

Pattern of vigorous physical activity among Egyptian freshmen university students

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Abstract

Objectives. To highlight the pattern of vigorous physical activity among freshmen university students and to evaluate the association between sociodemographic factors, perceived barriers, support factors, sedentary behaviours and body mass index.

Methods. A cross-sectional study was conducted on Mansoura University students at the beginning of the academic year 2008 - 2009. A total of 500 freshmen students were selected by systematic random sample. Participants responded to the short form of International Physical Activity Questionnaire and other questions.

Results. The study revealed that the prevalence of vigorous activity among the students was 9.8% (N=49) versus 90.2% (N=451) for mild and moderate activity. Body-related barriers were significantly higher among those reporting mild and moderate activities as shyness from others when doing exercise (6.9% versus 0.0%) and shyness from body looks in front of people (14.6% versus 4.1%). Lack of equipment was also perceived to be a barrier (31.0% versus 16.3%), for those doing mild to moderate versus vigorous, respectively. A significantly higher proportion of persons doing vigorous activity reported the influence of support factors such as perceived benefit for health (53.1% versus 33.7%), encouragement from others (53.1% versus 30.4%) and participation from others (51.0% versus 23.9%), compared with the more sedentary students. The majority of both groups spent <4 hours daily in front of a computer, but the overall proportion was significantly higher among those only reporting mild and moderate activity (88.0% versus 63.3%).

Conclusion. The prevalence of most of the barriers studied was higher among those reporting mild and moderate activities and support factors were higher among those reporting vigorous activity. These results highlight the importance of environmental factors, social norms and intra-personal factors in determining the pattern of activity among Egyptian freshmen university students.

Introduction

The benefits of regularly participating in physical activity, through casual or organised activities or programmes, seeking to improve fitness, mental well-being and social relationships, are well recognised.¹ Physically inactive lifestyles present a major health problem to the populations of developed and developing nations, contributing to chronic diseases and psychological distress.² Although young people are more physically active than adults, the worldwide

increase in overweight among youth has raised concerns about the adequacy of habitual activity levels among children and adolescents. The Centers for Disease Control and Prevention reported in 2000 that nearly half of American youth aged 12 - 21 years are not vigorously active on a regular basis.³ Further, youth become increasingly less active as grades in school increases, with the most dramatic declines occurring during adolescence (ages 15 - 19 years) and young adulthood (ages 20 - 25 years).⁴ Even in adolescence,⁵ in the transition to university, and more specifically during the period of study at university, there is a decrease in the practice of moderate to vigorous physical activity.⁶

Irwin,⁷ in his systematic review on participation in physical activity amongst university students (19 studies from 27 countries, not including Egypt) concluded that less than one-half of university students in USA and Canada were sufficiently active to gain a health benefit. Also Musharrafieh *et al.*⁸ found that 26.4% of university students in Lebanon engaged in regular physical exercise. Conversely, Abdullah *et al.*⁹ found that two-thirds of Chinese university students were physically active. In 2011, the American College Health Association¹⁰ reported that college students as a population are physically inactive, with only 20% reporting participation in moderate physical activity and 30% in vigorous physical activity on a regular basis from 2008 to 2010 with slight variation over years. In Egypt, the only available study of physical activity among university students was done by Abolfotouh *et al.*¹¹ This study was conducted among 600 students attending Alexandria University hostels and reported that 33.8% of the studied sample were physically inactive.

Barriers to physical activity have been examined across a variety of populations. Although findings revealed that as barriers increased, physical activity decreased in youth and adult populations, the findings have been inconsistent in adolescent populations.¹² Body consciousness has been shown to be a barrier for female adolescents in the general population.¹³ Lack of time has been the greatest obstacle to physical activity in adolescent students.¹⁴ Also the weather, class assignments and the lack of interest or just the desire to do any other activity, have been among the most commonly mentioned barriers to physical activity by university students in the study carried by Sanz and Ponce.¹⁵ The lack of social and institutional support, as well as the physical environment, were the main barriers found by Gyurcsik *et al.*¹⁶

The aim of our study was to describe the pattern of vigorous physical activity among Egyptian freshmen university students and to evaluate the association between physical activity,

sociodemographic determinants, barriers, support factors, sedentary behaviours and BMI.

