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SYMPTOMS OF ANXIETY AND DEPRESSION AND SCREEN TIME IN SCHOOLCHILDREN IN THE NORTH OF MINAS GERAIS, BRAZIL

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ABSTRACT

The objective of this study was to analyze the occurrence of signs and symptoms of anxiety disorders and depression and their relationship with sociodemographic factors, anthropometric profile, level of physical activity, and screen time of schoolchildren in Montes Claros, Minas Gerais State, Brazil. This is a cross-sectional study, with a quantitative approach, which included 163 students aged between 8 and 16 years. Structured interviews and anthropometric assessments were used to assess screen time, physical activity, symptoms of depression and anxiety. The results showed that 92% of the children evaluated had screen time above the recommended level, 58.9% had low weight and 63.8% had an inadequate level of physical activity. The prevalence of symptoms of general anxiety and depression was 25.2% and 13.5%. The indices of these variables point to a need for interventions aimed at schoolchildren and education of guardians about the impact of these phenomena.

Keywords: Child development, Screen time, Comprehensive Health Care.

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INTRODUCTION

Child growth is a marker that signals children's general well-being, the existence of interpersonal and psychological stress, and the presence of chronic diseases. Child development, on the other hand, evaluates the individual level of performance that a child can perform from the maturation of their systems and the combination of genetics and the environment in which they live (Brasil, 2022). In recent years, it has been possible to notice the emergence and development of new electronic media. At the same time, there was an expansion of access to these devices by individuals in different social conditions and different age groups. In this context, especially among younger people, the high time of exposure to screens has been drawing attention, causing concerns about the harm that may be caused by its abusive use, such as a sedentary lifestyle and some behavioral changes (Brazilian Society of Pediatrics, 2019).

According to a survey of 11,875 children, ages 9 to 10, average screen time among participants was 3.79±3.07 hours/day, with children accumulating >1 hour/day of additional screen time on weekends. In this study, the majority reported that television was the medium in which the most screen time was spent, with 19.4% saying they visit pages such as Facebook, Twitter, and Instagram, despite age restriction policies (Walsh et al., 2020). These habits have been standing out from games considered traditional, elucidated by the reduction of the reduced period of physical activity of children. Thus, it is pointed out that exposure to screens is relevant in the sedentary habits that children have presented, also influencing food preferences, with a tendency to consume more caloric foods and low nutritional value, thus also contributing to their weight gain (Naima, 2023; Putri; Humayrah, 2024).

From the moment that the use of electronics is valued to the detriment of other personal relationships, such as group games and family conversations, the external component of reality, that is, the physical and psychic space of playing, is eliminated. This can harm the child's emotional, physical, and social development. (Panjeti-Madan; Ranganathan, 2023). A longitudinal study by Mougharbel et al. (2023) found significant associations between increased screen time and higher symptoms of anxiety and depression in adolescents, with the strength of these associations varying by type of screen behavior and gender. In children and adolescents, passive screen time greater than 4 hours was associated with major depressive episode, generalized anxiety disorder, and social phobia (Kim et al., 2020). With this, Dr. Victoria Dunck Ley, author of the book "Rest your

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child's brain" named a new disease that children with high screen time suffer from, the "electronic screen syndrome". The author described that the typical symptoms of this syndrome mimic psychological disorders, such as stress, anxiety, sleep problems, irritability, and mood swings, and lead to behavioral changes and cognitive problems, such as learning difficulties, poor memory, and concentration. (Kamaleddine et al., 2022).

The present study aimed to analyze the occurrence of signs and symptoms of anxiety disorders and depression and their relationship with sociodemographic factors, anthropometric profile, level of physical activity and screen time of schoolchildren in Montes Claros/MG.

METHODOLOGY

This is a cross-sectional, quantitative study that evaluated signs and symptoms of anxiety and depression, as well as screen time, anthropometric profile and physical activity of 163 schoolchildren aged 8 to 16 years enrolled in the public school system in the city of Montes Claros – MG. The students were enrolled in the fourth, fifth, eighth and ninth grades. Data collection was carried out between March and November 2023.

Data collection was carried out through structured interviews and anthropometric assessment. All data collections were carried out after training and calibration of the researchers and equipment, and after the consent of the children and guardians selected for the research, periodic meetings were planned and scheduled with the children and guardians in the schools to carry out the evaluations. Information was collected on sociodemographic aspects, anthropometric profile, level of physical activity, screen time, as well as signs and symptoms of anxiety disorders and depression.

Information on gender (male and female), age (in years), and school level (4th, 5th, 8th, 9th grade) were obtained. The anthropometric assessment of the children was based on weight, calculated using a portable digital electronic scale, platform type, PLENNA brand (Soft Step MEA-08608), with a capacity of 150 kg and sensitivity of 100 g. Height measurement was performed using the portable anthropometer SECA. In this way, the Body Mass Index (BMI) will be obtained, calculated using the following formula: BMI = Weight/(Height)2. All participants were weighed in the usual clothes of the day of the interview and without shoes. BMI was classified as below normal (below 18.5 kg/m2), normal (18.6 to 24.9 kg/m2), overweight (25.0 to 29.9 kg/m2), and obese (above 29.9

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kg/m2) (Brasil, 2022). For statistical analysis, the overweight and obesity categories were evaluated together.

