PHYSICAL ACTIVITY AND ANXIETY IN STUDENTS

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SUMMARY

Introduction: Test anxiety is characterized by psychological, physiological, and behavioral reactions that occur in evaluation situations and affect academic performance and the mental health of students. Physical activity has been identified as a potential intervention to mitigate anxiety. Thus, the objective of this study is to analyze the effects of physical activity on test anxiety in students from full-time schools. **Methods:** A randomized clinical trial was conducted with 237 students from the 8th grade (final years of elementary school) to the 3rd year of high school, divided into group 01 (GPAF, n=122), which underwent a physical activity protocol: diaphragmatic and frenal breathing exercises combined with stretching, and group 02 control (GC, n=115) without the protocol. Data on body composition (bioimpedance), anxiety (CTAR25), physical activity levels (steps), and changes in heart rate variability (HRV), along with series, age, and sex, were collected from the participants. Statistical analysis was performed using a statistical package (SPSS, v 27.0, IBM), with descriptive data presented as mean, standard deviation, and parametric and non-parametric tests. **Results:** There were autonomic changes in group 1 (GPAF) compared to group 2 (GC), indicating an association between physical activity and test anxiety. The anxiety levels observed (CTAR25) showed that 78.8% of females demonstrated moderate to high anxiety and that 81.9% of students identified as sedentary. The body composition of students showed data within the normal range for age and sex. **Conclusions:** There are effects of physical activity on test anxiety.

Keywords: test anxiety; autonomic control; physical activity; mental health.

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Introduction

Test anxiety is a specific form of anxiety that occurs in evaluation or testing situations, comprising psychological, physiological, and behavioral reactions associated with concern about the results, understood as synonymous with the fear of failure, generating tension and worry (1,2). It is a response of the organism to stress, extensively studied since 1950, and negatively affects academic performance, as well as the mental health of students (1–6). In the evaluation process, tests have been widely used in educational settings (7,8), where it can occur before, during, or after assessments, generating impacts on students' lives (1,2,9,10), who may have difficulties in interpreting, evaluating, and organizing ideas to answer test items (11). The issue presented is so relevant that the World Health Organization (12) reports that one in seven young people aged 10 to 19 suffers from some mental disorder, representing 13% of the global disease burden in this age group. It is estimated that 3.6% of young people aged 10 to 14 and 4.6% of those aged 15 to 19 suffer from some form of anxiety disorder, which can evolve into depressive cases.

Given the context, various interventions have been used to cope with test anxiety, among them physical activity (PA) (13). Anxiety can be triggered by stress, one of the main causes of changes in the functioning of the autonomic nervous system (ANS) (14), which can be perceived through heart rate variability (HRV). HRV is a tool that allows for the quantification of these changes in the ANS, objectively assessing students' arousal during tests(15), and indicating the body's ability to adapt to environmental stressors(16–18). Physical activity can influence HRV and, consequently, the stress response, reducing anxiety and improving performance(19,20). However, there is a lack of consensus on the dose-response(21) and whether shorter intervention periods(6) would be sufficient to alleviate anxiety.

Given this, the hypothesis of the study is that anxiety symptoms during the evaluation process are related to physical activity (dose-response) and can be mitigated by the practice of PA, resulting in an improvement in the mental health and quality of life of adolescents. The objective of the randomized clinical trial (RCT),

therefore, was to analyze the effects of physical activity on test anxiety in full-time school students.