Methods

Locality

The study was carried out in Mansoura University, Egypt during the beginning of the academic year 2008 - 2009. Mansoura University was founded in 1972 in Mansoura city, Egypt and is one of the biggest public Egyptian universities. The main campus is located in Mansoura city. It comprises 13 faculties: medicine, education, science, pharmacy, dentistry, commerce, law, engineering, agriculture, nursing, veterinary medicine, physical education; as well as computer science and information systems. Four faculties are located off campus, namely arts, special education, tourism and hotels, and kindergartens.

Population

The target population included newly attending students (freshmen) of the practical sectors in Mansoura University (practical faculties of medicine, pharmacy, nursing, veterinary medicine, dentistry and the other practical faculties such as science, agriculture, computer and information, engineering), attending a routine medical checkup that is done for the first-year students in the university. The practical sectors were chosen as they were more accessible, and as first years, the students still live with their families. They represent different geographical and socio-economic strata of the community. The pattern of physical activity studied reflects physical activity during vacation time (not during the academic year). Most of these students would make use of public transportation, with a minority having access to private cars.

Sample size determination

There are approximately 6 000 first-year students. We based our sample size on an expected prevalence for vigorous physical activity in Arab young adults of 11.3%, previously reported by Al-Hazzaa.¹⁷ Using Epi-Info version 6 with 11.3% as the expected prevalence, and 8.5% as the minimal prevalence, we estimated that we would require a sample of at least 454 subjects, and increased this to 500 to be more representative. The students were selected according to a systematic sampling strategy, one in every 11 students.

Measures and data management

Demographic attributes, different forms of activity, barriers, support factors and other sedentary behaviours were assessed using a self-administered questionnaire presented in Arabic languages after obtaining oral consent from the participants. Participants reported their age, gender and residence. Socio-economic variables¹⁸ included parents' education and occupations, per capita monthly income in Egyptian pounds, family size, crowding index, and presence of audiovisual sets. Participants self-reported their frequency and duration of their physical activity during the previous week using the short form International Physical Activity Questionnaire.¹⁹ Physical activity was classified as follows:

- low — no activity is reported or some activity is reported but not enough to meet physical activity levels 2 or 3
- moderate — any of the following 3 criteria: 3 or more days of vigorous activity of at least 20 minutes per day or 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day or 5 or more days of any combination of walking, moderate or vigorous intensity activities achieving a minimum of at least 600 MET (Metabolic Equivalent)-minutes/week

Table I. General demographic and behavioural characteristics of the studied group

Studied group characters	N	%
Sociodemographic characteristics		
Gender		
Male	210	42.0%
Female	290	58.5%
Age (years)		
Mean ± SD	17.7 ± 0.7	
Residence		
Urban	305	60.6%
Rural	197	39.4%
Socioeconomic standard		
High	331	66.2%
Middle	155	31.0%
Low	14	2.8%
Activity pattern		
Practised vigorous activity	49	9.8%
Practised mild and moderate activity	451	90.2%
BMI		
Underweight	17	3.4%
Normal weight	311	62.2%
Overweight	112	22.4%
Obese	60	12.0%
Sedentary behaviour		
TV watching		
<4h	369	73.8%
≥4h	131	26.2%
Computer use		
<4h	428	85.6%
≥4h	72	14.4%
Music hearing		
	139	27.8%
Sleep hours		
<8h	428	85.6%
≥8h	72	14.4%

- high — any one of the following 2 criteria: vigorous-intensity activity on at least 3 days and accumulating at least 1 500 MET-minutes/week or 7 or more days of any combination of walking, moderate-vigorous intensity activities accumulating at least 3 000 MET-minutes/week.

One MET is the energy (oxygen) used by the body as a person sits quietly, perhaps while talking on the phone or reading a book. MET-minute/week is computed by multiplying the MET score of an activity by the minutes performed. The MET score differs according to the activity, for example walking = 3.3 METs, for moderate physical activity = 4.0 METs and for vigorous activity = 8.0 METs.

