

# Physical inactivity and symptoms of depression, anxiety and stress in adolescent students

Inatividade física e sintomas de depressão, ansiedade e estresse em adolescentes estudantes  
Inactividad física y síntomas de depresión, ansiedad y estrés en estudiantes adolescentes

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## Descritores

Adolescência; Sedentarismo; Atividade física; Depressão; Ansiedade; Estresse

## Descriptores

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## Abstract

**Objective:** To compare habitual physical activity and symptoms of depression, anxiety and stress among adolescent students of full-time and part-time public schools.

**Methods:** A cross-sectional analytical study with stratified proportional sampling by clusters, conducted in Goiânia, GO, in 2018. The sample included 516 adolescent students, 277 from part-time school and 239 from full-time school. To assess the level of physical activity, the International Physical Activity Questionnaire was applied. Screening for symptoms of depression, anxiety and stress was assessed by the Depression Anxiety Stress Scale. The chi-square test or Fisher's exact test was used to assess the categorical variables. The univariate General Linear Model (GLM) was adopted to compare continuous variables. Homogeneity correction was performed using the Levene test. The level of significance adopted was 5%.

**Results:** The mean age was  $15.95 \pm 1.15$  years old. The prevalence of adolescent part-time students who reported being independent and partially responsible for expenses was 13.4% ( $p < 0.005$ ). The general prevalence of physical inactivity was 93.5%. The frequency of full-time students who stated that life was meaningless was 13% ( $p < 0.05$ ). Students in full-time schools had a lower frequency of moderate to vigorous physical activity when compared to part-time students ( $4.10 \pm 3.60$  versus  $4.80 \pm 3.70$  days a week ( $p < 0.05$ )).

**Conclusion:** Adolescent students in the public school system showed a high rate of physical inactivity, with a higher proportion of inactive in full-time schools. Moreover, these students experience negative aspects of anxiety, stress and depression.

## Resumo

**Objetivo:** Comparar a prática de atividade física habitual e sintomas de depressão, ansiedade e estresse entre estudantes adolescentes de escolas públicas de tempo integral e parcial.

**Métodos:** Estudo transversal, analítico, com amostragem estratificada proporcional por conglomerados, realizado em Goiânia, GO, em 2018. A amostra incluiu 516 estudantes adolescentes, sendo 277 de escola de tempo parcial e 239 de escola de tempo integral. Para avaliar o nível de atividade física, foi aplicado o *International Physical Activity Questionnaire*. O rastreamento de sintomas de depressão, ansiedade e estresse foi avaliado pela Escala de Depressão, Ansiedade e Estresse para Adolescentes. Foi utilizado para avaliar as variáveis categóricas o Teste Qui-Quadrado ou Teste Exato de Fisher. Adotou-se o *General Linear Model* (GLM) univariado para comparação entre as variáveis contínuas. A correção da homogeneidade foi realizada pelo Teste de Levene. O nível de significância adotado foi de 5%.

**Resultados:** A média de idade foi de  $15,95 \pm 1,15$  anos. A prevalência de adolescentes estudantes do tempo parcial que relataram ser independentes e responsáveis parcialmente pelas despesas foi de 13,4% ( $p < 0,005$ ).

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Conflicts of interest: nothing to declare.

A prevalência geral de sedentarismo foi de 93,5%. A frequência de alunos de tempo integral que afirmaram que a vida não tinha sentido foi de 13% ( $p < 0,05$ ). Os alunos das escolas de tempo integral apresentaram menor frequência de atividade física moderada a vigorosa quando comparados aos de tempo parcial ( $4,10 \pm 3,60$  versus  $4,80 \pm 3,70$  dias por semana) ( $p < 0,05$ ).

**Conclusão:** Os estudantes adolescentes do sistema público de ensino demonstraram alto índice de inatividade física, com maior proporção de inativos nas escolas de período integral. Além disso, esses estudantes vivenciam aspectos negativos de ansiedade, estresse e depressão.

