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# Brazilian Adolescent Movement Behaviours throughout the 24-Hour Period are Associated with Anxiety Disorders and Depression Symptoms

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#### Abstract

High rates of comorbid depressive symptoms are present in adolescents with anxiety disorders; 10 to 15% of those with anxiety disorders also fit the diagnostic criteria for major or persistent depressive disorders. According to longitudinal data, there is a reciprocal relationship between anxiety disorders and depressive disorders, with major depressive disorder striking about 25% of adults with anxiety diagnoses within a year.

Keywords: Adolescents; Depression; Anxiety.

#### Introduction

Patients do, however, frequently exhibit subsyndromal depression, which is characterized by depressive symptoms that do not meet major depressive disorder diagnostic criteria but nevertheless have an impact on functioning. According to Hirschfeld, people who have both comorbid depression and anxiety disorders have more impairment in their psychosocial functioning, work functioning, and overall quality of life. A history of anxiety may indicate a concurrent susceptibility to depressive symptoms since theories propose that depression and anxiety symptoms may be caused by a similar dysregulation of negative affective psychological systems [1-3].

#### Methodology

It is commonly known that there are benefits to participating in healthy movement behaviours for symptoms of depression. According to longitudinal data, people who participate in more moderate-tovigorous physical activity (MVPA) in their early years of life have a lower chance of developing major depression in the future. For individuals with mild to moderately severe major depressive disorder, exercise therapy is acknowledged as an efficacious treatment modality. Population level evidence generally indicates that adolescents with lower levels of depression symptoms are those who limit their recreational screen time while obtaining sufficient sleep and MVPA. Therefore, encouraging healthier movement habits is probably going to help adolescents with depression both prevent and manage their symptoms [4,5].

Few studies have specifically looked at the relationships between participating in MVPA, getting enough sleep, and limiting screen time and depression symptoms, despite the fact that people with anxiety are more likely to experience depression. No studies with samples that specifically had a history of anxiety disorder were found in a systematic review of physical activity intervention studies conducted on adolescents. Given that physical activity interventions for individuals with anxiety are frequently intended to assess the potential effects of lifestyle change on reducing state anxiety, it is not entirely surprising that few intervention studies have evaluated this potential benefit [6-8].

Changes in depression as a secondary outcome in intervention studies may be biased due to floor effects unless individuals with comorbid symptoms are specifically recruited, since not all people with anxiety disorders present with comorbid depressive symptoms. However, population-based research that can evaluate the symptoms of depression in groups of people who have experienced anxiety in the past might be better equipped to demonstrate how beneficial healthy movement habits are at preventing the symptoms of depression. Adolescents with a history of anxiety disorders may not benefit from healthy movement behaviours for depression symptoms to the same extent as the general population, despite the fact that these benefits are well-documented. The advantages of healthy MVPA, sleep, or screen time may be less pronounced in adolescents with anxiety, and these individuals may have to adhere to more lifestyle targets to accrue the same benefit. Predisposing factors that increase the risk of developing depression may also mean that individuals with anxiety disorders do not experience the same degree of benefit as their peers without clinical anxiety. In contrast, adolescents with anxiety have low rates of sleep, healthy MVPA, and sedentary behaviour/screen time. Those who are able to meet targets may benefit greatly from even a small number of positive lifestyle targets [9,10].

The first hypothesis of this study is that adherence to 24-hour movement behaviour targets minimizes depression symptoms among adolescents with and without a history of anxiety diagnosis. This hypothesis is based on previous research on the relationship between movement behaviours and mental health indicators in populationbased studies. Furthermore, prior research indicated that many individuals have a tendency to experience a variety of anxiety-related symptoms following a diagnosis, and that these symptoms tend to lessen as treatment progresses. Consequently, we also postulated that after diagnosis awareness, achieving movement behaviour targets would lessen depressive symptoms. Therefore, the main goal of this study was to compare the impact of multiple movement-related lifestyle targets on depression symptom severity in adolescents who had previously been diagnosed with anxiety disorders versus those who had not. A secondary goal was to investigate whether movement behaviours' effects on the severity of depression symptoms were further moderated by treatment status or the amount of time since receiving an anxiety disorder diagnosis.

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Received: 02-Feb-2024, Manuscript No: jcalb-24-126949, Editor Assigned: 05-Feb-2024, pre QC No: jcalb-24-126949 (PQ), Reviewed: 19-Feb-2024, QC No jcalb-24-126949, Revised: 21-Feb-2024, Manuscript No: jcalb-24-126949 (R), Published: 28-Feb-2024, DOI: 10.4172/2375-4494.1000603

**Citation:** Sovosky H (2024) Brazilian Adolescent Movement Behaviours throughout the 24-Hour Period are Associated with Anxiety Disorders and Depression Symptoms. J Child Adolesc Behav 12: 603.

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J Child Adolesc Behav, an open access journal ISSN: 2375-4494

Citation: Sovosky H (2024) Brazilian Adolescent Movement Behaviours throughout the 24-Hour Period are Associated with Anxiety Disorders and Depression Symptoms. J Child Adolesc Behav 12: 603.

#### Results

This cross-sectional study examined data from the National Health Survey (PNS), which covered all of Brazil's Federative Units and was carried out by the Brazilian Institute of Geography and Statistics (IBGE) in collaboration with the Ministry of Health between August 2019 and March 2020. The purpose of the survey was to gather information about the health and way of life of Brazilians. The National Health Council and Research Ethics Committee gave their approval for the study.

Data from 4141 teenagers, aged 15 to 19 (M = 17.2, SD = 1.4), were analyzed for this study (50.0% of whom were female). Of the sample, 180 individuals, or 4.4%, self-reported having an anxiety disorder diagnosis. Adolescents with anxiety disorders were more likely to selfreport having poor sleep quality (68.9% vs. 22.4%) and not meeting any of the movement behaviour targets for the 24-hour period (15.6%).

### Discussion

The PHQ-9 scores for depression symptoms were lower in adolescents with anxiety diagnoses who met two (B: -4.93; 95%CI: -6.43; -3.44) or three (B: -5.71; 95%CI: -7.85; -3.57) movement behaviour targets than in adolescents without an anxiety diagnosis who met one (B: -6.97; 95%CI: -8.15; -5.79), two (B: -8.21; 95%CI: -9.38; -7.03), or three (B: -8.46; 95%CI: -9.66; -7.27) of the movement behaviour targets. A noteworthy correlation was observed (B: -1.89; 95%CI: -3.24; -0.55) between the presence of anxiety disorders and achieving the movement behaviour objectives.

According to the current study, adolescents with and without an anxiety disorder diagnosis reported more depressive symptoms when they did not meet the 24-hour movement behaviour targets than when they did meet one or more of the target behaviours. The biological effects of each of the 24-hour movement behaviour targets on cortisol secretion, the autonomic nervous system, the serotonergic system, and the dopaminergic system may help to explain this result.

## Conclusion

There was a clear correlation between the symptoms of depression and anxiety disorders. The associations were especially concerning for teenagers who failed to meet any of the movement behaviour targets for the 24-hour period. It is important to emphasize as a public health message that adolescents with and without an anxiety diagnosis experienced similar levels of depression symptoms when they met all three of the 24-hour movement behaviour targets.

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