We obtained measures of height and weight. Height measurements were to the nearest 0.5 cm without shoes and weight was measured to the nearest 0.1 kg with light clothes. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Individuals with a BMI <18.5 are considered underweight, those with BMI of 18.5 - 24.9 are considered normal

Table II. Distribution of the studied group physical activity according to their personal, social, behavioural characteristics and their BMI

Studied group social and personal characters	Physical activity				Test of sig.
	Mild and moderate N=451 N %		Vigorous N=49 N %		
Gender					
Male	180	85.7%	30	14.3%	**p=0.003
Female	271	93.4%	19	6.6%	
Age (years)					
Mean ± SD	17.7 ± 0.69		17.7 ± 0.77		***p=0.64
Residence					
Urban	267	88.1%	36	11.9%	**p=0.035
Rural	184	93.4%	13	6.6%	
Socio-economic standard					
High	290	87.6%	41	12.4%	*p=0.011
Middle	149	96.1%	6	3.9%	
Low	12	85.7%	2	14.3%	
Different forms of sedentary behaviours					
TV watching					
<4h	333	73.8%	36	73.5%	*p=0.54
≥4h	118	26.2%	13	26.5%	
Computer use					
<4h	397	88.0%	31	63.3%	*p=0.000
≥ h	54	12.0%	18	36.7%	
Music hearing	126	27.9%	13	26.5%	*p=0.49
Sleep hours					
<8h	387	85.8%	41	83.7%	*p=0.41
≥8h	64	14.2%	8	16.3%	
BMI					
Underweight	16	3.5%	1	2.0%	*p=0.37
Normal weight	275	61.0%	36	73.5 %	
Overweight	105	23.3%	7	14.3%	
Obese	55	12.2%	5	10.2%	

The faculties of the students not included in the analysis as the pattern of study in these faculties have no effect yet.
 *Chi-square (χ²).
 ** Fisher's Exact test.
 *** t-test.

weight, individuals with BMI of 25 - 29.9 are considered overweight, while individuals with a BMI of 30 or more are considered obese.²⁰

Barriers and support factors to physical activity

Data on barriers to and factors in support of physical activity were collected. These were grouped according to whether they were related to physical limitations, convenience, available resource, social factors, and fitness-related issues. Participants also reported the total hours they spent watching television, playing video games, in front of computers or using the Internet and if they prefer listening to music during studying lessons.

Statistics

A nested case-control study was carried out between students with mild/moderate activity and those with vigorous activity. The com-

pleted questionnaires were subjected to revision and the collected data were coded, processed and analysed through SPSS (Statistical Package for Social Sciences) (Standard version release 16.0). The Chi-square and Fisher's exact tests were used for testing significance of categorical data, as appropriate. Student's t-test was used for continuous data as age. The significance level was considered at $p \leq 0.05$.

Results

Table I presents the characteristics of the sample, 42.0% of whom were male and 58.0% of whom were female, with a mean age of 17.7 ± 0.7 years. About two-thirds of studied groups were from urban areas and had high socio-economic status. Only 9.8% (N=49) of the students practised vigorous activity but 62.2% of the students had

Table III. Distribution of the studied group physical activity according to different types of barriers to physical activity (PA)

Different barriers to physical activity	Types of physical activity				Test of sig.
	Mild and moderate N=451		Vigorous N=49		
	N	%	N	%	
Body-related					
Shyness from others when doing exercise	31	6.9%	0	0.0%	*p=0.037
Shyness from body looks in front of people	66	14.6%	2	4.1%	**p=0.024
Convenience					
Lack of time	292	64.7%	30	61.2%	*p=0.37
Inconvenient weather	30	6.7%	4	8.2%	**p=0.43
Resource					
Lack of convenient place	142	31.5%	10	20.4%	*p=0.072
Lack of interest in PA	71	15.7%	5	10.2%	*p=0.21
Lack of facilities	140	31.0%	8	16.3%	*p=0.02
Lack of knowledge	78	17.3%	4	8.2%	**p=0.068
Social					
Lack of participation from friends	29	6.4%	5	10.2%	*p=0.23
Lack of skilled friends	15	3.3%	1	2.0%	**p=0.52
Bad behaviour of friends	10	2.2%	1	2.0%	**p=0.7
Fitness					
Too overweight to do PA	11	2.4%	0	0.0%	**p=0.32
PA is uncomfortable or difficult	78	17.3%	5	10.2%	**p=0.14