## Resumen

**Objetivo:** Comparar la práctica de actividad física habitual y síntomas de depresión, ansiedad y estrés entre estudiantes adolescentes de escuelas públicas de jornada completa y simple.

**Métodos:** Estudio transversal, analítico, con muestreo estratificado proporcional por grupos, realizado en Goiânia, estado de Goiás, en 2018. La muestra incluyó 516 estudiantes adolescentes, de los cuales 277 asistían a la escuela en jornada simple y 239 en jornada completa. Para evaluar el nivel de actividad física, se aplicó el *International Physical Activity Questionnaire*. La investigación de síntomas de depresión, ansiedad y estrés fue analizada mediante la Escala de Depresión, Ansiedad y Estrés para Adolescentes. Para evaluar las variables categóricas, se utilizó la prueba  $\chi^2$  de Pearson o la prueba exacta de Fisher. El *General Linear Model* (GLM) univariado fue utilizado para la comparación entre las variables continuas. La corrección de la homogeneidad fue realizada mediante la prueba de Levene. El nivel de significación adoptado fue del 5 %.

**Resultados:** El promedio de edad fue de  $15,95 \pm 1,15$  años. La prevalencia de estudiantes adolescentes en jornada simple que relataron ser independientes y parcialmente responsables por los gastos fue del 13,4 % ( $p < 0,005$ ). La prevalencia general del sedentarismo fue del 93,5 %. La frecuencia de alumnos en jornada completa que afirmaron que la vida no tenía sentido fue del 13 % ( $p < 0,05$ ). Los alumnos de las escuelas de jornada completa presentaron menor frecuencia de actividad física moderada a fuerte en comparación con los de jornada simple ( $4,10 \pm 3,60$  versus  $4,80 \pm 3,70$  días por semana) ( $p < 0,05$ ).

**Conclusión:** Los estudiantes adolescentes del sistema público de educación demostraron un alto índice de inactividad física, con una mayor proporción de inactivos en las escuelas de jornada completa. Además, estos estudiantes sufren aspectos negativos de ansiedad, estrés y depresión.

## Introduction

Physical activity is defined as any body movement produced by muscles, which requires energy expenditure above resting levels,<sup>(1)</sup> particularly in adolescence. It benefits everyday life, such as improving physical capacity and self-esteem, encouraging socialization and integration in social group and greater commitment in the pursuit of life goals.<sup>(2)</sup> Although the benefits of physical activity for adolescents are well established, the prevalence of physical inactivity in Brazil is 85.2%<sup>(3)</sup> and in the world is 81%<sup>(4)</sup>, using different measuring instruments.

Sedentary lifestyle affects about 60% of adolescents<sup>(3,5)</sup> and has been shown to be a risk for various organic changes during adolescence. Such organic changes are chronic non-communicable diseases such as obesity, diabetes mellitus and cardiovascular diseases.<sup>(6)</sup> The idle lifestyle of this population has been increasing with the increasing use and support of technologies (computer, smartphones, tablets), significantly reducing leisure time with physical activity.<sup>(7)</sup>

Sedentary lifestyle in students can enhance the experience of negative aspects of depression, anxiety and stress. Adolescents are vulnerable to stressful situations and can report harmful symptoms, leading to physical and mental impairment.<sup>(8)</sup> A

meta-analysis identified that physical inactivity was associated with symptoms of depression in children and adolescents.<sup>(9)</sup>

Although there are studies that have identified that physical activity is a protective factor in adults for depression,<sup>(10)</sup> anxiety<sup>(11)</sup> and stress<sup>(12)</sup>, there is a scarcity of studies regarding physical activity and symptoms of depression, anxiety and stress in adolescents.

Thus, the study aimed to compare the habitual physical activity and symptoms of depression, anxiety and stress among full-time and part-time adolescent students from state public schools in the city of Goiânia.

