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**Brief Report**

# Determinants of university students physical exercise: a study from Lebanon

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**Summary**

**Background:** Studies to assess the patterns of physical exercise among University students in Lebanon are lacking. The current study looks at the prevalence of physical exercise among university students in Beirut and predictors of performing physical exercise.

**Methods:** In a cross-sectional study, a proportionate random sample of university students selected from five major universities were asked to complete a self-administered questionnaire related to physical exercise, demographic, scholastic, and health risk behavioral characteristics. Physical exercise was divided into: "No"" (<0.5 h) and "Yes" (>0.5 h) per week. Chi-square tests and binary regression were conducted to determine the predictors of performing physical exercise.

**Results:** Of 2,013 students, only 26.4 % engaged in physical exercise. Predictors of performing physical exercise for males, were adoption of exercise as the method of weight control, while for females, they were living abroad, drinking excessive alcohol, and adopting exercise for weight control.

**Conclusion:** The prevalence of physical exercise among Lebanese university students is low. Weight control remains the most important predictor of physical activity in males and females.

**Keywords:** Physical exercise – Predictors – Adolescents – Lebanon.

Over the past two decades, physical exercise has gained increasing attention for its positive impact on quality of life, and its essential role in disease management and prevention. Children and adolescents are recommended to accumulate at least 60 min of moderate to vigorous physical activity on most days of the week or preferably on each day[1,2]**.** Low levels of physical exercise during adolescence may contribute to increased incidence of obesity and type2 diabetes[3,4] more symptoms of depression[5] and increased risk of sedentary behaviour[6]. In addition, lack of involvement in regular physical exercise has been reported to be associated with cigarette smoking, marijuana use, more time watching television, failure to use seatbelt while driving, and a lower perception of academic performance[7]**.**

Lebanon, following a 15-year civil war, has witnessed a drastic modification in the lifestyle of Lebanese adolescents due to Western influence in the post-war period. Recent studies on food consumption patterns of Lebanese adolescents showed a shift from healthy traditional meals to those high in saturated fats, coinciding with the opening of major international fast food chains in the country. The increasing prevalence of an overweight and obese Body Mass Index among Lebanese adolescents has been found to be higher in comparison to those in developed countries[8]. Moreover, Lebanon is now facing an emergence of chronic diseases (specifically cardiovascular diseases and diabetes) as the leading cause of morbidity and mortality[8]. Few studies in Lebanon addressed the relationship between multiple lifestyle-related health factors, and their demographic correlates. Identifying group disparities in health-enhancing or health-declining **behaviour** remains important in order to target health promotion interventions. A better understanding of the **cluster**s and demographic correlates may give additional insights to improve specific recommendations and suggest interventions.

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The aim of this study was to estimate the prevalence of regular physical exercise among university students in Lebanon, as well as to assess the predictors of such behavior.

## Methods

In Lebanon, the number of students enrolled in higher education for the academic year 1998–1999 was 113,022 (51 % females) (United Nations Development Program, 2002). Students pursuing their education at universities located in Beirut (an estimated 50 %) are believed to reflect the varied religious and socioeconomic diversity of all university students in the country. This was a cross sectional study, conducted between February and June 2001, on students from the five major universities located in Beirut (4 private and one public) each accommodating at least 500 students. Based on the number of students enrolled in each university, a proportionate random sample was selected. Participants were randomly selected, approached, interviewed within university campuses and asked to complete a self-administered anonymous questionnaire. Permission from the university administration was obtained regarding conduction of the study in addition to relevant ethical issues being taken into consideration.

The outcome of interest, performance of physical exercise, was assessed through the question: "Do you exercise regularly? If yes, specify number of hours per week". Physical exercise was classified into "No" (<0.5 h per week) and "Yes" (>0.5 h per week). The questionnaire included items on demographic, scholastic, and health risk behavioral characteristics. Demographic variables assessed were: age, gender, marital status, nationality, residence (whether alone or with family), employment status, having lived abroad for more than one year, and parents' education level. The rationale behind including the variable "having lived for more than one year outside the country" was to see whether exposure to other cultures would influence the practice of regular physical exercise. Scholastic variables assessed were: type of university (public versus private), degree pursued (graduate versus undergraduate), and field of study. Health behaviors considered were: applying normal or extreme weight control measures (such as vomiting and/or use of pills), current smoking behavior (cigarettes and/or water-pipe), alcohol consumption, and seatbelt use while driving. Excessive drinking was defined as what is equivalent to more than 7 pints of beer per week[8].

Chi-square tests were carried out to study the association between physical exercise and each of the above mentioned variables. Variables significant at the bivariate level were entered into a binary logistic regression model to determine predictors of exercise performance. Odds Ratios and 95 % confidence intervals (CI) were reported for the regression model.

