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# Evaluation of quality of life, sleep and respiratory symptoms in children and obese adolescents

Evaluación de la calidad de vida, del sueño y síntomas respiratorios en niños y adolescentes obesos

Avaliação da qualidade de vida, do sono e sintomas respiratórios em crianças e adolescentes obesos

## ABSTRACT

**Objective** To evaluate the life quality, sleep and respiratory symptoms in obese children and teens. **Method** Research was transversal, realized in Centro de Obesidade Infantil de Campina Grande (PB). Anthropometric evaluation, application of a socioeconomic and lifestyle form was performed, PEDSQL, PSQI and to finalize answered a survey about the existence of respiratory symptoms. The results were analyzed in SPSS version 18, the variables showed normal distribution. Was realized the chi-squared test and Pearson correlation test, a 95% significance level was used. **Results** The bad quality of life was predominant (60%) as well as the sleep (70%). In the respiratory symptoms the lack of air (85%) and cough (60%). It was observed a considerable correlation among hours of sedentariness and the average scores of PedsQL and the PSQI. **Conclusion** Sedentary lifestyle and physical inactivity impact changes in the quality of life and sleep of obese children and adolescents.

**DESCRIPTORS:** Childhood obesity; Quality of life; Sleep Deprivation; Signs and Symptoms Respiratory.

## RESUMEN

**Objetivo** Evaluar la calidad de vida, el sueño y los síntomas respiratorios en niños y adolescentes obesos. **Método** La encuesta transversal, realizada en el Centro de Obesidad Infantil de Campina Grande (PB). Se realizó la valoración antropométrica y aplicación de un formulario socioeconómico y de estilo de vida, los PedsQL, el PSQI y un cuestionario sobre la existencia de síntomas respiratorios. Los resultados se analizaron en SPSS versión 18, las variables pasaron la prueba de distribución de normalidad, se realizó chi-cuadrado, y se utilizó la prueba de correlación de Pearson, con un nivel de significancia de 95%. **Resultados** Predominó la mala calidad de vida (60%) y el sueño (70%). En los síntomas respiratorios, la disnea (85%) y la tos (60%) fueron los más comunes. Se observó una correlación significativa entre las horas sedentarias y las puntuaciones de la puntuación PedsQL y el PSQI. **Conclusión** El estilo de vida sedentario y la inactividad física repercuten en los cambios en la calidad de vida y el sueño de los niños y adolescentes obesos.

**DESCRIPTORES:** Obesidad infantil; Calidad de vida; La privación del sueño; Signos y síntomas respiratorios.

## RESUMO

**Objetivo** Avaliar a qualidade de vida, do sono e sintomas respiratórios em crianças e adolescentes obesos. **Método** Pesquisa transversal, realizada no Centro de Obesidade Infantil de Campina Grande (PB). Foi realizada avaliação antropométrica, aplicação do formulário socioeconômico e de estilo de vida, do PedsQL, do PSQI e questionário sobre sintomas respiratórios. Os resultados foram analisados no SPSS versão 18, as variáveis apresentaram distribuição normal, foi realizado o teste qui-quadrado e o de correlação de Pearson. Utilizou-se nível de significancia de 95%. **Resultados** A má qualidade de vida foi predominante (60%) assim como a do sono (70%). Nos sintomas respiratórios a falta de ar (85%) e a tosse (60%) foram os mais afirmados. Foi observado correlação significativa entre horas de sedentarismo e a pontuação dos escores do PedsQL e do PSQI. **Conclusão** Sedentarismo e inatividade física repercutem em alterações na qualidade de vida e do sono de crianças e adolescentes obesos.

**DESCRIPTORIOS:** Obesidade infantil; Qualidade de vida; Privação do sono; Sinais e Sintomas respiratórios.

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**INTRODUCTION**

Over the past three decades, obesity has acquired worldwide dimensions and has increased in prevalence. This disease has serious implications for individuals of all age groups, being classified as a worldwide epidemic and a challenge for public health.<sup>(1,2)</sup> According to WHO<sup>(3)</sup> at least 41 million children under the age of 5 are obese or overweight. A reality influenced by the consumption of high-calorie foods, growth in physical inactivity and a lifestyle full of sedentary activities, since the use of screens occupies more and more space in the daily lives of children and adolescents.<sup>(4,5)</sup>