To assess the physical activities habitually performed by the children interviewed, the habitual physical activity questionnaire, developed and validated by Florindo et al. in 2006, was used. The parents/guardians provided the information, which quantifies the time used for each physical activity performed by the child, added to the time used to move to the school environment, if they do it on foot or by bicycle. The time values were summed and divided into groups by daily exercise time: from 0 to 15 minutes, 15 to 30 minutes, 30 to 45 minutes, 45 to 60 minutes, and 60 minutes or more. Only those belonging to the latter group are considered adequate by the World Health Organization.

To assess screen time, the form Sedentary Leisure Activities Time was used, used by Maras et al. in 2015, which separately evaluates the time in which the interviewees use: television, video games and computers. This evaluation has answers between 0 and 5, as follows: 0 (A) = does not use electronic devices; 1 (B) = Use it for less than one hour a day; 2 (C) = from 1 to 3 hours per day; 3 (D) = from 3 to 5 hours per day; 4 (E) = 5 to 8 hours per day; 5 (F) = more than 8 hours per day. The time of use is evaluated on the 5 days of the week (from Monday to Friday) and on weekends (Saturday and Sunday). The results were calculated from the following formula: [(Monday to Friday x 5) + (Saturday and Sunday x 2)] / 7. Children who use electronic devices for more than an average of three hours a day were considered above the recommended level (Brazilian Society of Pediatrics, 2019).

To assess anxiety in children, the MASC (Multidimensional Anxiety Scale for Children) was used, which consists of a form composed of 39 items, evaluated on a four-point scale, as follows: 0 = Never; 1 = Rarely; 2 = Sometimes; 3 = Often. The questions include physical symptoms, avoidance of danger, social anxiety and separation anxiety, which are able to define the level of anxiety of the interviewee based on the sum of the answers. The cutoff point of the MASC scale for general anxiety is 56 points, and higher values indicate signs and symptoms of general anxiety (Vianna, 2008).

The evaluation of the presence of depressive symptoms in children was performed using the Children's Depression Inventory (CDI), a validated questionnaire capable of determining the significance of depressive symptoms in children. This consists of 20 multiple-choice questions that address predictive signs and symptoms of depression with alternatives between a and c. To evaluate the results, the answers are graded between 0

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and 2 points, as follows: a = 0; b = 1; c = 2. This score was added and presents significant depressive symptomatology from 17 points. (Rodrigues et al., 2016).

Based on the data released in the Statistical Package for the Social Sciences (SPSS®), version 21.0, descriptive analyses of all the variables investigated were initially performed through their frequency distributions. Binary logistic regression was used as a multivariate analysis to evaluate the association of the investigated variables with the occurrence of anxious and depressive symptoms, producing their odds ratios and 95% confidence intervals. A stepwise backward conditional adjustment method was used to define the most significant model. The level of statistical significance was 95% ($p < 0.05$).

The project complied with the existing rules in Resolution 466/12 of the National Health Council, having been approved by the ethics committee for research involving Human Beings through opinion number 5.272.580/2022.

RESULTS

In this study, 200 forms were collected from public school students, of which 37 were discarded due to not filling out properly, leaving 163 for analysis. Most participants were female (62.0%), with a mean age of 12.1 ± 2.6 years (minimum of 9 and maximum of 16 years), of the eighth and ninth years (53.4%), with low weight (58.9%), inadequate level of physical activity (63.8%), and screen time above the recommended (92.0%). The prevalence of symptoms of general anxiety and depression was 25.2% and 13.5%, respectively.

Table 1 shows a high prevalence of anxiety symptoms among female participants (85.4%), with a mean age of 12.0 ± 2.6 years, who are in school years 4 and 5 (51.2%), with low body weight (58.5%), inadequate levels of physical activity (75.6%), and excessive use of screen time (97.6%). The majority of participants with symptoms of depression were female (81.8%), with a mean age of 13.3 ± 2.5 years, mainly concentrated in years 8 and 9 (72.7%), and many also had a body mass index indicative of low weight (45.5%) and 100% had screen time above the recommended level. Furthermore, among students with depressive symptoms, it was observed that 63.6% also had concomitant anxiety symptoms. On the other hand, among students without depressive symptoms, the vast majority, 80.9%, also did not have symptoms of anxiety.

Table 2 shows that the chances of presenting anxiety symptoms were higher among female schoolchildren (OR= 4.645; p=0.002) and those with depressive symptoms

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(OR=7.142; p=0.001). In addition, it was observed that there are greater chances of having depressive symptoms among those with a higher age group (OR=1.253; p=0.049), and the presence of overweight/obesity (OR=7.225; p=0.021) and anxiety symptoms (OR=9.949; p=0.001).

TABLE 1: Frequency distribution of the study variables in relation to the occurrence of anxious and depressive symptoms in schoolchildren in Montes Claros/MG, referring to the second semester of 2023 and the first semester of 2024.