*Chi-square (χ^2).
**Fisher's Exact test.

normal BMI, 26.2% (N=131) spent more than 4 hours in front of the television but only 14.4% (N=72) spent more than 4 hours in front of the computer. Also 14.4% (N=72) of the studied group slept more than 8 hours per day and 27.8% (N=139) preferred listening to music.

As shown in Table II, the age of the sample ranged between 17 and 20 years, with a mean age of (17.7±0.7 years), with slight differences between groups. Only 6.6% of the women reported vigorous activity compared with 14.3% of men. Vigorous activity was more prevalent among urban inhabitants (11.9%) than rural ones (6.6%) (p=0.035). However, a nearly equal prevalence of vigorous activity was reported among low and high social class but much lower rates were reported among middle social class (p=0.011).

By studying the sedentary behaviours, it was found that the only significant difference between groups was for computer use, which was higher among those reporting only mild and moderate activity. For the rest of sedentary behaviours no significant differences were detected.

Although no significant difference was detected between both groups regarding BMI, it was observed that normal-weight students represented the majority among both groups with a higher per cent among the students reporting vigorous activity. Overweight and obesity were slightly more prevalent among those reporting only mild and moderate activity.

Barriers to physical activity are presented in Table III. Certain barriers were significantly more common among those reporting only

mild and moderate activities such as body-related barriers which included shyness from others when doing exercise (6.9% versus 0.0%) and shyness from body looks in front of people (14.6% versus 4.1%) and one of the resource barriers, which was lack of equipment (31.0% versus 16.3%). Other resource barriers, convenience barriers, social barriers and fitness barriers showed no significant differences between groups. However, bad weather and lack of participation by friends were barriers more commonly reported for those students participating in vigorous physical activity.

Table IV shows the distribution of different support factors for physical activity among the studied groups. Those students that engaged in vigorous physical activity more commonly reported perceived benefit for health, encouragement from others and participation from others, as support factors for participation.

Discussion

Many young people do not engage in sufficient levels of physical activity to afford the associated health benefits. The 2005 Youth Risk Behavior Surveillance Survey results indicate that only 36% of American high school students participate in at least 60 minutes per day of physical activity on a regular basis.²¹ Moreover, recent data from the National Health and Nutrition Examination Survey (NHANES) indicate that 33% of American teenagers are unfit and that this is setting the stage for health problems later in life.²²

The results of the present study showed that only 9.8% of the students practised vigorous activity. Nearly equal rates were reported

Table IV. Distribution of the studied group physical activity according to support factors to physical activity

Different support factors to physical activity	Physical activity				Test of sig.(χ^2)
	Mild and moderate N=451 N %		Vigorous N=49 N %		
Perceived benefit for health	152	33.7%	26	53.1%	p=0.006
Encouragement from others	137	30.4%	26	53.1%	p=0.001
Transportation availability	66	14.6%	10	20.4%	p=0.192
Participation by others	108	23.9%	24	51.0%	p=0.000

by Lemos *et al.*,²³ who used the IPAQ as he found that 8.4% of the university students in Spain were vigorously active. Higher rates of activity reported in other studies that assessed vigorous activity as the activity that 'made you sweat or breathe hard' engaged in for 20 minutes or more (e.g. Staten *et al.*²⁴) reported that 39% of university students in one of USA public universities were vigorously physically active. Porter *et al.*,²⁵ found that 44.3% of South African university students reported having engaged in vigorous physical activity on 5 or more of the 7 days preceding the survey. The variation of these prevalences among different countries is a reflection of the different socio-economic status, availability of facilities and also the different tools used for the assessment.