The results of these habits are systemic and compromise both physical and psychological aspects that, possibly, will accompany the child to adulthood.<sup>(6,7)</sup> Recent studies show that obese children and adolescents have low quality of life, due to the set of physical, emotional and psychological consequences that are developed through obesity. These comorbidities add up and cause a psychosocial impact, bringing negative results to their quality of life.<sup>(8,9)</sup>

Scientific evidence points out that insomnia is the most prevalent sleep disorder among obese children and adolescents. This reduction in the sleep period results in metabolic and endocrine changes that contribute to excessive weight gain.<sup>(10,11,12)</sup> Obstructive sleep apnea syndrome is strongly influenced by obesity, with obese children being the most predisposed, which directly reflects on the quality and total period of sleep. Thus, obesity can favor the development of sleep disorders as well as

be accentuated by the presence of inadequate sleep quality.<sup>(11,13)</sup>

In addition to nocturnal apnea, other respiratory symptoms may appear, since the excess of adipose tissue in the thoracoabdominal region causes a dysfunction in the diaphragm mobility and hinders the expansion of the chest wall, increasing the ventilatory work.<sup>(14)</sup> The appearance of these respiratory symptoms can signal the early manifestation of pulmonary disorders. In addition to hampering the performance of activities of daily living, these symptoms contribute to physical inactivity and physical inactivity, and can lead to social embarrassment and loss of confidence.<sup>(15)</sup>

Given this scenario, this study is justified due to the great need to understand obesity and its consequent changes in quality of life and sleep, as well as its contribution to the onset of respiratory symptoms. This knowledge will bring the obese child and adolescent justifications about the urgency to adopt healthier habits, allowing less repercussions in their future life, in addition to contributing to the awareness of parents and/or guardians about the disease, its severity and how this nutritional deviation may have systemic consequences on the child's health. Thus, the aim of this study was to assess the quality of life, sleep and respiratory symptoms in obese children and adolescents.

**METHOD**

Cross-sectional study carried out at the Childhood Obesity Center (COI - Centro de Obesidade Infantil), located at the Clinical Nursing School of the State University of Paraíba in Campina Grande - PB, from 12/04 to 08/05 2019. COI patients were contacted on the day from routine care and invited to participate in the research, in addition, patients who missed appointments were consulted by phone about their interest in participating and thus scheduled for home care or at the COI itself.

On the day of the collection, the objectives of the research were explained to the participant and the person in charge and asked to sign the Informed Consent Form (ICF). All collection was carried out in a reserved environment, only with the researcher and the person in charge (if it was the participant's wish). Initially, the anthropometric assessment was carried out. To obtain weight, a digital scale was used and for height a wall stadiometer was used. The measurements were made in duplicate, considering the average value of the two measurements for analysis. Only values were accepted whose differences between the first and second measurements were up to 100 grams for weight and 0,5 centimeters for height. The Body Mass Index (BMI) was used to categorize the nutritional status performed according to the BMI Z-score through the AnthroPlus application.<sup>(7)</sup>

The volunteer filled out a structured form for collection with socioeconomic information: age (ordinal measure, in complete years); gender (male or female) and economic class according to the Brazilian criterion of economic classification of the Brazilian Association of Research Companies - ABEP (Associação Brasileira de Empresas de Pesquisa).<sup>(16)</sup>

The lifestyle was composed of the following variables: Level of physical activity, assessed using the International Physical Activity Questionnaire - IPAQ,

developed by WHO to assess the level of physical activity. (17,18,19) For the purposes of data analysis, a reclassification was carried out in two groups: “active” (very active and active) and “non-active” (irregularly active A, irregularly active B and sedentary). The sedentary habit was measured through the free time of the day spent in front of the television, computer or video game, considering that the adolescent who obtains an average of sedentary activities equal to or greater than two hours/day is sedentary. (20)

Soon after, the Pediatric Quality of Life Questionnaire (PedsQL) version 4.0 was delivered. (21,06) O PedsQL is the first generic instrument specifically for use in children and adolescents with chronic health conditions, consisting of four domains (physical, emotional, social and school), each with 23 items. (22)

Then, the volunteer was asked to complete the Pittsburgh Sleep Quality Index (PSQI), which consists of 19 self-administered questions and 5 directed to the roommate. The PSQI evaluates sleep quality based on the previous month.

