

Sedentary Behavior and Physical Activity in University Students: A Pilot Study.

MARTÍN G. FARINOLA, NELIO E. BAZÁN

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Address for reprints:

Lic. Martín G. Farinola
Rivera Indarte 815
(1406) CABA
Cel. 15 4092 2106
E-mail: martinfarinola@gmail.com

SUMMARY

The effectiveness of physical activity as primary and secondary prevention strategy of several chronic diseases is well documented. Sedentary behavior, a factor that has been recently introduced, is associated with these disorders and seems to act independently of the level of physical activity. Sedentary behavior refers to activities that do not increase energy expenditure substantially above the resting level. Increased levels of sedentary behaviors, independent of physical activity levels, are associated with increased risk of obesity, metabolic syndrome, cardiovascular mortality and all cause mortality. We analyzed the sedentary behavior in a local university population of a group of students from the University of Flores (n = 425). The sedentary behavior and the level of physical activity were studied using the self reporting questionnaire GPAQ. We found that the sedentary behavior is a variable with a heterogeneous response. Sedentary behaviors were more frequent in women, yet the differences were non-significant. Sixteen percent of students had high levels of sedentary behaviors and, simultaneously, low levels of physical activity, with higher risk of chronic diseases. Further surveys are needed about sedentary behaviors during work, motorized transportation and spare time in the general population.

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Key words >

Sedentary lifestyle - Physical activity - Chronic disease - Mortality

Abbreviations >

PA	Physical activity	GPAQ	Global Physical Activity Questionnaire
SB	Sedentary behavior		

BACKGROUND

The effectiveness of physical activity (PA), as primary and secondary prevention strategy of several chronic diseases such as obesity, cardiovascular disease, diabetes or even premature death, has been well documented. (1)

Recently, another factor (sedentary behavior) has been introduced which is associated with the aforementioned disorders and acts independently of the PA level. Sedentary behavior (SB) refers to activities that do not substantially increase the energy expenditure above the resting level (they entail a metabolic rhythm between 1 and 1.5 MET). (2) The operating definitions, which were studied, are: time sitting, hours in front of the television and hours of screen at work.

The study of SB acquired relevance due to the fact that every day more activities of everyday life are solved in time sitting, so we have to study if the fact of being sitting may damage health. SB was significantly associated with overweight and obesity in men and women. (3, 4) This association is independent of the PA level of the participants. (5, 6) The same happens with the metabolic syndrome. (7, 8) That is, the risk of suffering from metabolic syndrome and/or obesity increases as the SB rises, independently of doing PA.

The time sitting is also positively related to mortality due to cardiovascular disease or any cause in both sexes. The relationship is gradual, the more time sitting, the higher the risk of death. These associations follow the same pattern in the group of active people as well as in the group of inactive people (Figure 1) which suggests that the risk of death for being sitting is independent of the PA level. (9, 11) Those people that simultaneously do less PA and more SB have the greatest risk (Figure 1).

The objective of the present work is to study the SB in a local university population. SB levels were determined in a sample of students from University of Flores and those people with high risk of developing chronic pathologies, that is, those people that are sedentary and insufficiently active at the same time were identified.

MATERIAL AND METHODS

Trained survey takers performed the survey through a Global Physical Activity Questionnaire (GPAQ) at school hours in an intentional sample of students of different years and degree courses not related to health at the University of Flores. The day of the survey was not previously informed and the questionnaire was answered in an anonymous and voluntary way.

The validity and reliability of the GPAQ were studied in people of different nationalities and their performance was similar to other questionnaires. (12) The GPAQ allows the analysis of PA in a scale of categories (high, moderate or low PA level) according to the existing recommendations of PA to promote health, and besides with a final item that asks about the time sitting in a typical day. (13) As there are no pre-established categories of total SB per day, people were gathered according to interquartile ranges.

For the treatment of data, descriptive statistics was used and Mann-Whitney U test was chosen to know if there are differences among groups. The confidence level was established in 95%. For the treatment of data SPSS version 11.5 software was used.

RESULTS

The rate of response was 99.8%. No questionnaire was rejected due to mistakes or omissions. The sample was made up of 187 men between 18 and 57 years of age and 238 women between 17 and 66 years of age; 70% was under 31 years of age and only one person was more than 58 years of age. PA and SB levels did not significantly differ among people under 31 years of age and the rest ($p > 0.05$), that is why age groups were not analyzed separately.

Women remained more time sitting than men, although these differences were not significant ($p > 0.05$) (Figure 2). 50% of those polled stated that they were sitting between 6 and 10 hours per day. 34% of the people were sitting 10 hours per day.

Then, data from PA and SB levels (Table 1) were crossed and those people, who having a low PA level were simultaneously in the interquartile range of great quantity of SB, were identified (here, 10 or more hours sitting). These two criteria were carried out by 66 people (16% of the total), 44 of them were women (19% of the total of women) and 22 men (12% of the total of men).

DISCUSSION

PA levels of the group of students that participated of this study were presented and discussed in a previous study. (14) This work was focused on the analysis of a

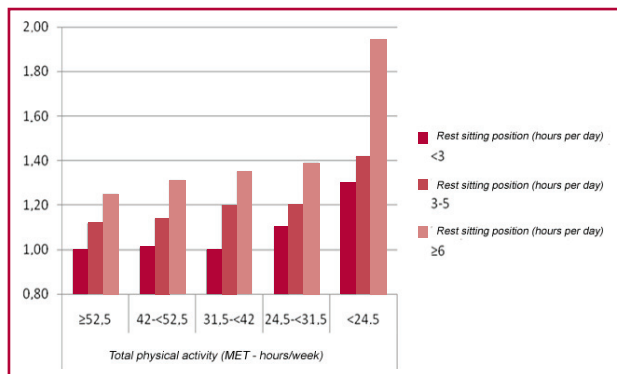


Fig. 1. Proportional indexes adjusted in a multivariate way ($p < 0.05$) for time sitting during the spare time and physical activity in relation to mortality due to any cause, for women from the Cancer Prevention Study II Nutrition Cohort, 1993-2006. Concordant results were found for men. Taken from quotation 10, Oxford University Press.

phenomenon of recent interest in the field of health; as it is the SB and its possible coexistence with low PA levels.