Variables	Anxiety		Depression	
Sex	Absent	Present	Absent	Present
Female (n=101)	66 (54,1%)	35 (85,4%)	83 (58,9%)	18 (81,8%)
Male (n=62)	56 (45,9%)	6 (14,6%)	58 (41,1%)	4 (18,2%)
Age (12.1 ± 2.6 years)	12.2 ± 2.6	12.0 ±2.6	12.0 ± 2.6	13.3 ± 2.5
Schooling				
4th and 5th grade (n=76)	55 (45,1%)	21 (51,2%)	70 (49,6%)	6 (27,3%)
8th and 9th grades (n=87)	67 (54,9%)	20 (48,8%)	71 (50,4%)	16 (72,7%)
Body mass index				
Low weight (n=96)	72 (59,0%)	24 (58,5%)	86 (61,0%)	10 (45,5%)
Eutrophic (n=57)	43 (35,2%)	14 (34,1%)	50 (35,5%)	7 (31,8%)
Overweight/Obesity (n=10)	7 (5,7%)	3 (7,3%)	5 (3,5%)	5 (22,7%)
Physical activity level				
Adequate (n=59)	49 (40,2%)	10 (24,4%)	53 (37,6%)	6 (27,3%)
Inadequate (n=104)	73 (59,8%)	31 (75,6%)	88 (62,4%)	16 (72,7%)
Screen Time				
Within the recommended range (n=13)	12 (9,8%)	1 (2,4%)	13 (9,2%)	0 (0,0%)
Above the recommended level (n=150)	110 (90,2%)	40 (97,6%)	128 (90,8%)	22 (100,0%)

TABLE 2: Binary logistic regression to assess the relationship between the variables studied and the occurrence of anxiety symptoms and depressive symptoms. Data represent the most significant statistical model after adjustment. RC: Odds ratio. *Statistically significant values (p<0.05).

	Variables	Categories	RC	95% CI	*p*
	Sex	Male	Reference		
		Female	4,645	1,723-12,526	0,002*
	Age		0.866	0.735-1.020	0.086
Symptoms of Anxiety	Screen time	Recommended	Reference		
		Above recommended	5.247	0.613-44.918	0.130
	Symptoms of Depression	Missing	Reference		
		Gifts	7,142	2,487-20,508	0,001*
	Age		1,253	1,000-1,570	0,049*
		Eutrophic	Reference		0.045*
	Body Mass Index	Low Weight	0,978	0,313-3,055	0,970
Symptoms of Depression		Overweight/obesity	7,225	1,354-38,551	0,021*
	Symptoms of Anxiety	Missing	Reference		
		Gifts	9,949	3,359-29,465	0,001*

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DISCUSSION

The present study evaluated behavioral, clinical and sociodemographic characteristics of a sample of children and adolescents from public schools and their relationship with the occurrence of symptoms of anxiety and depression. According to the guidelines of the Brazilian Society of Pediatrics (2019), children who use electronic devices for more than an average of three hours a day are considered above the recommended level. The present study considered the time of 3 hours as the cutoff point to determine the appropriate daily time of exposure to the screen, and identified that the vast majority of students are exposed to electronic devices for a longer time than recommended. In this context, the COVID-19 pandemic has affected the lives of children and adolescents around the world. Faced with this situation, governments were forced to institute isolation, which lasted for months. A survey that traced the percentage of smartphone use during the pandemic showed that there was an increase of 47.5%. The average use of this non-recommended habit by children alone was 6.85 hours per day, suggesting the great adoption of this non-recommended habit (Muslim et al., 2024).

Through the increase in children's screen time, exposure to sensitive and dopaminergic content increases. The use of social networks and games is among the most used activities, which tend to affect communication and family dynamics (Antawati; Resmadewi; Muttaqien, 2024). This exposure can affect the child's cognitive and physical development, leading to delays in language, memory, and attention (Gruppo et al., 2024). In addition, due to government restriction and a situation of public calamity, children have reduced the time spent playing and moving outdoors, harming the physical, social, and cognitive development that was possible in other periods (Crispim et al., 2023). Thus, inadequate exposure to screens not only increases susceptibility to mood disorders, with anxiety and depression being the most prevalent, but also favors a sedentary lifestyle and unhealthy eating habits (Rocha et al., 2022).

In addition, in the present study, it was observed that most of the schoolchildren had inadequate levels of physical activity and body mass indexes. The practice of physical activities is related to a decrease in the incidence of depression and stress-related disorders (Firth et al., 2020). A meta-analysis that gathered fifteen scientific articles, including 191,130 participants, demonstrated that the cumulative of 2.5 hours of physical activity per week reduced the risk of depression by about 25% (Pearce et al., 2022). Beneficial effects on anxiety management have also been observed when aerobic,

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resistance and yoga exercises are included (Singh et al., 2023). Possibly, there is more than one mechanism that explains this phenomenon, including the release of neuroendocrine substances, activation of the endocannabinoid system, reduction of inflammation and oxidative stress (Kandola et al., 2019). The practice of physical activity also increases caloric expenditure and insulin sensitivity, contributing to better control of metabolism and adiposity (Kanaley et al., 2022).