## Methods

This is a cross-sectional, analytical study, with stratified proportional sampling by clusters, carried out from February to July 2018, with students between fourteen and nineteen years old, of both sexes, enrolled in public full-time and part-time high schools in Goiânia, state of Goiás. The capital is considered a metropolis, located in central Brazil, with a total of 34,704 adolescents enrolled in December 2017. For the sample calculation, a total of 516 students was estimated. Of these, 277 were from a part-time

school, and 239 were from a full-time school, considering an effect size of 0.30, with an observed and expected power of 80% and  $\alpha=0.05$ , including 10% of losses. Eighteen of the 75 schools were drawn to represent all regions of Goiânia.

For the purpose of this study and based on the district division, the municipality of Goiânia was divided into Northwest, Southwest, *Mendanha*, *Vale do Meia Ponte*, North, South, East, West, and Central. The inclusion criteria were: students enrolled in the state school system in the city of Goiânia; in part- and full-time modalities; of both sexes; regular students in part- or full-time for at least two months before entering the study; and age between 14 and 19 years. The exclusion criteria were: regions that did not have part-time and/or full-time modalities; students with physical disabilities, such as paraplegia, hemiplegia; students whose guardians did not sign the Informed Consent Form (ICF); and students who did not sign the ICF.

To characterize the sociodemographic profile of students, a semi-structured form was used, consisting of information related to age; sex; housing arrangement; type of housing; family budget; monthly family income in minimum wage (MW) of reference in the 2018 Demographic Census of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*, abbreviated IBGE) (954 reais (954 reais, Brazilian currency, corresponds to about 190 US Dollars); lifestyle habits such as smoking, alcoholism, and illicit drug use.

To assess the level of physical activity of adolescent students, the short version of the International Physical Activity Questionnaire (IPAQ), validated in Brazil, was used, composed of eight open questions. The IPAQ information estimates the time spent per week in various dimensions of physical activity (walking, physical activity of moderate and vigorous intensity) and sedentary lifestyle (sitting position). The IPAQ classification records the frequency (days) and duration (minutes) in which students practice physical activity, which can be classified as very active, active, irregularly active and inactive.<sup>(13)</sup>

Using the survey carried out by the IPAQ on the level of physical activity among adolescents, the

WHO classification criteria were considered physically active (adolescents who perform at least 300 minutes of moderate to vigorous physical activity per week) or physically inactive (adolescents who perform physical activity, however insufficiently to be classified as active, as they do not comply with the WHO recommendations of 300 minutes of physical activity per week).<sup>(1)</sup> The sedentary lifestyle of these adolescent students was assessed through the average time in minutes sitting on weekdays and on weekends. Adolescents should not spend more than two hours a day in sedentary lifestyle<sup>(14)</sup>, which corresponds to ten hours during the week and four hours at the weekend (total of 14 hours per week).

From *Escala de Depressão, Ansiedade e Stress para Adolescentes* (EDAE-A), it was possible to track the depression, anxiety and stress symptoms of the research participants. This scale was adapted from the DASS-21 (Depression Anxiety Stress Scale), being validated in Brazil, consisting of 21 questions. The scores for depression, anxiety and stress are determined by the sum of the scores of the 21 items.<sup>(8)</sup> For interpretation, the sum of points corresponding to the answers was considered: 0 (it did not happen to me this week), 1 (it happened to me a few times a week), 2 (it happened to me during a good part of the week), 3 (it happened to me in most of the time of the week).

The levels of physical activity and symptoms of depression, anxiety and stress were compared between part-time and full-time students. The non-parametric distribution data were standardized by the Z score. The chi-square test/Fisher's test was used to assess categorical variables, and the univariate General Linear Model (GLM) was used to compare continuous variables. The frequencies and parameters of physical activity level and physical inactivity were determined for the general group, and were stratified by part-time and full-time modalities. The level of significance adopted was 5% ( $p < 0.05$ ).