Recently, 4 hours or more of SB in the command of the spare time raise doubly the risk of cardiovascular disease. (11) Although the cutting point of 4 hours sitting in the spare time had been communicated in other works, (3, 4, 6-8) it should be taken with precaution since we take the risk of classifying people in the same way with different SB patterns: for instance, to a professional sportsman and an office worker that in their spare time watch television. If the worsening that the SB produces is an effect triggered by the low musculoskeletal activity, (15) we should have to measure the total exposure, that is, in all commands to assess the risk.

In our study, we have asked for the SB already performed in a typical day which includes all the commands. Although we could not make comparisons with the studies mentioned below, we could find some regularities.

SB varies from one person to another (coefficient of variation of 50%). A worrying quantity (16%) of our students (most of them women) are insufficiently active and sedentary at the same time, so they have a high risk to develop metabolic and/or cardiovascular chronic diseases. This people should not be sitting for long periods of time. (16) Besides, this shows that PA and SB may coexist in the same person, that is why the term “sedentary” is used for those people that are long periods of time sitting.

SB is a phenomenon present in our lifestyle. At the present moment, lines of research, which go from experiments to study the underlying physiological mechanism up to strategies to modify the sedentary lifestyle, are performed. (15, 16) Another topic to study is the development of techniques for measurement of SB. In our study, we use the self-reference. In

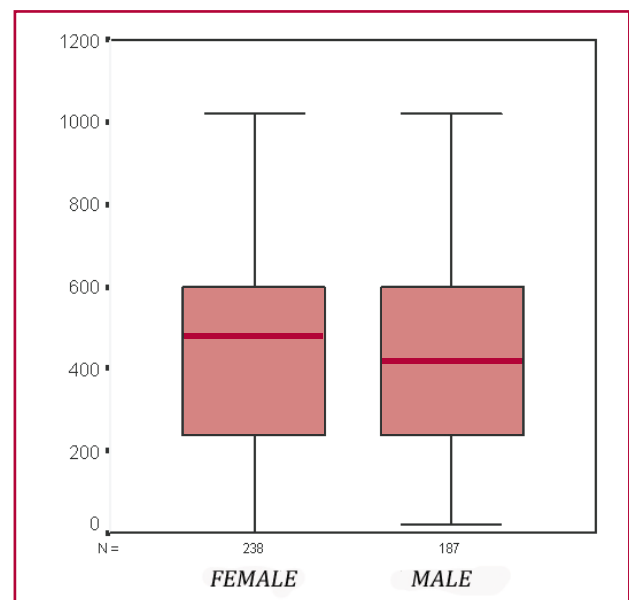


Fig. 2. Minutes sitting per day according to sex. Differences between sexes were not significant (Mann-Whitney U test, $p > 0.05$).

		Physical activity level*(32.2%)		
		Low	Moderate	High
Time sitting per day	IQR 1 (≥ 600 min.)	16%	10%	8%
	IQR 2 y 3 (241-599 min.)	10%	13%	16%
	IQR 4 (≤ 240 min.)	5%	6%	16%

*Physical activity levels were established according to the manual of the GPAQ proposed by the WHO. (13)

Table 1. Relative quantity of people within each interquartile range (IQR) of sedentary behavior according to the physical activity level (n = 425)

this sense, we should advance in the construction of instruments that may add information about the SB performed in each command. On the other hand, more objective techniques are being studied, such as accelerometers which allow us to improve the estimates of SB at a great cost. (15)

Lastly, we believe that the health study in the university population is socially relevant. We observed insufficient PA and high SB. The different universities should provide their graduates the necessary cares with the aim of having a prosperous and lasting professional life.

RESUMEN

Conducta sedentaria y actividad física en estudiantes universitarios: un estudio piloto

Introducción

La efectividad de la actividad física como estrategia de prevención primaria y secundaria de diversos trastornos crónicos ha sido bien documentada. Recientemente se introdujo otro factor, la conducta sedentaria, que se asocia con dichos trastornos y que parece actuar de manera independiente del nivel de actividad física. La conducta sedentaria hace referencia a actividades que no incrementan sustancialmente el gasto energético por encima del nivel de reposo. Niveles altos de conducta sedentaria se asocian con el padecimiento de obesidad, síndrome metabólico y mortalidad por enfermedad cardiovascular y por toda causa, con independencia del nivel de actividad física que se realice. Con el objetivo de analizar la conducta sedentaria en una población universitaria local, en un grupo de estudiantes de la Universidad de Flores (n = 425) se estudió el nivel de conductas sedentarias y de actividad física mediante el cuestionario GPAQ con la técnica de autorreferencia. Se halló que la conducta sedentaria es una variable de comportamiento heterogéneo. Las mujeres refirieron más conductas sedentarias que los varones, aunque las diferencias no fueron significativas. El 16% de los estudiantes tenían niveles altos de conductas sedentarias y niveles bajos de actividad física simultáneamente, lo que les aumenta el riesgo de padecer enfermedades crónicas. Se necesitan sondeos de conducta sedentaria durante la actividad laboral, de transporte y de ocio en la población general.

Palabras clave > Estilo de vida sedentario - Actividad física
Enfermedad crónica - Mortalidad

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Conflict of interest statement

Authors declare no conflict of interest that may affect the conducting or the report of this work.