A questionnaire to investigate respiratory symptoms was developed by the researcher, in order to investigate the presence of symptoms such as: shortness of breath, cough, wheezing, pain when breathing, recording the presence/absence; frequency on days of the week and duration in hours.

Children and adolescents who had: illnesses that affect cognition or acute respiratory illnesses, clinical or physiotherapeutic treatment for sleep disorders or disorders or some type of respiratory physiotherapy were excluded from the study.

The data were entered and analyzed in SPSS, version 18. A descriptive analysis of all socioeconomic and lifestyle variables (absolute and relative frequency for categorical and average for continuous) was performed. The distribution of continuous variables was symmetrical using the Kolmogorov-Smirnov test. To check the association between categorical variables, the chi-square test was performed, considering the probability less than or equal to 5% for the rejection of the null or non-association hypothesis. Pearson's correlation test was used to measure the degree and direction of the correlation between quality of life, sleep and respiratory symptoms in obese children and adolescents.

This study was evaluated by the Research Ethics Committee for Higher Education and Development of the Faculty of Medical Sciences of Campina Grande and carried out after approval (CAAE: 10313919000005175), and followed all ethical principles in accordance with Resolutions 466/12. (23)

## RESULTS

The research sample consisted of 20

children and adolescents, with a minimum age of 10 years and a maximum age of 17 years, average of  $13,45 \pm 1,79$ , with a higher prevalence of females (85%). It was observed that the majority, 65% of the individuals, belonged to economic class C. Regarding the nutritional status, 12 (65%) children/adolescents presented obesity and 8 (35%) presented marked obesity. As for the level of physical activity, the majority, (60%), were non-active. It was observed that 100% of the sample had a sedentary habit, with an average of  $6,50 \pm 2,78$  hours per day, with a minimum of 2 hours and a maximum of 12 hours of sedentary activities.

When associating the categories of obesity with the variables of lifestyle, respiratory symptoms, quality of life and sleep, we can highlight some findings in relation to physical inactivity that was prevalent in 60% of the sample, being a more prevalent habit among individuals with obesity (66,7%). Among the respiratory symptoms, the high prevalence of shortness of breath (85%) and cough (60%) stands out, both affecting more individuals with severe obesity. The research showed that poor quality of life and sleep had high prevalence in the sample, 60% and 70% respectively. And that among those with severe obesity, the majority had low quality of life (62,5%) and sleep (75%) (Table 1).

Table 1. Association of obesity degrees with lifestyle factors, respiratory symptoms, quality of life and sleep in school children and adolescents with obesity. Campina Grande, Paraíba, Brazil, 2019.

		OBESITY n (%)	INCREASED OBESITY n (%)	TOTAL n (%)	P
Physical Activity Level	Active	4 (33,3%)	4 (50%)	8 (40,0%)	0,648
	Not Active	8 (66,7%)	4 (50,0%)	12 (60,0%)	
	Total	12 (100%)	8 (100%)	20 (100%)	
Shortness of breathe	Yes	9 (75,0%)	8 (100%)	17 (85,0%)	0,242
	No	3 (25,0%)	0 (0%)	3 (15,0%)	
	Total	12 (100%)	8 (100%)	20 (100%)	
Cough	Yes	7 (58,3%)	5 (62,5%)	12 (60,0%)	1,000
	No	5 (41,7%)	3 (37,5%)	8 (40,0%)	
	Total	12 (100%)	8 (100%)	20 (100%)	
Pain when breathing	Yes	2 (16,7%)	1 (12,5%)	3 (15,0%)	

Wheezing Chest	No	10 (83,3%)	7 (87,5%)	17 (85,0%)	1,000
	Total	12 (100%)	8 (100%)	20 (100%)	
	Yes	1 (8,3%)	3 (37,5%)	4 (20,0%)	
Quality of life	No	11 (91,7%)	5 (62,5%)	16 (80,0%)	0,255
	Total	12 (100%)	8 (100%)	20 (100%)	
	Bad	6 (50,0%)	6 (75,0%)	12 (60,0%)	
Sleep quality	Good	6 (50,0%)	2 (25,0%)	8 (40,0%)	0,373
	Total	12 (100%)	8 (100%)	20 (100%)	
	Bad	9 (75,0%)	5 (62,5%)	14 (70,0%)	
	Good	3 (25,0%)	3 (37,5%)	6 (30,0%)	0,642
	Total	12 (100%)	8 (100%)	20 (100%)	

Source: Research data (2019).