The Research Ethics Committee of *Pontifícia Universidade Católica de Goiás* (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 74378817.9.0000.0037) approve the study, accord-

ing to guidelines for research with human beings contained in Resolution 466/2012 of the Brazilian National Health Council (*Conselho Nacional de Saúde*).

## Results

The average age of the students who participated in the study was  $15.95 \pm 1.15$  years. Of the 516 students surveyed, 242 (46.9%) stated that they lived in their own property; 38 (7.4%) owned their own financed property; 210 (40.7%) lived in rented property; 15 (2.9%) lived in conceded property; and 11 (2.1%) lived in property inherited by relatives. Regarding adolescents' family situation, 272 (52.7%) answered that their parents were married; 207 (40.1%) had divorced parents; 17 (3.3%) stated that the father is deceased; and 7 (1.4%) reported that the mother is deceased.

Full and part-time school students were similar in terms of sex and housing conditions. However, part-time school students had a larger share of family income, generally low, as shown in Table 1.

As for the level of physical activity, most of the adolescents assessed were inactive, totaling 93.5% of part-time schools and 98.3% of full-time schools (Figure 1).

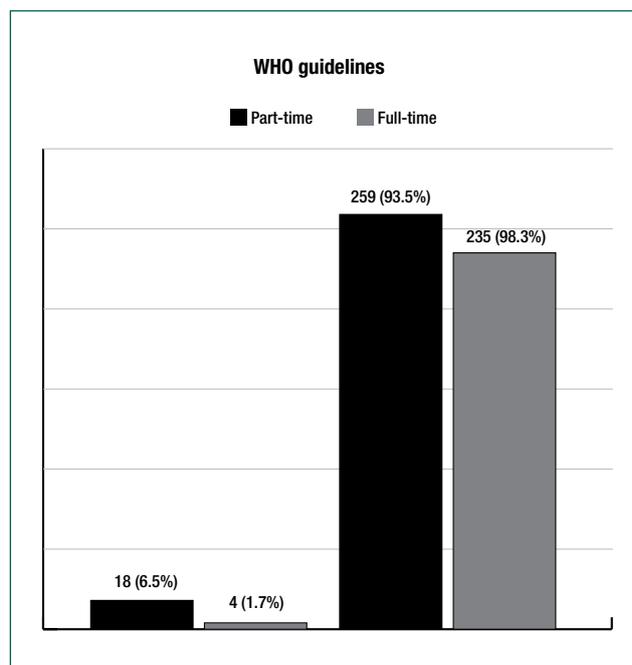
Students from full-time schools showed less frequency of physical activity related to walking ( $p=0.04$ ), total sum of physical activity ( $p=0.04$ ) and sum of moderate and vigorous physical activities ( $p=0.03$ ) (Table 2).

The sedentary lifestyle of adolescent students from both schools was evidenced when other parameters of physical activity were demonstrated, such as sitting daily for a long period. Students in full-time schools said they spent more time sitting compared to students in part-time schools ( $10.15 \pm 2.80$  versus  $9.08 \pm 3.48$  hours,  $p < 0.001$ ) on weekdays. On a weekend day, students in full-time schools also spend more time sitting ( $8.73 \pm 4.32$  versus  $9.87 \pm 4.32$  hours,  $p=0.002$ ). The average sedentary lifestyle of students in the schools assessed was  $18.78 \pm 6.23$  hours, being higher in full-time schools ( $20.03 \pm 5.51$  versus  $17.81 \pm 6.53$  hours,  $p < 0.001$ ).