Females reported less vigorous activity than males, which is similar to the results described by others.^{26,27} This may be due to lack of time associated with their responsibilities and care-giving duties to their mothers and family and also the body-centered issues related to their shyness and religious issues in Islamic society. Also in Egyptian society, many women rarely practise physical activity except for weight loss.

Concerning residence, vigorous activity was more prevalent among urban inhabitants than rural inhabitants, and this may be due to the availability of resources such as equipped clubs, gymnasium halls and sidewalks. Conversely, nearly equal rates of vigorous activity were reported among low and high social class, but much lower rates were reported among middle social class. This may be explained, in part, as higher classes have greater access to facilities for physical activity with lower barriers. Lower social classes lack access to advanced technology and luxury items that promote sedentary behavior; they also lack private cars for transportation, making them more dependent on public and human-powered transport. This is in contrast with what was reported by Landsbaugh,²⁸ who found that as socio-economic status level increased, the amount of physical activity increased and the amount of time reported participating in vigorous activities increased.

The majority of both groups were sitting in front of computer less than 4 hours daily. Nevertheless, the time spent in front of the computer was higher among those reporting participation only in mild and moderate activity. Naomi *et al.*²⁹ reported that sedentary behaviour is a distinct category of activity and is not merely the absence of vigorous exercise. Also Samdal *et al.*³⁰ reported that it is possible for adolescents to obtain sufficient physical activity and to spend time watching TV.

There was no significant difference in BMI between groups, which is in agreement with Osman *et al.*,³¹ who found no significant relation between levels of physical activity and overweight status among obese subjects. However, Inas³² reported that increased intensity is correlated with a lower BMI.

Body-related barriers and lack of facilities were significantly higher among those reporting mild and moderate activities. These

findings are consistent with a recent study that found that the number of recreational facilities was positively associated with physical activity in a national sample of adolescents.³³ However, a more recent review concluded there was no consistent association between activity and availability of facilities.³⁴ Lack of time was slightly higher among those reporting mild and moderate activities, which is similar to that reported by Salmon *et al.*³⁵ Bowles *et al.*³⁶ suggested that perceived lack of time as a barrier could, in fact, be a reflection of a lack of self-motivation rather than a legitimate obstacle to regular participation in physical activities. Also, most social and fitness barriers were slightly higher among those reporting mild and moderate activities. This is in agreement with Zlot *et al.*³⁷ Also Ball *et al.*³⁸ reported that being overweight can also be perceived as a significant barrier to physical activity.

Most of the support factors for physical activity were significantly higher among those reporting vigorous activities. This is in agreement with McNeill *et al.*³⁹ Also Norman *et al.*⁴⁰ stated that family support is an important modifiable factor for reducing sedentary behaviour in children and adolescents.

Limitations

This study had many limitations. It is cross-sectional, and as such causal inferences for both barriers and support factors cannot be made. In addition, it was based on self-report measures of physical activity. Finally, we opted to evaluate only leisure-time physical activities, therefore individuals who did not meet the physical activity guidelines in this study may have been active in other domains (occupation, commuting and housework).

Conclusion and recommendations

Low levels of leisure-time vigorous physical activity were found among freshmen students in the current study. There was a positive relationship between the number of perceived barriers and physical inactivity. However, the support factors were strongly related to vigorous activity. In order to increase leisure-time physical activity, policymakers should focus their interventions on strategies designed to increase awareness of particular aspects of physical activity, which in turn may help individuals to overcome the perceived barriers to physical activity that were detected in this study. Health education programmes should stress the benefits of physical activity, different ways of practising physical activity, including walking, and providing information concerning the recommended levels of physical activity. Availability of modest clothing designed for physical activity, especially for women, may decrease shyness in this group of students. Also, the lack of availability of facilities was a barrier for activities, which may be overcome by encouraging the students to visit the Olympic Village in the university. This facility has a subsidised programme of activities running throughout the year, including tennis, squash, football, swimming, boxing and others. University pro-

grammes should encourage team building and sport competitions between students. Programmes should also encourage students to decrease their weight, as overweight and obesity appeared to have an impact on activity.

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