Table 2 shows the correlations between hours of sedentary lifestyle and quality of life and sleep, one can see a positive association between the score on the Pittsburgh score and a negative one with the PedsQL score between hours of sedentary lifestyle, quality of life and of sleep, both moderate and statistically significant. Regarding the quality of sleep, 18,74% ( $r^2=0,1874$ ) of the high score on the score can be explained by the high hours of sedentary lifestyle, and 21,25% ( $r^2=0,2125$ ) of the low quality of life, found in the low PedsQL score can be attributed to the high hours of sedentary lifestyle.

## DISCUSSION

Obesity is a complex disease that has numerous aggravating factors, one of which is the lack of resources. 65% of the studied sample has a low socioeconomic profile (class C). This population has less access to healthy food and often lives in an accelerated daily routine, which hinders adequate family food. Other

factors are, the impossibility of access or less chance of performing some types of physical activity, in addition to less education and knowledge about health care, which contributes to the higher prevalence of obesity.<sup>(24,25,26)</sup>

The obesogenic environment, defined as a living environment that promotes a high energy intake and a sedentary lifestyle, has a great influence on the daily habits of obese children and adolescents, and contributes to the genesis, maintenance and repercussions of obesity. The environment in which the child is inserted can contribute strongly both to the adoption of healthy behavior and to the reduction of physical and psychological health.<sup>(27,26,28)</sup>

The sample analyzed in this study was composed of obese children and adolescents and 100% of them were classified as sedentary, with an average of 6 and a half hours of sedentary activity per day. This finding emphasizes the influence of the obesogenic environment and corroborates Silva and his collabo-

rators<sup>(29)</sup> who assessed a sedentary habit in 21 obese children and adolescents in northern Brazil (PA). It was observed that all individuals in the sample had sedentary behavior, with an average of 6,42 hours of sedentary activities per day. In a survey in Colombia, which found cardiovascular risk factors in the pediatric population, a 90,9% prevalence of physical inactivity was found in children and adolescents aged 3 to 17 years who were overweight or obese, as opposed to 36,5 % in eutrophic children.<sup>(30)</sup>

The high prevalence of physical inactivity in this population is worrisome, as it is a factor that directly contributes to the development of cardiovascular and metabolic diseases and obesity itself, in addition to the possibility of the permanence of this habit during adulthood, being extremely It is important to reduce it in the early stages of life, with a reduction in sending activities and an increase in physical activities.<sup>(31,32)</sup>

It was possible to observe high levels of physical inactivity, with 60% of the

Table 2. Correlation of the Pittsburgh score and the PedsQL score with hours of sedentary lifestyle in obese school children and adolescents. Campina Grande, Paraíba, Brazil, 2019.

	SEDENTARY HABIT (HOURS)	
	R	P
Pittsburgh score (sleep quality)	0,433	0,041
PedsQL score (quality of life)	- 0,461	0,057

Source: Research data

sample classified as non-active. Research shows that obese children and adolescents are physically inactive or have a low level of physical activity, which can increase the prevalence of childhood obesity and contribute to a low quality of life, since physical activities, defined as those that have spent energy above rest level, contribute positively to an increase in quality of life.<sup>(33,34,35)</sup>

The low quality of life was predominant in the study, reaching 60% of the sample, consistent with the research by Cunha and collaborators<sup>(6)</sup> held in Belém (PA). The research evaluated the association between obesity and quality of life using also the PedsQL, with a sample of 80 children, 40 eutrophic children and 40 obese children. The researchers observed that obese children had a lower quality of life compared to eutrophic children in all domains.

The study by Gouveia and collaborators<sup>(36)</sup> assessed quality of life and body image in children and adolescents aged 8 to 18 years. The sample consisted of 155 children and adolescents with ideal weight and 207 with obesity. They observed that those with nutritional disorders had a worse quality of life and greater dissatisfaction with their body image. These findings emphasize the negative impact of obesity on various aspects of the lives of these children and adolescents, and show that it is not just limited to physical health, it affects emotional, social and psychological areas, which encompass the individual as a whole, thus having repercussions in their quality of life.

