Sedentary Life Style is Associated with an Elevated Perceived Stress

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ABSTRACT

Sousa CV, Sales MM, Moraes JFVN, Rocha PO, Santos RRC, Assis BP. Sedentary Life Style is Associated with an Elevated Perceived Stress. JEPonline 2014;17(6):90-96. Chronic stress is associated with detrimental effects on physical health that is likely to decrease a person's quality of life. Studies have indicated that regular exercise is an excellent non-pharmacological strategy to prevent and/or treat anxiety, stress, and depression. This study estimated the prevalence of elevated perceived stress among individuals with different levels of physical activity and to verify the association between both. Twenty-seven subjects (mean age, 33.5 yrs) were submitted to two questionnaires to verify their level of physical activity and perceived stress. The Fisher's exact test and chi-square were used for comparison between frequency. To verify the association between the level of physical activity and the chance of elevated perceived stress, the binary logistic regression was used. The values were presented in Odds Ratio and intervals of confidence (IC=95%). The subjects stratified as sedentary (48.1%) were 3.018 times more likely to have elevated perceived stress compared to their physically active peers. In conclusion, the results indicate that individuals who practice regular exercises have lower scores of perceived stress, and sedentary people have higher scores of perceived stress.

Key Words: Motor Activity, Mental Health, Chronic Diseases
INTRODUCTION

In a recent and elegant randomized clinical trial with 1,127 young adults, Swedes et al. (24) reported a high prevalence of perceived stress, symptoms of depression, and sleep disturbances among young adults (23%) (1). In Brazil, the prevalence of stress in bank workers can reach 50% (15). Similarly, in medical students, 49.7% of the students surveyed showed symptoms of stress (1).

It is well established that anxiety and stress can trigger factors for various diseases, such as metabolic and cognitive disorders. Anxiety and stress can even contribute to the development of some cancers by decreasing the immune responses in the human body (19,26,27). Stress, in particular, is also associated with premature death from a serious coronary or cerebral event (14). People who suffer from stress and social isolation often neglect their emotional and physical health. As a result, many adopt a sedentary lifestyle that is strongly linked to cardiovascular disease (4) and other physiological disorders such as type 2 diabetes and systemic arterial hypertension (8,19).

On the other hand, it is increasingly clear that regular exercise is an excellent non-pharmacological strategy to prevent and treat anxiety, stress, and depression (13,16,21). Systematic physical exercise is associated with positive changes in mood state, which can generate a psychological well-being that increases a person’s resistance to daily stress. Yet, for some reason, there is not even one study in Brazil that has tried to associate the level of physical activity with perceived stress.

Thus, the purpose of this study is to estimate the prevalence of elevated perceived stress among individuals with different levels of physical activity and exercise and to document the association between them.

METHODS

Subjects and General Procedures

This study consisted of 27 subjects of both sexes (10 men and 17 women) with a mean age of 33.5 ± 15.3 (range, 15 and 86 yrs of age). The short version of the International Physical Activity Questionnaire (IPAQ) validated by the Portuguese by Matsudo (18) was used to determine the subjects’ physical activity level. Perceived stress was estimated through the score analysis from the questionnaire proposed by Cohen (5), and validated for the population used by Luft (17).

The same researcher applied the questionnaires at the same hour of the day (8:00 a.m.). The subjects were free to choose which questionnaire to answer first (IPAQ or perceived stress). There was no time limit for completion. The subjects were asked to express what immediately comes to their mind, thus encouraging a response that was true of their psycho-emotional state.

Before data collection, the subjects were informed of the research procedures. Each subject signed an informed consent form in accordance with Resolution 196/96 of the National Health Council of Brazil (2).
**Statistical Analyses**

The normality and homogeneity of the data were determined using the Shapiro-Wilk and Levene tests, respectively. The data concerning the subjects’ age were expressed as mean ± standard deviation. The Fisher's exact test was used to compare frequency for groups less than five (n<5) subjects. When the number of subjects was higher than five (n>5), chi-square was used. Moreover, to verify the association between the level of physical activity and the chance of elevated perceived stress, we used the binary logistic regression of which the values were presented in Odds Ratio and intervals of confidence (IC=95%). The significance level was set at 5% (P<0.05). All procedures were carried out using the Statistical Package for Social Sciences for Windows (SPSS 15.0).