The high prevalence of underweight among students, identified in 58.9% of the sample, may be related to both inadequate levels of physical activity and excessive use of screens. Since most participants had screen time above the recommended level (92.0%), it is possible that this prolonged exposure is associated with a sedentary lifestyle, negatively impacting physical development. However, this association is not well documented, such as the relationship between screen time and obesity. A cross-sectional study conducted in Shanghai found that problematic smartphone use was positively associated with obesity, with variations based on educational attainment and gender. Specifically, male students and those at higher educational stages reported higher rates of obesity and problematic smartphone use (Ma et al., 2021). The association of mobile phone use and low weight can have worrying consequences for children and adolescents. This is because, usually, these young people acquire poor eating habits, forget or delay meals, and have an inadequate consumption of fruits (Ting, Chen; 2020). It is also noteworthy that contact with social networks inserts users in an environment in which beauty and eating standards may be unrealistic for the individual. The distortion of body image and the development of compulsive eating disorders then become possible for these young people (Alqahtani et al., 2024).

The low body weight observed may be a reflection of a combination of factors, including poor diet, often associated with sedentary behavior patterns. From this perspective, the World Health Organization (WHO) recommends at least 60 minutes or more of daily physical activity. Similar to the present study, another study conducted in Brazil showed that 54.8% of adolescents were classified as insufficiently active (Andrade et al., 2022). Data from the research by Buss and Ugerer (2016) showed that 80% of adolescents are physically inactive and 70% of preventable deaths in adults are related to non-communicable diseases linked to risk factors that begin in adolescence. Thus, it is possible to observe three important associations that can impact the health status of Brazilian children and adolescents: excessive use of smartphones, low weight, and low

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level of physical activity, since they act with factors that can increase the risk of developing cardiometabolic diseases, such as diabetes and hypertension (Lourenço; Souza; Mendes, 2019).

In addition, malnutrition impacts the development of children's skills and cognition, especially in the early stages of life. This environment disrupts brain development and alters the intestinal microbiota, which can influence health as a whole (Shennon et al., 2024). A study conducted in Ecuador correlated the low score on children's cognitive scores with malnutrition, emphasizing the importance of this element in the lives of the little ones (Aguilar-Paredes et al., 2023). In this aspect, since this research deals with children who are in school in a public school system, it is the duty of the State to turn its attention to this age group. Malnutrition during this period of life can impact the biopsychosocial health of this individual as an adult, generating more costs to the health system.

The WHO defines adolescence as the period from 10 to 19 years old. This stage represents a transition between childhood and adulthood, characterized by biological, psychological, and social changes. During this phase, issues such as career choice, the entrance exam, and completion of high school can generate psychoaffective changes, increasing the risk of disorders such as anxiety and depression (Feliciano et al., 2019). The investigated sample showed a high prevalence of symptoms related to anxiety and depression. Although there are few extensive studies on the subject, some studies highlight the fragility of mental health among adolescents. An observational study published by the Journal of Developmental and Behavioral Pediatrics, in the United States, revealed a 19% increase in diagnoses of anxiety disorders in children and young people aged 6 to 17 years between 2007 and 2012. This study used data collected from the National Survey of Children's Health to analyze diagnostic trends in anxiety and depression (Bitsko et al., 2018). In Brazil, a study conducted by Zuccolo et al. (2022), during the COVID-19 pandemic, reported that the weighted prevalence rates of anxiety and depression symptoms among Brazilian children and adolescents were 29.7% and 36.1%, respectively. This study emphasized the impact of the pandemic on mental health, particularly among vulnerable populations.

In the present study, the symptoms of anxiety and depression prevailed in females, with about four times more chances of anxiety occurring in girls. Psychosocial and biological factors contribute to a higher incidence of depression and anxiety among women. In this regard, a meta-analysis published in JAMA Pediatrics found that during the COVID-

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19 pandemic, the combined prevalence of clinically elevated depression and anxiety symptoms in children and adolescents was 25.2% and 20.5%, respectively. The study also noted that these rates were higher in girls and increased over time, which corroborates the data from this research (Racine et al., 2021).

Another meta-analysis published in the Annals of the New York Academy of Sciences, reported the combined prevalence of anxiety in 31% of children and adolescents during the pandemic. This study included a sample of 1,242,604 children and adolescents, in an analysis of 129 studies (Deng et al., 2021). Among the factors that contribute to the higher prevalence of anxiety and depression in girls, the following can be mentioned: biological susceptibility, influence of social media, greater chances of interpersonal violence, and stress induced by gender inequality. In addition, geographic factors must be considered, with regions where support for mental treatment is limited, such as India and some regions of Asia, which have substantially higher rates, compared to Europe and America (Deng et al., 2021; Racine et al., 2021; McIsaac et al., 2023).