## Results

2,013 students filled out the questionnaire, with an overall response rate exceeding 90 %. Participants were evenly distributed among public (50.5 %) and private (49.5 %) universities. The average age of the students was 21.0 years (Standard Deviation (SD) = 2.4), with 818 students (40.6 %) being of male gender. A total of 1,481 students (73.6 %) reported that they did not exercise regularly, whereas 532 (26.4 %) reported exercising.

Table 1 shows the distribution of regular physical exercise by demographic, scholastic and behavioral characteristics of the study participants for males and females separately. For males, a high father's educational level was associated with more exercise (34.1 % for university level compared to 21.3 % for elementary level). Adopting exercise as the method of weight control was associated with more exercise (35.4 % compared to 14.3 %). Also, wearing a seat belt while driving was associated with more exercise (36.2 % for those who always wear it compared to 23 % for those who never wear it). As for females, students who had lived abroad for more than one year were significantly more likely to perform regular physical exercise. Regular physical exercise was associated with higher maternal education. Employment status was also found to be significantly associated with physical exercise, with a greater percentage of physical exercise found among employed students. For males, adopting exercise as the method of weight control was associated with regular physical exercise and drinking alcohol was also associated with physical exercise. Finally, wearing a seat belt was correlated with exercising regularly. Other variables were not shown to be significant as indicated in Table 1.

Table 2 shows the results of the binary logistic regression model to assess the predictors of regular physical exercise. For males, students who were significantly at higher odds of performing regular physical exercise compared to "none" were those who those who adopted exercise as the method of weight control (OR = 3.288; 95 % CI: 1.353–7.992). For females, students who were significantly at higher odds of performing regular physical exercise compared to "none" were those who lived outside (OR = 1.742; 95 % CI: 1.056–2.871), drink alcohol (OR = 2.443; 95 % CI; 1.336–4.468), and adopted exercise as the method of weight control (OR = 8.716; 95 % CI: 3.834–19.818).

**Table 1.** Association between regular physical exercise and demographic, scholastic, and behavior characteristics among study participants for males and females separately.

| | males | | | females | | |
|---|---|---|---|---|---|---|
| | Regular physical exercise | | | Regular physical exercise | | |
| | Yes | No | | Yes | No | |
| | N (%) | N (%) | p | N (%) | N (%) | p |
| **Major** | | | 0.183 | | | 0.956 |
| **Health** | 24 (28.9) | 59 (71.1) | | 25 (23.4) | 82 (76.6) | |
| **Science** | 48 (30) | 112 (70) | | 75 (22.1) | 264 (77.9) | |
| **Engineering** | 61 (35.1) | 113 (64.9) | | 12 (20.7) | 46 (79.3) | |
| **Law** | 34 (25.4) | 100 (74.6) | | 34 (25.6) | 99 (74.4) | |
| **Business** | 56 (31.8) | 120 (68.2) | | 41 (22.8) | 139 (77.2) | |
| **Arts** | 30 (42.3) | 41 (57.7) | | 70 (21.5) | 255 (78.5) | |
| **Lived outside**** | | | 0.125 | | | 0.001* |
| **Yes** | 97 (36.1) | 172 (63.9) | | 92 (28.5) | 231 (71.5) | |
| **No** | 155 (30.6) | 351 (69.4) | | 150 (19.4) | 623 (80.6) | |
| **Father's education** | | | 0.048* | | | 0.067 |
| **Illiterate** | 6 (33.3) | 12 (66.7) | | 4 (19) | 17 (81) | |
| **Elementary** | 26 (21.3) | 96 (78.7) | | 36 (16.1) | 187 (83.9) | |
| **Secondary** | 82 (34.6) | 155 (65.4) | | 91 (23) | 304 (77) | |
| **University** | 141 (34.1) | 273 (65.9) | | 123 (25) | 369 (75) | |
| **Mother's education** | | | 0.064 | | | 0.004* |
| **Illiterate** | 4 (12.1) | 29 (87.9) | | 7 (19.4) | 29 (80.6) | |
| **Elementary** | 47 (33.8) | 92 (66.2) | | 37 (15.1) | 208 (84.9) | |
| **Secondary** | 106 (31.7) | 228 (68.3) | | 117 (22.9) | 395 (77.1) | |
| **University** | 96 (35) | 178 (65) | | 92 (27.9) | 238 (72.1) | |
| **Job** | | | 0.258 | | | 0.018* |
| **Yes** | 71 (35.5) | 129 (64.5) | | 47 (29.6) | 112 (70.4) | |
| **No** | 189 (31.2) | 417 (68.8) | | 206 (21.1) | 769 (78.9) | |
| **Marital status** | | | 0.781 | | | 0.596 |
| **Single** | 247 (32) | 524 (68) | | 232 (22.5) | 798 (77.5) | |
| **Married** | 8 (34.8) | 15 (65.2) | | 20 (20.2) | 79 (79.8) | |
| **Living status** | | | 0.772 | | | 0.140 |
| **Alone** | 72 (31.2) | 159 (68.8) | | 67 (25.8) | 193 (74.2) | |
| **With parents** | 184 (32.2) | 387 (67.8) | | 187 (21.4) | 686 (78.6) | |
| **Nationality** | | | 0.219 | | | 0.529 |
| **Lebanese** | 224 (32.8) | 458 (67.2) | | 230 (22.4) | 799 (77.6) | |
| **Non-Lebanese** | 27 (26.7) | 74 (73.3) | | 22 (25.3) | 65 (74.7) | |
| **University** | | | 0.354 | | | 0.139 |
| **Public** | 115 (33.8) | 225 (66.2) | | 135 (20.7) | 517 (79.3) | |
| **Private** | 147 (30.8) | 331 (69.2) | | 123 (24.4) | 382 (75.6) | |
| **Education Level** | | | 0.482 | | | 0.970 |
| **Graduate** | 35 (29.2) | 85 (70.8) | | 28 (22.6) | 96 (77.4) | |
| **Undergraduate** | 222 (32.4) | 463 (67.6) | | 229 (22.4) | 792 (77.6) | |
| **Age** | | | 0.058 | | | 0.140 |
| **< 19** | 17 (42.5) | 23 (57.5) | | 36 (28.6) | 90 (71.4) | |
| **19–21** | 130 (34.9) | 242 (65.1) | | 140 (20.6) | 539 (79.4) | |
| **> 21** | 88 (28) | 226 (72) | | 67 (22.1) | 236 (77.9) | |
| **Exercise as weight control** | | | 0.007* | | | 0.000* |
| **Yes** | 40 (35.4) | 73 (64.6) | | 110 (39.3) | 170 (60.7) | |
| **No** | 7 (14.3) | 42 (85.7) | | 7 (5.9) | 111 (94.1) | |
| **Drink Alcohol***** | | | 0.303 | | | 0.001* |
| **Yes** | 100 (34.7) | 188 (65.3) | | 59 (32.2) | 124 (67.8) | |
| **No** | 158 (31.2) | 349 (68.8) | | 194 (20.6) | 750 (79.4) | |