**Table 1.** Characteristics of adolescents enrolled in state public schools and comparison between full-time and part-time groups

Characteristics	Total n(%)	Full-Time n(%)	Part-Time n(%)	P value
Sex (n=516)				
Male	214(41.5)	96(40.2)	118(42.6)	0.57
Female	302(58.5)	143(59.8)	159(57.4)	
Education				
1 <sup>st</sup> year	235(45.6)	104(43.5)	131(47.3)	0.59
2 <sup>nd</sup> year	189(36.6)	93(38.9)	96(34.7)	
3 <sup>rd</sup> year	92(17.8)	42(17.6)	50(18.1)	
Housing arrangement				
With family	314(60.9)	142(59.4)	172(62.1)	0.14
Alone	4(0.8)	2(0.8)	2(0.7)	
With friends	6(1.2)	0(0.0)	6(2.2)	
Shared	48(9.3)	27(11.3)	21(7.6)	
With relatives	3(0.6)	0(0.0)	3(1.1)	
With father	25(4.8)	14(5.9)	11(4.0)	
With mom	108(20.9)	50(20.9)	58(20.9)	
With siblings	8(1.5)	4(1.7)	4(1.7)	
Family budget				
Dependent on parents	414(80.2)	204(85.4)	210(75.85)	0.003*
Dependent on relatives	22(4.3)	13(5.4)	9(3.2)	
Financially independent	21(4.1)	8(3.3)	13(4.7)	
Indep. and part. resp. by exp.	47(9)	10(4.2)	37(13.4)	
Indep. and resp. by house exp.	12(2.3)	4(1.7)	8(2.9)	
Family income				
1-2 wages	287(55.6)	131(54.8)	156(56.3)	0.19
3-4 wages	185(35.9)	82(34.3)	103(37.2)	
>5 wages	44(8.5)	26(10.9)	18(6.5)	

Univariate GLM,  $p < 0.05$ . \*Caption: Indep. - independent; resp. - responsible; part. - partially; exp. - expenses



Chi-square,  $p = 0.96$

**Figure 1.** Proportion of physical activity among adolescent students according to WHO guidelines - Goiânia, Goiás, Brazil, 2018

**Table 2.** Comparison of physical activity level parameters between full-time and part-time groups

Physical activity	Days/Minutes	Total n=516	Full-Time n=239	Part-Time n=277	P value
Walking	Weekly frequency (days)	3.53±2.42	3.30±2.48	3.72±2.36	0.04*
	Length of effort (min)	52.71±48.82	50.88±49.69	54.29±48.09	0.43
Moderate	Weekly frequency (days)	2.75±2.34	2.63±2.28	2.88±2.39	0.25
	Length of effort (min)	58.98±53.73	59.87±51.64	58.21±55.56	0.72
Vigorous	Weekly frequency (days)	1.71±1.99	1.61±1.91	1.80±2.05	0.28
	Length of effort (min)	46.42±54.21	43.47±52.37	48.97±55.71	0.25
Total sum	Weekly frequency (days)	8.00±4.91	7.54±5.00	8.40±4.82	0.04*
	Length of effort (min)	158.12±111.53	154.23±109.02	161.48±13.74	0.46
Moderate and vigorous sum	Weekly frequency (days)	14.00±4.50	4.10±3.60	4.80±3.70	0.03*
	Length of effort (min)	420.00±105.40	106.65±92.40	104.33±90.30	0.77

Univariate GLM; p&lt;0.05\*

From the EDAAE-A questionnaire, it was possible to track the depression, anxiety and stress symptoms of the research participants. As for stress, of the 516 adolescents, 99 (19.2%) answered that they have difficulty in calming down most of the week; 137 (26.6%) had exaggerated reactions to situations a few times a week; 130 (25.2%) said they were quite nervous most of the week; 147 (28.5%) said that sometimes during the week they noticed that they were getting agitated and had no patience when they were interrupted; 133 (25.8%), during some times a week, found it difficult to relax, indicating symptoms of stress.

With regard to anxiety disorder, 170 (32.9%) students reported experiencing dry mouth a few times a week; 58 (11.2%) said they had difficulty breathing most of the week as well as some tremors and concerns about panic.

However, when asked whether they were about to panic, 43 (18%) full-time school students and 29 (10.5%) part-time school students said it happened a few times a week; 98 (19%) reported that the heart was racing without having made physical effort a few times a week; and 106 (20.5%) stated that they felt scared for no reason for a few times a week.