In this study, it was evidenced that older students, who were in the final years of elementary school, were 25% more likely to have symptoms of depression. The prevalence of depression among Brazilian adolescents varies according to studies, but several important findings can be highlighted. According to a study by Silva et al. (2024), the prevalence of depression symptoms in a sample of 73 seventh, eighth, and ninth grade students in the city of Recife-PE was 30% using the Child Depression Inventory. Additionally, a national survey of 125,123 schoolchildren aged 13 to 17 reported that 31.4% felt sad most of the time or always, 30% felt that no one cared about them, and 21.4% felt that life was not worth living. These data add to the risk that this population faces for depression (Antunes et al., 2022). In addition, a systematic review and meta-analysis found that the overall point of self-reported depression symptoms among adolescents was 34% between 2001 and 2020, with major depression disorder being 8%, and dysthymias 4% (Shorey; Ng; Wong, 2021). These data indicate a growing concern about depression in this age group, both globally and in the Brazilian context.

The relationship between depression and the school year is also remarkable. A Chinese meta-analysis reported that the prevalence of depressive symptoms among Chinese high school students increased with higher grades, from 24.5% in the first year of high school to 40.1% in the third year of high school (Tang et al., 2019). Similarly, Mkhize et al. (2024) reported that being in a higher grade was significantly associated with depressive

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symptoms among adolescents in South Africa. Among the factors that may be related to this event, it was observed that the inability of adolescents to learn the skills expected of them is associated with increased depression, in addition to this time coinciding with changes in puberty (Hong; Zainal; Ong, 2023; Copeland et al., 2019).

The development of anxiety is influenced by biological, child development, psychological, and social/environmental factors (Garcia; O'Neil, 2021). Human development, which extends throughout life, can be affected by social and economic adversities, impacting areas such as physical, cognitive, emotional, and occupational health (Souza; Dick; Fiorati, 2019). The occurrence of depressive symptoms was observed to occur about seven times more likely to occur in overweight/obese schoolchildren compared to eutrophic students in the present study. The increased risk of depression in adolescents and children who are obese or overweight is influenced by a complex of psychological and social relationships. In this context, a meta-analysis of observational studies reported that the relative risk for developing depressive disorders in children and adolescents with obesity or overweight was 1.32, while the relative risk of depression and obesity symptoms was 1.16 (Chen et al., 2024). Among the psychological factors that influence risk is negative self-perception and dissatisfaction with body image among obese young people, which contributes to feelings of depression (Cao et al., 2023). As for social factors, it is reported that these young people are more likely to suffer from bullying and victimization, which can exacerbate or develop symptoms of isolation and depression (Hampl et al., 2023). Another aspect is that obesity is associated with subclinical inflammation and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, which are implicated in the pathophysiology of depression. Elevated levels of inflammatory markers, such as C-reactive protein and interleukin-6, have been observed in adolescents with obesity and depression (Steptoe et al., 2023, McLachlan; Shelton; Lin, 2023).

Furthermore, it was also noticed that among students with depressive symptoms, it was observed that most of them also had symptoms of concomitant anxiety. It is crucial to note that anxiety can progress to a more severe disorder as defined by the DSM-5. This disorder is characterized by a persistent state of nervousness and excessive worry about various events, which lasts for at least six months and is accompanied by three or more additional symptoms. In addition to its own implications, untreated anxiety can significantly increase the risk of developing depression. The persistence of anxious symptoms can generate a psychological environment prone to feelings of discouragement and

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hopelessness, which, in turn, can lead to comorbidity with depression. (Dalgalarrondo, 2018).

It is important, however, to mention that the cross-sectional design of this study makes it difficult to analyze the causal relationships between the variables investigated and the occurrence of anxiety and depression symptoms. The relatively high prevalence of these conditions in schoolchildren should be further explored, considering that these disorders cause damage to the individual's biopsychosocial development. The identification of risk behaviors in this population is indispensable, since the mental health of students is essential for the formation of a future Brazilian citizen. In addition, a study involving private institutions could better describe the child and adolescent population investigated and perhaps identify distinct behavioral and sociodemographic patterns, which would allow for an improvement in the generalization of the results.

In addition, the work obtained results that point to possible factors associated with the symptoms of Pandemic Fatigue, such as: being female, thinking about dropping out of the course, and having signs and symptoms of BS. Thus, the study can serve as a subsidy in the creation of a profile of individuals who suffer from this condition, and in directing future studies on the subject. Longitudinal and multicenter follow-up research will be important to identify several factors associated with pandemic fatigue and BS in university students throughout their academic lives.

However, the study portrays a solid picture of the symptoms of depression and anxiety, as well as screen time in children and adolescents in Brazilian public schools, allowing the identification of association factors in this specific group. A large presence of inadequate screen time was reported, in addition to the high occurrence of anxiety symptoms among female students and those with depressive symptoms; as well as depressive symptoms associated with older age, occurrence of overweight/obesity and anxious symptoms. These data can serve as a basis for public policies for prevention and intervention, as well as for future studies that expand the diversity of the sample and allow comparisons between different school contexts.