**RESULTS**

The present investigation indicates that subjects stratified as sedentary show higher scores of perceived stress (33.3%; P=0.001) compared to the physically active subjects (48.2%; P=0.001). The subjects stratified as sedentary (48.1%) were 3.018 (1.318 - 6.909) times likely to have a higher perceived stress level in comparison to the active subjects (Table 2).

**Table 1. Comparison between Sedentary and Active Rates with Perceived Stress Level.** The data are expressed in absolute (n) and relative (%) rate.

<table>
<thead>
<tr>
<th>Stress level</th>
<th>Sedentary</th>
<th>Active</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td>Elevated Stress</td>
<td>9 (33.3)</td>
<td>1 (3.7)</td>
<td>0.001</td>
</tr>
<tr>
<td>Lower Stress</td>
<td>4 (14.8)</td>
<td>3 (48.2)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Association of the Physical Activity Level and Elevated Perceived Stress** (n=27).

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>OR (IC 95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>14</td>
<td>51.9</td>
<td>1</td>
</tr>
<tr>
<td>Sedentary</td>
<td>13</td>
<td>48.1</td>
<td>3.018* (1.318 - 6.909)</td>
</tr>
</tbody>
</table>

OR – Odds Ratio: *P<0.05.

**DISCUSSION**

The purpose of this study was to compare the prevalence of elevated perceived stress between different levels of physical activity. The intent was to demonstrate that an important relationship
exists between being physically active and self-reported psychological stress. In agreement with this thinking, in addition to a body mass index in the healthy range, a low waist/hip ratio, and not smoking, Hodge et al. (11) indicated that being physically active is associated prospectively with successful aging. Sustained physical activity improves survival and the aging process, especially in regards to the perception of stress and the risk of cardiovascular diseases and metabolic disorders such as type 2 diabetes and systemic arterial hypertension (8,19).

Our findings highlight that the sedentary subjects were 3.018 (1.318 - 6.909) times more likely to have an elevated perceived stress than the active subjects. Also, it was apparent that they were more exposed to developing chronic non-communicable diseases. The deleterious effects of physical inactivity are substantially increased with the perception of high stress that predisposes individuals to increased sympathetic nerve activity (3,10). The increase in adrenergic activity may contribute to an increase in blood pressure and cardiovascular mortality.

The external stress caused by the daily activities can lead to a higher activity of sympathetic nervous system (SNS) (22), which may induce a higher secretion of catecholamines. Adrenaline is a well-known insulin-antagonist that leads to an accumulation of blood glucose, as well as promoting the hepatic glycogenolysis. If this becomes very frequent, it may lead to an insulin resistance and/or even type 2 diabetes (12). In addition, the stress induced increase in SNS activity favors the release of catecholamines that cause vasoconstriction and an increase in blood pressure.

An increase in SNS activity may also result in an increase in oxidative stress that reduces the bioavailability of nitric oxide (NO). This is not good because NO is a powerful vasodilator plus there is an associated reduction in tetrahydrobiopterin, which is an important cofactor of NO synthase. The limited NO can then lead to stimulating arterial wall inflammation and atherosclerosis with reduced functionality of the endothelium (9,10). Chronic physiological stress is also associated with a high oxidative stress, thus resulting in an accelerated cell aging that favors the emergence of non-communicable chronic diseases commented above (7).

On the other hand, regular physical activity is responsible for reducing the activation of the SNS and cortisol in response to daily stressors (6,20,25). This physiological adaptation renders active individuals less sensitive to the acute stress triggers (23), and it decreases their perceived stress levels. Hence, it is reasonable to infer that physically active individuals are more protected against the development of cardiovascular and metabolic diseases.

Although the results of the present study are interesting, they should be analyzed with caution given the small sample size, the cross-section nature of the study, and the methods used to estimate the levels of stress and physical activity. Also, the fact that catecholamine concentration and maximal oxygen consumption were not measured is a limitation of this study. Lastly, it is worth noting that the results presented in this study did not establish any cause and effect relationship.

However, despite these limitations, to our knowledge this is the first study performed with Brazilian people that report having a high prevalence of stress symptoms (1,15). We believe it is important that more studies without the limitations raised in this study will help to better understand the relationship of the level of physical activity with perceived stress.
CONCLUSIONS

The subjects stratified as sedentary (48.1%) were 3.018 times more likely to have elevated perceived stress compared to their physically active peers. These findings indicate that individuals who practice regular exercises have lower scores of perceived stress while sedentary people have higher scores of perceived stress.

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