When comparing the anxiety, stress and depression symptoms of adolescent students from part-time and full-time schools, no difference was found, as shown in Table 3.

Of the 516 study participants, 232 (45%) reported that they had no positive thoughts during the week; 54 (29.8%) reported having a difficult initiative to do things a few times a week; 141 (27.3%) did not have a positive expectation a few

**Table 3.** Comparison of anxiety, stress and depression symptoms between full-time and part-time students

EDAAE-A domains	Groups	n	Mean± SD	P value
Depression	Part-time	277	7.05 ± 5.84	0.24
	Full-time	239	7.56 ± 5.81	
Anxiety	Part-time	277	5.21 ± 4.74	0.20
	Full-time	239	5.87 ± 5.05	
Stress	Part-time	277	8.50 ± 6.00	0.18
	Full-time	239	9.11 ± 5.60	
Total (EDAAE-A)	Part-time	277	20.77 ± 14.84	0.17
	Full-time	239	22.55 ± 14.50	

Univariate GLM, p&lt;0.05; EDAAE-A - Escala de Depressão, Ansiedade e Estresse em adolescentes.

times a week; 132 (25.6%) felt down and sad most of the week; 106 (20.5%) said they did not have much value as a person most of the week, indicating symptoms of depression. When compared, there was a higher proportion of “negative affects” of depression in full-time school students (p=0.03), as the adolescents reported feelings that life was meaningless for most of the week, as shown in Table 4.

## Discussion

The results of the present study indicate that adolescent students are inactive, and in full-time schools, the situation is even more serious when compared to part-time. Physical inactivity in the present study was greater than in others that used the same criterion (<300 minutes per week). Systematic review that assessed international studies identified prevalence from 65.4 to 89.0%.<sup>(15)</sup> National studies have shown prevalence of 65.5%<sup>(16)</sup> and 64.7% in boys and 81.5% in girls.<sup>(17)</sup>

Full-time schools originally deal with extending the school day, exposing the adolescent to a longer period of school activities, such as theater, dance

**Table 4.** Comparison between full-time and part-time groups regarding symptoms of depression, anxiety and stress

Statements (domain)	Statement to students during the week	Total n(%)	Full-Time n(%)	Part-Time n(%)	P value
I felt I was about to panic (anxiety)	It did not happen during the week	359(69.6)	161(67.4)	198(71.5)	0.05
	It happened a few times	72(14)	43(18)	29(10.5)	
	It happened many times during the week	52(10.1)	19(7.9)	33(11.9)	
	It happened most of the week	33(6.4)	16(6.7)	17(6.1)	
I felt scared for no reason (anxiety)	It did not happen during the week	313(60.7)	141(59)	172(62.1)	0.06
	It happened a few times	106(20.5)	47(19.7)	59(21.3)	
	It happened many times during the week	56(10.9)	35(14.6)	21(7.6)	
	It happened most of the week	41(7.9)	16(6.7)	25 (9)	
Heart racing without physical effort (stress)	It did not happen during the week	270(52.3)	117(49)	153(55.2)	0.07
	It happened a few times	98(19)	45(18.8)	53(19.1)	
	It happened many times during the week	75(14.5)	33(13.8)	42(15.2)	
	It happened most of the week	73(14.1)	04(18.4)	29(10.5)	
I felt down and sad (depression)	It did not happen during the week	171(33.1)	78(32.6)	93(33.6)	0.58
	It happened a few times	131(25.4)	55(23)	76(27.4)	
	It happened many times during the week	82(15.9)	41(17.2)	41(14.8)	
	It happened most of the week	132(25.6)	65(27.2)	67(24.2)	
I felt life was meaningless (depression)	It did not happen during the week	286(55.4)	129(54)	157(56.7)	0.03*
	It happened a few times	85(16.5)	33(13.8)	52(18.8)	
	It happened many times during the week	49(9.3)	31(13)	17(6.1)	
	It happened most of the week	97(18.8)	46(19.2)	51(18.4)	

Fisher's exact test/chi-square  $p < 0.05$ 

and sports practices during the day.<sup>(18)</sup> However, when we analyzed the results of this study, we realized that the assumption that the adolescent stays longer in school and, therefore, would do more physical activities, was not confirmed with the data obtained. On the contrary, there was a higher percentage (98.3%) of inactive adolescent students in this type of education.