The study reinforces the importance of identifying and evaluating the excessive and prolonged use of electronic devices in schoolchildren so that interventions can be made. The prevention of possible physical, mental and behavioral effects that may arise with digital dependence should be promoted. In this aspect, the role of the family is important in creating rules for the use of screens in a healthy way, according to the recommendations of

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the Brazilian Society of Pediatrics. Educational and health managers can promote health education campaigns with students and their guardians through public policies in schools, to protect and prevent the risks of inappropriate use of smartphones, video games, computers, televisions and tablets. The joint importance of the public health and education systems for the screening of anxiety and depression in schoolchildren is also highlighted, to improve the performance of social health equipment and prevent problems resulting from these conditions in the biopsychosocial development of children and adolescents.

CONCLUSION

The research showed a relatively high prevalence of anxiety (25.2%) and depression (13.5%) symptoms among participants, being more frequent in females. In addition, it was found that 92% of the students exceeded the screen time recommended by the specialist society, and 63.8% had inadequate levels of physical activity. Elevated odds of anxiety symptoms were also observed among female schoolchildren and those with depressive symptoms. The odds of depressive symptoms were increased among participants in the older age group, overweight/obese and with anxious symptoms.

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REFERENCES

1. Aguilar-Paredes, S., et al. (2023). Understanding the relationship between child malnutrition and cognitive development: An analysis of the Ecuadorian case. Journal of Medical and Health Studies, 4(6), 47–58. https://doi.org/10.32996/jmhs.2023.4.6.7

2. Alqahtani, R. A., et al. (2024). Smartphone use and its association with body image distortion and weight loss behaviours among adolescents in Saudi Arabia. Technology and Health Care, 32(2), 1159–1176. https://doi.org/10.3233/thc-230756

3. Andrade, M. L. S. S., et al. (2022). Birth-related and current factors associated with physical inactivity in the leisure time in Brazilian adolescents. PLOS ONE, 17(9), Article e0273611. https://doi.org/10.1371/journal.pone.0273611

4. Antawati, D. I., Resmadewi, R., & Muttaqien, D. R. (2024). What do they do with their phones? Teens' smartphone use behavior post COVID-19 pandemic. Journal of Educational, Health and Community Psychology, 13(1). http://dx.doi.org/10.12928/jehcp.v13i1.28233

5. Antunes, J. T., et al. (2022). A saúde mental dos adolescentes brasileiros: Pesquisa Nacional de Saúde do Escolar de 2019. REME - Revista Mineira de Enfermagem, 26, Article e38984. https://doi.org/10.35699/reme.v26i.38984

6. Bitsko, R. H., et al. (2018). Epidemiology and impact of health care provider-diagnosed anxiety and depression among US children. Journal of Developmental & Behavioral Pediatrics, 39(5), 395–403. https://doi.org/10.1097/DBP.0000000000000571

7. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Saúde Materno Infantil. Coordenação-Geral de Saúde Perinatal e Aleitamento Materno. (2022). Caderneta da criança: Menino: Passaporte da cidadania (5th ed.). Ministério da Saúde. https://www.saude.gov.br

8. Buss, P. M., & Ungerer, R. (2016). Saúde da mulher, da criança e do adolescente no contexto da Agenda das Nações Unidas para o Desenvolvimento Sustentável 2030. Divulgação em Saúde para Debate, (53), 9–22. https://www.arca.fiocruz.br/handle/icict/20644

9. Cao, B., et al. (2024). Potential biopsychosocial factors mediating/moderating the relationship between depressive symptoms and body size among children and adolescents: A systematic review. Obesity Reviews, 25(1), Article e13645. https://doi.org/10.1111/obr.13645

10. Chen, Y., et al. (2024). Obesity and risk of depressive disorder in children and adolescents: A meta-analysis of observational studies. Child: Care, Health and Development, 50(2), Article e13237. https://doi.org/10.1111/cch.13237

11. Copeland, W. E., et al. (2019). Early pubertal timing and testosterone associated with higher levels of adolescent depression in girls. Journal of the American Academy of

Revista ARACÊ
ISSN: 2358-2472

Child & Adolescent Psychiatry, 58(12), 1197–1206. https://doi.org/10.1016/j.jaac.2019.02.007

12. Crispim, M. E. S., et al. (2022). O uso excessivo de telas por crianças pós COVID-19: Impactos psicológicos e do desenvolvimento infantil. Estudos Avançados sobre Saúde e Natureza, 5. [No DOI or URL provided; please verify for accuracy.]

13. Dalgalarrondo, P. (2018). Psicopatologia e semiologia dos transtornos mentais (3rd ed.). Artmed.

14. Deng, J., et al. (2023). Prevalence of mental health symptoms in children and adolescents during the COVID-19 pandemic: A meta-analysis. Annals of the New York Academy of Sciences, 1520(1), 53–73. https://doi.org/10.1111/nyas.14947

15. Essau, C. A., & Delfabbro, P. H. (2020). Smartphone addiction. In C. H. Ting & Y. Y. Chen (Eds.), Adolescent addiction: Epidemiology, assessment, and treatment (2nd ed., pp. 215–249). Academic Press. https://doi.org/10.1016/C2018-0-04203-6

16. Feliciano, G. S. de C., et al. (2019). Transtornos mentais comuns: A percepção de professores do ensino superior sobre a saúde mental dos jovens estudantes [Unpublished manuscript]. Programa de Pós-graduação em Educação, Brasília.