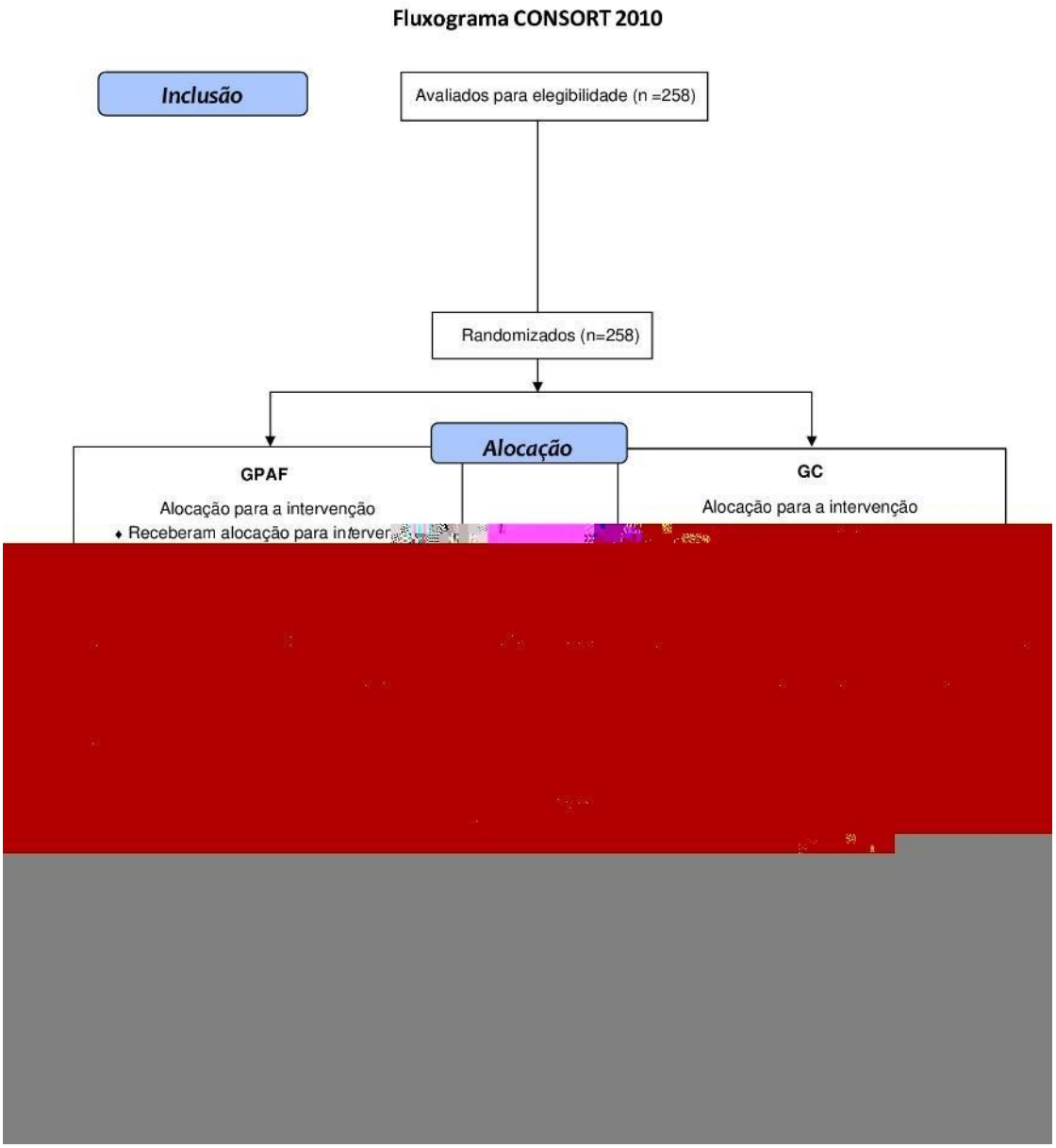
Methodology

A parallel randomized clinical study was conducted on 258 students from the public school system of Goiás, following the CONSORT 2010 standards(22,23). Approved by the Research Ethics Committee (REC) of Unievangélica – Goiás, with opinion number 6.513.144. Accepted by the Secretary of Education of Goiás, by the regional education coordinator of Anápolis-GO, and by the managers of the school units. The consent for the Free and Informed Consent Form (FICF) and the Image Use Authorization Form was obtained from the students' guardians.

Participants

The study participants attend state public schools in Anápolis – GO, in full-time schools, and are in the 8th grade of elementary school to the 3rd year of high school, aged between 13 and 17 years, do not use any antidepressant medication, do not have any disease that interferes with the measurement of heart rate variability (such as hypertension, diabetes, cardiovascular diseases), and are non-smokers. Divided into two groups (Figure 1).

Figure 1. CONSORT 2010 Flowchart



GPAF: physical activity protocol group; GC: control group.

Source: authors (2024) and (22,23).

Intervention

School tests at the Full-Time Education Centers (CEPIs) always take place on Mondays. In the week prior to the test, the students were invited to participate in the

research. They received guidance regarding the inclusion criteria and were instructed to download the Google Fit: Activity Tracking app on their smartphones. In a private room, their body composition data (bioimpedance) were collected and HRV recorded by evaluators who were unaware of the research. On Sunday, the day before the test, they used the Google Fit app to check steps, data collected. On the day of the evaluation, the students went to a reserved room and randomly received passwords 1 (GPAF) and 2 (GC). The participants were not aware of the application of the AF protocol. Group 1 (GPAF) participated in an AF protocol (diaphragmatic and frenolabiial breathing exercises associated with stretches) applied by the research professor. Group 2 (GC) followed the school routine. Both answered the CTAR25 questionnaire (Revised Cognitive Test Anxiety Scale) (5,11)

Outcome

In this RCT, the main objective was to analyze the effects of physical activity on test anxiety in full-time school students. And, it was expected that the GPAF students would show a reduction in anxiety (CTAR25) compared to the GC, verified by better autonomic regulation (HRV). Furthermore, it was expected to analyze the relationship between test anxiety and physical activity, established by the correlation between anxiety scores, the level of physical activity (steps), and body composition. It was also expected that the students would demonstrate a better stress response capacity for their physical and mental well-being.

Sample size

The estimated sample size necessary to conduct this study was 214 participants (Medcalc ® v 9.2.1.0), based on a power of 0.80 and α of 0.05 from the results of Levin's work (2011) (24). After an open invitation in the schools, 258 students obtained their guardians' consent and participated in the research.

Randomization

The procedure for allocating students was done using numbered tickets 1 (GAF) and 2 (GC), randomly distributed by employees who were unaware of the research.

Results

Although partial, the results show that the anxiety levels revealed through the CTAR25 indicate that 78.8% (female) demonstrate moderate to high anxiety and that 81.9% of the students present as sedentary (Table 1). Regarding body composition, the students present data within the normal range for age and sex (Table 2). There were autonomic changes in group 1 (GPAF) compared to group 2 (GC) (Table 3), notable by the HRV parameters, suggesting an association between physical activity and test anxiety.

Conclusion

It is concluded, up to this point, that there are effects of physical activity on test anxiety, evidenced by the HRV parameters, that the female sex shows a higher percentage of anxiety corroborating data from other studies (25), and that physical inactivity among adolescents is increasing (12). There is a need for a greater number of studies to validate the role of physical activity in coping with test anxiety, and possibly contribute to the prescription of PA (26).

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