The most alarming is that the sedentary lifestyle and sedentary lifestyle of adolescents are risk factors for health, predisposing them to diseases, such as metabolic syndrome, cardiovascular diseases, type 2 diabetes, sleep disturbance, anxiety, depression and stress, among others<sup>(19)</sup>.

Disorders presented during adolescence can cause damage in adulthood, with the appearance of chronic diseases, such as high blood pressure, obesity and physical inactivity. A study carried out with 963 adult patients using SUS in Bauru, SP, 73.4% of whom were female, with a mean age of 65 years, found that only 1.2% of individuals had active behavior in childhood, adolescence and age adult. Individuals active in two stages of life totaled 5.4%; in just one phase, 29.2%; and sedentary throughout life, 64.2%.<sup>(20)</sup> A similar study carried out in 2010 with adult SUS users in Goiânia (GO) found that 59.8% of this population had low levels of physi-

cal activities.<sup>(21)</sup> The high rates of physical inactivity in adolescents are worrisome, especially when it is known that this type of behavior tends to be perpetuated for the rest of life.

The frequency of sedentary lifestyle was higher than that recommended for both part-time and full-time school students; however, the last group had a longer time of sedentary lifestyle than the first, both on weekdays and on weekends, suggesting sedentary lifestyle perhaps due to the use of screens and/or school tasks. A study that assessed more than 100 thousand schoolchildren in Brazil identified 68.15% of students' sedentary lifestyle (more than two hours a day).<sup>(22)</sup> It is worrying that few adolescent students engage in physical activity and do not comply with the WHO recommendations of at least 60 minutes a day of moderate to vigorous physical activity; especially when considering the evidence that habits of habitual physical activity are important in preventing chronic non-communicable diseases.<sup>(19)</sup>

Engagement of adolescent students in physical activity programs should go beyond physical education classes, especially in full-time schools, in which students spend a good part of the day inside the institution, with theoretical tasks, sitting and with little movement in the motor part. A national study

carried out using the PeNSE 2015 questionnaire, with 16,698 adolescents, pointed out that 69.2% of students in public schools have a sports court to practice physical activity. Ninety-two percent rely on the availability of materials for sports and that 22.2% of students have access to changing rooms in conditions of use.<sup>(23)</sup>

In this sense, it is suggested that adolescent students, especially from full-time schools, should have access to physical activity in a moderate to vigorous manner for at least 60 minutes daily, inside or outside schools. It is suggested information and experiences coming mainly from schools, encourage the possibility of attitude and independence in the face of physical activity throughout their life. Studies carried out in Maringá, with 64 adolescents, and in Mandaguari, with 277 adolescents, both from the state of Paraná, demonstrated the importance of students' intrinsic motivation through extension projects, mainly the *Projeto Segundo Tempo* (Second Half Project). Such a project is present in full-time schools, stimulating the possibility of physical activity within the school, providing leisure, improving physical fitness and technical improvement in some sport.<sup>(24,25)</sup>

However, a systematic review study points out the adolescents' lack of interest in the practice of physical activity after class. Even though schools are an important setting in promoting physical activity and reducing sedentary lifestyles, the current precarious facilities in schools and excessive use of electronic devices in practical classes undermine the intrinsic motivation of physical activity developed by adolescent students in schools.<sup>(26)</sup>

Furthermore, most adolescent students experience symptoms of depression, anxiety and stress. In this study, when comparing characteristics between schools, there was a higher proportion of students from the full-time school with negative symptoms of depression. Studies show results for the tracking of episodes of depression in adolescence similar to that found in our study.<sup>(27-29)</sup>