17. Felício, J. F., et al. (2020). Refletindo sobre a depressão e a ansiedade no contexto escolar. Revista Interfaces: Saúde, Humanas e Tecnologia, 8(1), 482–490.

18. Firth, J., et al. (2020). A meta-review of “lifestyle psychiatry”: The role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. World Psychiatry, 19(3), 265–412.

19. Florindo, A. A., et al. (2006). Desenvolvimento e valida(Duration: 4 seconds)ção de um questionário de avaliação da atividade física para adolescentes. Revista de Saúde Pública, 40(5), 802–809.

20. Furlan, S. P. (2007). Qualidade de vida em crianças e adolescentes com bronquiolite obliterante pós-infecciosa [Master’s dissertation, Universidade Federal do Rio Grande do Sul]. Repositório UFRGS.

21. Garcia, I., & O’Neil, J. (2021). Anxiety in adolescents. The Journal for Nurse Practitioners, 17, 49–53.

22. Gruppo, I. F., et al. (2024). Impacto da exposição prolongada a telas eletrônicas no desenvolvimento infantil: Perspectivas e recomendações. Revista Eletrônica de Administração e Sociedade, 10(3). https://doi.org/10.51891/rease.v10i3.13214

23. Hampl, S. E., et al. (2023). Clinical practice guideline for the evaluation and treatment of children and adolescents with obesity. Pediatrics, 151(2), Article e2022060640. https://doi.org/10.1542/peds.2022-060640

Revista ARACÊ
ISSN: 2358-2472

24. Hong, R. Y., Zainal, N. H., & Ong, X. L. (2023). Longitudinal associations between academic competence-building and depression symptoms in early adolescence. Development and Psychopathology, 35(4), 2061–2072. https://doi.org/10.1017/S0954579422000694

25. Kamaleldine, A. N., et al. (2022). Effect of screen time on physical and mental health and eating habits during COVID-19 lockdown in Lebanon. Psychiatry Investigation, 19(3), 220–228. https://doi.org/10.30773/pi.2021.0239

26. Kanaley, J. A., et al. (2022). Exercise/physical activity in individuals with type 2 diabetes: A consensus statement from the American College of Sports Medicine. Medicine & Science in Sports & Exercise, 54(2), 353–368. https://doi.org/10.1249/MSS.0000000000002800

27. Kandola, A., et al. (2019). Physical activity and depression: Towards understanding the antidepressant mechanisms of physical activity. Neuroscience & Biobehavioral Reviews, 525–539. https://doi.org/10.1016/j.neubiorev.2019.09.040

28. Kim, S., et al. (2020). Differential associations between passive and active forms of screen time and adolescent mood and anxiety disorders. Social Psychiatry and Psychiatric Epidemiology, 55, 1469–1478. https://doi.org/10.1007/s00127-020-01833-9

29. Kinout, A. J. Y., et al. (2021). Transtornos de ansiedade em adolescentes em situação de vulnerabilidade social: Uma revisão narrativa. Brazilian Journal of Health Review, 4(5), 22455–22467.

30. Li, X., et al. (2021). Screen use and mental health symptoms in Canadian children and youth during the COVID-19 pandemic. JAMA Network Open, 4(12), Article e2140875. https://doi.org/10.1001/jamanetworkopen.2021.40875

31. Lourenço, C. L. M., Souza, T. F. de, & Mendes, E. L. de. (2024). Relacionamento entre smartphone e comportamento sedentário: Estudo de base escolar com adolescentes. Revista Brasileira de Atividade Física e Saúde, 24, Article e0076. https://doi.org/10.12820/rbafs.24e0076

32. Ma, Z., et al. (2021). The association between obesity and problematic smartphone use among school-age children and adolescents: A cross-sectional study in Shanghai. BMC Public Health, 21(1), Article 12124. https://doi.org/10.1186/s12889-021-12124-6

33. Maras, D., et al. (2015). Screen time is associated with depression and anxiety in Canadian youth. Preventive Medicine, 73, 133–138.

34. McIsaac, M. A., et al. (2023). Mechanisms accounting for gendered differences in mental health status among young Canadians: A novel quantitative analysis. Preventive Medicine, 169, Article 107451. https://doi.org/10.1016/j.ypmed.2023.107451

Revista ARACÊ
ISSN: 2358-2472

35. McLachlan, C., Shelton, R., & Li, L. (2023). Obesity, inflammation, and depression in adolescents. Frontiers in Psychiatry, 14, Article 1221709. https://doi.org/10.3389/fpsyt.2023.1221709

36. Mkhize, M., van der Westhuizen, C., & Sorsdahl, K. (2024). Prevalence and factors associated with depression and anxiety among young school-going adolescents in the Western Cape Province of South Africa. Comprehensive Psychiatry, 131, Article 152469. https://doi.org/10.1016/j.comppsych.2024.152469