**Table 1** continued.

| | males | | | females | | |
|---|---|---|---|---|---|---|
| | Regular physical exercise | | | Regular physical exercise | | |
| | Yes N (%) | No N (%) | p | Yes N (%) | No N (%) | p |
| **Wear seat belt** | | | 0.032* | | | 0.000* |
| **Always** | 130 (36.2) | 229 (63.8) | | 139 (27.7) | 363 (72.3) | |
| **Sometimes** | 71 (30.2) | 164 (69.8) | | 67 (19.5) | 277 (80.5) | |
| **Rarely** | 13 (32.5) | 27 (67.5) | | 16 (26.7) | 44 (73.3) | |
| **Never** | 34 (23) | 114 (77) | | 23 (11.2) | 182 (88.8) | |
| **Smoking** | | | 0.988 | | | 0.796 |
| **Yes** | 133 (32.4) | 277 (67.6) | | 86 (22.9) | 289 (77.1) | |
| **No** | 128 (32.5) | 266 (67.5) | | 170 (22.3) | 594 (77.7) | |

* $p < 0.05$
** have lived outside the country for more than one year
*** drinks alcohol more than 7 pints per week

**Table 2.** Correlates of regular physical exercise among study participants using binary logistic regression analysis.

**Multivariate analysis for males:**

| | P-value | OR | 95 % CI (Lower) | 95 % CI (Upper) |
|---|---|---|---|---|
| **Constant** | 0.000 | | | |
| **Exercise as weight control** | 0.009 | 3.288 | 1.353 | 7.992 |

**Multivariate analysis for females:**

| | P-value | OR | 95 % CI (Lower) | 95 % CI (Upper) |
|---|---|---|---|---|
| **Constant** | 0.000 | | | |
| **Exercise as weight control** | 0.000 | 8.716 | 3.834 | 19.818 |
| **Lived outside*** | 0.030 | 1.742 | 1.056 | 2.871 |
| **Drink alcohol**** | 0.004 | 2.443 | 1.336 | 4.468 |

* have lived outside the country for more than one year
** drinks alcohol more than 7 pints per week

## Discussion

In our study, we found that 26.4 % of university students engaged in regular physical exercise. Proportionate random samples were selected from the five major universities in Beirut to ensure representation of participants of different genders and different socioeconomic groups.