Adolescent students also experiences, during their school day and adolescence, according to the DSM-V, negative aspects of anxiety symptoms, with statements that they felt that they were about to

panic, feeling scared for no reason.<sup>(30)</sup> Similar to our result, a study carried out with 407 adolescent students aged 14 to 18 years in the city of Maceió (AL) showed that the majority (52%) had a moderate to severe degree in the negative aspect of anxiety.<sup>(31)</sup>

Adolescents end up spending a good part of their life at school, with the social interaction necessary for their academic education; however, the school environment presents some situations of potential stress that can aggravate negative anxiety symptoms, such as answering questions in classroom, oral presentation and interaction in groups.<sup>(32)</sup>

In this setting, adolescents can be bullied, ridiculed and even victimized, stopping attending classes, distancing themselves from their peers and friendships, leading to profound effects on mental health and reinforcing school dropout.<sup>(33)</sup>

In addition to all this setting in schools and the little physical activity developed by these young people, technology seems to be an ally to the negative symptoms of anxiety and aggression. A study carried out in 2015, with 264 school adolescents from Recife (PE), showed that 99.6% of the participants have access to the internet; the most used technological device was the smartphone (65.2%) for a period of more than ten hours a day; and banning the use of technological devices reinforces feelings of aggressiveness and irritability, causing symptoms of stress.<sup>(34)</sup>

In our study, adolescent students showed, in some way, symptoms of symptoms of negative aspects of stress (72.1%); difficulty in calming down; exaggerated reactions to situations; very nervous and agitated; without patience when interrupted; and difficulty in relaxing. A study carried out with adolescent students from Florianópolis (SC) showed similar results with 76.4% of students who had a predominance of psychological stress.<sup>(35)</sup> Another study carried out in São Paulo, with 83 school adolescents, found that 49.40% of them had anxiety/depression disorders, sociability problems and aggressive behavior. Moreover, 33.33% had negative symptoms of psychological, cognitive and physiological stress.<sup>(36)</sup>

The study has limitations, as there are more effective instruments and techniques than ques-

tionnaires to assess physical activity. Such tools are electronic movement sensors for assessment of habitual physical activity and physiological identifiers; biochemical parameters for detecting symptoms of depression, anxiety and stress in adolescents or even analysis by a specialized professional. However, these methods end up making population surveys unfeasible due to the high cost of the monitors and the complex logistics of placing the devices. They involve great demand for professionals, in addition to specific technical knowledge, whether with the model, or software, or data analysis.

Questionnaires tend to overestimate the practice of physical activity when compared to other electronic and mechanical measurement procedures, such as heart rate monitors, pedometers and accelerometers.<sup>(37)</sup> However, questionnaires are less costly and easy to handle and manage, being advantageous in extensive epidemiological studies.<sup>(38)</sup>

Other studies are essential to define whether the negative aspects of depression, anxiety and stress are associated with the level of physical activity in adolescent students. The coexistence of these factors makes students prone to diseases now and in the future. It is noteworthy that schools and the family are formidable pillars similar to healthy living habits, so influences in these spheres can be ideal for promoting health and adequate living conditions.

## Conclusion

Adolescent students in the public school system showed a high rate of physical inactivity, not meeting WHO recommendations, with a higher proportion of inactive in full-time schools. Moreover, these students experience “negative affects” of anxiety, stress, and depression. We believe that this study contributed to important findings, and is an alert for public education and health systems, especially for full-time schools, as they can support public policies to encourage physical activity for adolescents in state schools; social education on the physiological benefits of exercise in the prevention of chronic diseases, mental disorders; and awareness of adolescent students about the performance and

importance of physical activities during adolescence and adulthood.

## Collaborations

Costa MPS, Schmidt A, Vitorino PVO and Corrêa KS declare that they contributed to the study design, data analysis and interpretation, writing of the article, relevant critical review of intellectual content and approval of the final version to be published.

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