Another point observed was the poor sleep quality, present in 70% of the studied sample, being more prevalent in obesity (75%). Gonzaga and collaborators<sup>(37)</sup> in a study in the city of Campina Grande (PB), evaluated the quality of sleep and the presence of the metabolic syndrome in 135 obese children and adolescents, using the Pittsburgh index as an instrument. There was a prevalence of poor sleep quality or sleep disorder in 40,7% of the sample. Poor sleep quality was also associated with high

diastolic blood pressure and high waist circumference.

An epidemiological study carried out in Montes Claros (MG) that assessed the level of insomnia before and after an exercise program in overweight children and adolescents. It was observed that the control group had a prevalence of insomnia before (72,7%) and after the program (90%). The group that performed the intervention obtained a significant reduction in insomnia levels. There was evidence of worsening sleep disturbance in sedentary adolescents.<sup>(38)</sup> This finding confirms the results of this study, and shows a link between sleep quality and physical inactivity. A poor quality of sleep, with insufficient hours, can have physical and psychological consequences, which will reflect on your school, social, emotional life and, consequently, a reduction in quality of life.

## An epidemiological study carried out in Montes Claros (MG) that assessed the level of insomnia before and after an exercise program in overweight children and adolescents.

As for respiratory symptoms, a predominance of shortness of breath (85%) and cough (60%) was observed. This finding corroborates the literature that sta-

tes changes in ventilatory mechanics and impaired pulmonary function in obese individuals. The accumulation of fat can narrow the airways, making it difficult for air to pass, causing symptoms such as coughing and throat clearing. Fat in the thoracoabdominal region prevents diaphragmatic work efficiently and can lead to respiratory distress and shortness of breath. In addition, obesity is a risk factor for some lung diseases such as asthma, which initially presents symptoms of shortness of breath, cough and wheezing.<sup>(39,40,41)</sup>

According to Mendes and collaborators<sup>(42)</sup> obese children and adolescents who develop asthma have a low quality of life. In a study of 1691 schoolchildren aged 7 to 18 years, they observed that 46,2% of students with asthma were overweight or obese and had a lower quality of life, compared to adolescents without asthma and eutrophic. This finding shows that the presence of diseases or respiratory symptoms can reduce the quality of life of obese children and adolescents. These can also decrease the frequency of physical activity, increasing the time for sedentary habit.

In addition to being a risk factor for the development and aggravation of obesity, physical inactivity has a negative impact on the quality of sleep and life, which can compromise daily activities, family and school life and the development of children and adolescents, making it more important to adopt more active and less sedentary habits.<sup>(43,26)</sup> The results found in this study revealed a correlation between hours of physical inactivity and the score of the scores for quality of life and sleep, being negative between hours of physical inactivity and the score of the PedsQL score, and positive, in relation to physical inactivity and the score of the Pittsburgh Index. Thus showing that the greater the amount of hours spent in sedentary activities, the worse the quality of life and sleep.

The study had limitations regarding the access of obese children and adolescents, resulting in a small number of the sample, and it is not possible to observe

the relationship between all the factors studied that are so addressed by the literature. Another point observed was the difficulty of interviewing children and adolescents, since they may have had difficulties understanding the questions and fear to remove their doubts, which may have had a negative impact on the results of the research.

However, the study showed the need to act in the obesogenic environment, more specifically in the sedentary lifestyle, since the development of obesity is a sum of factors and the obesogenic

environment is part of these. Thus, it is necessary to continue studies that prove that intervention in sedentary behavior can change the quality of life and sleep of obese individuals.

## CONCLUSION

A good quality of life and sleep are essential for the development and healthy growth of children and adolescents, as well as a good functioning of the respiratory system. Their deprivation will da-

mage these individuals' physical, psychological and emotional health.

It was possible to observe that exposure to late hours of sedentary habit and physical inactivity have repercussions on changes in the quality of life and sleep of obese children and adolescents. Changes in daily habits and lifestyle may have a positive impact on the health and well-being of individuals with this nutritional deviation.

Studies on this theme should be carried out in order to deepen the knowledge about this correlation and about the repercussions of obesity. ■

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