		
About a month ago	1.0	N.S
About a year ago	0.7 (0.4–1.4)	N.S
About 2 years ago	0.7 (0.3–1.4)	N.S
Do not remember	0.8 (0.4–1.5)	N.S
Being in science or non-science college		
Science	1.0	
Non-science	1.3 (0.9–1.7)	N.S
Desiring higher degree		
Yes	1.0	
No	1.5 (1.1–1.9)	<.05
Countries preferred for visiting		
Western	1.0	
Eastern	1.1 (0.7–1.6)	N.S
Do not visit	1.9 (1.2–3.0)	<.01
Like to visit both	1.0 (0.7–1.4)	N.S

OR: odds ratio, CI: confidence interval.

mainly through decreasing dietary intake and increasing physical activity [16].

A study of students living in Alexandria University hostels showed that 86% ate unhealthy diets and 33.8% were physically inactive; a lower inactivity rate than in Kuwait, but a revealing diet statistic. Those who are already at an unhealthy weight should be provided with special attention in order to decrease their BMI and assist with learning healthy habits, especially as BMI is a risk factor for physical inactivity. Once students become overweight, they are less likely to participate in physical activity—an unhealthy cycle. Unhealthy eating habits were also found in a study of college students in Saudi Arabia [17] as well as in an evaluation

of the nutritional status of United Arab Emirates University female students [18]. Similar studies have been done in St. Lucia, demonstrating that the majority of university students participate in less than seven hours per week of physical activity [19].

Studies in other Middle Eastern countries have consistently found similar relationships between obesity and social, dietary, and health factors [20]. Unfortunately, in Arab populations obesity is not always viewed as a risk to health and female plumpness is often a positive attribute [21]. The lack of exercise facilities in Kuwait specifically for women is also a hinderance [22]. Additional targeted strategies should be used to increase the number of females engaging in physical activities at Kuwaiti colleges. Desiring a higher degree may be a risk factor for physical inactivity because of the amount of sedentary behaviour (studying, writing, etc.) required to achieve high academic performance. Not visiting other countries may play a role in physical activity levels either as an indicator of socioeconomic status which would influence dietary and physical activity patterns, or due to less exposure to lifestyle values of other societies [23]. Regardless of risk factor, these barriers to lifestyle changes can only be modified by shifts in Kuwaiti cultural norms and values.

In Kuwait, the most common excuse for not engaging in physical activity is the climate, as it is extremely hot most of the year. This unique issue can be remedied by offering candidates for weight reduction simple indoor exercises that may be termed “lifestyle physical activities”. This approach has been shown to be associated with healthier cardiometabolic gain even if weight loss is modest. In a study of obese Arab woman, a culturally sensitive lifestyle intervention was effective in reducing the components of metabolic syndrome [24]. A similar approach could be used with obese college students. The combination of “lifestyle physical activity” with dietary restrictions seem to have more positive returns than the traditional methods like dieting under the supervision of a specialist or attending a health club, which requires structured programmes of physical activity [25].

The second most prevalent excuse for not exercising is lack of time, an excuse common in all populations experiencing high rates of obesity. This is especially relevant to college students who may prioritize academics to the point where there is no time left over for exercise. In Kuwaiti culture, this can be remedied by reserving part of the day for leisure-time activities and imploring the candidate, even using verses from the Quran, to engage in physical activity as God planned for him to pray five times a day at certain times, which in itself a form of physical activity. Time for physical activity must be made a part of the college day. This would require academic policy changes, but would be a change bringing great benefits. The candidate can also be advised to park his/her vehicle far away from his/her college campus, use stairs instead of elevators, make use of home-exercise gadgets, and eat at least one sensible meal daily.

The associated factors that are not risk factors should be further examined. Marital status is not a significant risk factor for physical activity, possibly because the student lifestyle of married students may have more impact than

the working lifestyle of nonstudent married couples. It is interesting, however, that last dental and health checkups were not found to be risk factors for physical activity. Cross-sectional data cannot be relied on to imply a casual relationship between most effective weight management strategies and engagement in physical activities. However, this study does have strong implications for the role colleges may play in promoting sensible diet and increased physical activity. Future studies should look into the dietary habits of those who are trying to lose weight and also analyze the types of physical activity they engage in [14].

The adolescent health promotion (AHP) scale was developed in Taiwan and is commonly used to evaluate health-promoting lifestyles [26]. There are several other similar scales [27–29]; however, the AHP has also been validated for use in China and the United States of America [30]. Validation of the AHP scale for use in middle-eastern countries such as Kuwait would be a primary step towards evaluating the current health status of college students in an effort to shape their future health outcomes. A wider and standardized evaluation of college student health-promoting behaviours will be necessary prior to supporting large interventions [31].

The increasing prevalence of obesity, decreasing engagement in physical activity, the emergence of numerous resultant health risks and the great cost of obesity necessitate heightened efforts toward controlling and reducing this trend. Teaching university students how to plan physical activity into their schedules has been found to be an effective tool in changing health behaviours and should be considered as an addition to college curriculum in Kuwait [32]. Culturally appropriate and sensitive solutions need to be implemented in order to combat this worsening issue, especially in college students who often find balancing academic commitments and lifestyle factors difficult. Kuwait's development of a national physical activity plan is a critical first step [33], although reassessment of the program goals using the above mentioned evaluation scales and suggested policy changes to ensure appropriate focus on college students and other high risk groups will be necessary for its success.

## Conflict of Interests

The authors declared that there is no conflict of interests.

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