Factors that were positively associated at the bivariate level with regular physical exercise (Table 1) in males and females were father's and mother's level of education respectively. A previous report showed that regardless of the type of support provided, girls who had high levels of support from at least one parent were more likely to report being highly physically active. Interventions to increase physical activity were more beneficial in the presence of a parental component to encourage support and self-efficacy, and as in our study, younger adolescents appear to be especially influenced by their same-sex parent[9]. Another common positive correlate in males and females with physical activity was using seatbelt. This is in conformity with the fact that positive and negative health behaviors tend to cluster separately[10] and suggests that young physical exercisers who are health conscious are compliant with the law and self-protection.

The multivariate analysis (Table 2) showed, both males and female students were more considerate of physical activity if it helped reducing body weight. In one study, students who experienced more situational body dissatisfaction exercised for appearance and weight control[11].

Surveys of college students' health habits indicate that about 35 % to 37 % report having a regular schedule of physical exercise, defined as activities that made them breathe hard for at least 20 min on three or more days per week[12]. Similarly, data on college students' exercise behavior revealed that a sedentary lifestyle (inactive or irregular exercise) characterizes a

substantial proportion (46 %) of adolescents on campus[13] and that sedentary lifestyles increased with age, especially after adolescence[14] .Our study showed much higher levels of inactivity among our students (73.6 %), with females being more sedentary than males.

The relatively low percentage of adolescents who exercise regularly in the present study could perhaps be a reflection of several reasons documented in the literature. Barriers to physical exercise encountered include lack of awareness about the benefits of physical exercise and negative attitudes towards physical education[15], time constraints[16], lack of accessibility to sports facilities due to financial burdens[17], and lack of positive parental role models[18]. Aspects peculiar to Lebanon include: small number of schools that include or emphasize on physical education in their curricula; lack of parks, public beaches, walking/bicycle lanes; scarcity of sports facilities and expensive membership fees in the ones available. Thermore the revival of old methods of tobacco use exemplified by water-pipe, a recent fashionable social habit, poses additional health risks and encourages inactivity[19] .The result is that leisure-time physical exercise remains inaccessible to a vast segment of the population.

As in other studies[12], girls engage in less leisure-time physical exercise than males. Possible explanations might be related to differential development of motor skills, and greater interest towards sports and physical exercise[20] and a means of achieving a well-built physique. Special to the Lebanese females, adolescent girls have been acculturated to emphasize thinness, staying in shape and self-presentation. Adolescents Lebanese university students were found to follow risky weight control more than regular exercise to reduce their weights and maintain a slim image[21].

For females, living outside the country for more than one year, exposure to the upper-middle and high income countries may have contributed to the adoption of physical activity, and promotion of health consciousness and awareness. Females who consume more alcohol, may have adapted to western life habits and became more receptive to women's dinking .Although in one study, physical activity was found to be associated with alcohol consumption[22], data on alcohol intake and physical activity remain confusing and inconsistent. The fact that males did not emphasize alcohol drinking, may have resulted from considering alcohol a cultural tradition rather than a risk behavior. Alcohol drinking in Lebanon, is popular specifically in the form of Arak, a homemade type of alcohol offered as hors d'oeuvres with the Maza: a famous Lebanese specialty.

Of significance is the fact that employed students tend to be more involved in "high" physical exercise than non-employed ones. Although time constraints and job responsibilities may hinder university students from practicing sports regularly[13], working students may be more efficient in time management and/or have financial resources needed to join health clubs.

A major limitation in the study lies in the cross-sectional nature of the study where causalities cannot be implied. The study also lacks a validated tool to measure physical exercise among university students. As such, the accuracy of assessing pattern of behavior as reported by the students instead of being objectively measured, may have resulted in imprecision that have influenced the results. Despite this, the study was the first to provide data addressing physical exercise and associated covariates among Lebanese students.

The low prevalence of physical exercise among Lebanese university students necessitates the need for intervention strategies to promote the adoption of physical exercise in its various types, among both males and females, incorporated in the routine of their everyday life. Thus, exercise counseling for youth must be tailored to expand their knowledge about factors that promote physical exercise. Irregular exercisers should be driven into more regular patterns of performance, and encouraged to develop lifetime fitness skills, while non-exercisers need to find the motivation to initiate exercise: these motivations should take into account awareness, gender, parental support, culture, and adolescent behaviors. If staying in shape is the issue, let it be endorsed the healthy way and advertised through physical exercise and education.

In conclusion, the current findings highlight Lebanese university students, both males and females, as a high risk group for physical inactivity. Although exercise counseling for youth is vital, many interventions at the community level can be suggested and implemented. Such interventions should always be tailored to the needs of the community, and skills centered on recognizing cues and opportunities pertinent to the population studied.

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