37. Mougharbel, F., et al. (2023). Longitudinal associations between different types of screen use and depression and anxiety symptoms in adolescents. Frontiers in Public Health, 11, Article 1101594. https://doi.org/10.3389/fpubh.2023.1101594

38. Muslim, R. N. I., et al. (2024). Smartphone addiction levels in school-age children after the COVID-19 pandemic in rural areas. SENTRI: Jurnal Riset Ilmiah, 3(5), 2397–2412. https://ejournal.nusantaraglobal.ac.id/index.php/sentri/article/view/2678

39. Naima, M. (2023). The effect of screen time on children's behaviour. World Family Medicine, 21. https://doi.org/10.5742/MEWFM.2023.95256194

40. Panjati-Madan, V. N., & Ranganathan, P. (2023). Impact of screen time on children's development: Cognitive, language, physical, and social and emotional domains. Multimodal Technologies and Interactions, 7(5), Article 52. https://doi.org/10.3390/mti7050052

41. Pearce, M., et al. (2022). Association between physical activity and risk of depression: A systematic review and meta-analysis. JAMA Psychiatry, 79(6), 550–559. https://doi.org/10.1001/jamapsychiatry.2022.0609

42. Putri, M., & Humayrah, W. (2024). Tingginya durasi screen time berhubungan dengan pola konsumsi dan perilaku makan balita usia 3-5 tahun di Jabodetabek. Journal of Nutrition College, 13(2), 139–151. https://doi.org/10.14710/jnc.v13i2.41369

43. Racine, N., et al. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. JAMA Pediatrics, 175(11), 1142–1150. https://doi.org/10.1001/jamapediatrics.2021.2482

44. Rocha, M. F. de A., et al. (2022). Consequências do uso excessivo de telas para a saúde infantil: Uma revisão integrativa da literatura. Research, Society and Development, 11(4), Article e72017227176. https://doi.org/10.55905/revconv.17n.3-072

45. Rodrigues, I. O., Freire, T., Gonçalves, T. S., & Crenitte, P. A. P. (2016). Sinais preditores de depressão em escolares com transtorno de aprendizagem. Revista CEFAC, 18(4), 865–875.

46. Shennon, I., et al. (2024). The infant gut microbiome and cognitive development in malnutrition. Clinical Nutrition. https://doi.org/10.1016/j.clnu.2024.03.029

Revista ARACÊ
ISSN: 2358-2472

47. Shorey, S., Ng, E. D., & Wong, C. H. J. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. British Journal of Clinical Psychology, 61(2), 287–305. https://doi.org/10.1111/bjc.12333

48. Silva, E. R. de C., et al. (2024). Sintomas preditores de depressão entre estudantes adolescentes do nordeste brasileiro no período pós-pandêmico. Cuadernos de Educación y Desarrollo, 16(6), Article e062. https://doi.org/10.55905/cuadv16n6-062

49. Singh, B., et al. (2023). Effectiveness of physical activity interventions for improving depression, anxiety, and distress: An overview of systematic reviews. British Journal of Sports Medicine, 57, 1203–1209. https://doi.org/10.1136/bjsports-2022-106195

50. Sociedade Brasileira de Pediatria. (2019). Manual de orientação - Grupo de Trabalho Saúde na Era Digital: #MENOSTELAS #MAISSAÚDE. https://www.sbp.com.br/fileadmin/user_upload/22246c-ManOrient-MenosTelasMaisSaude.pdf

51. Souza, L. B. de, Panúncio-Pinto, M. P., & Fiorati, R. (2019). Crianças e adolescentes em vulnerabilidade social: Bem-estar, saúde mental e participação em educação. Cadernos Brasileiros de Terapia Ocupacional, 27(2), 251–269.

52. Steptoe, A., et al. (2023). Obesity and psychological distress. Philosophical Transactions of the Royal Society B: Biological Sciences, 378(1888), Article 20220225. https://doi.org/10.1098/rstb.2022.0225

53. Tang, X., et al. (2019). Prevalence of depressive symptoms among adolescents in secondary school in mainland China: A systematic review and meta-analysis. Journal of Affective Disorders, 245, 498–507. https://doi.org/10.1016/j.jad.2018.11.043

54. Vianna, R. R. A. B. (2009). Avaliação dos níveis de ansiedade de uma amostra de escolares no Rio de Janeiro através da Escala Multidimensional de Ansiedade para Crianças (MASC-VB). Psicologia Clínica, 21(2), 500.

55. Walsh, J. J., et al. (2020). Associations between duration and type of electronic screen use and cognition in US children. Computers in Human Behavior, 108, Article 106312. https://doi.org/10.1016/j.chb.2020.106312

56. Yang, S., et al. (2024). Associations of screen use with cognitive development in early childhood: The ELFE birth cohort. Journal of Child Psychology and Psychiatry, 65, 680–693. https://doi.org/10.1111/jcpp.13887

57. Zuccolo, P. F., et al. (2023). Children and adolescents' emotional problems during the COVID-19 pandemic in Brazil. European Child & Adolescent Psychiatry, 32(6), 1083–1095. https://doi.org/10.1007/s00787-022-02006-6