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PARA ALÉM DO DESCANSO: O PAPEL DO SONO NO BEM-ESTAR E NO DESEMPENHO ACADÉMICO DOS ADOLESCENTES

BEYOND REST: THE ROLE OF SLEEP IN ADOLESCENT WELL-BEING AND ACADEMIC PERFORMANCE

MÁS ALLÁ DEL DESCANSO: EL PAPEL DEL SUEÑO EN EL BIENESTAR Y EL RENDIMIENTO ACADÉMICO DE LOS ADOLESCENTES

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RESUMO

Introdução: O sono desempenha um papel vital na saúde física e mental, no bem-estar e no desempenho académico dos adolescentes.

Objetivo: Explorar a associação entre a duração do sono, a saúde, o bem-estar e o desempenho escolar em adolescentes portugueses.

Métodos: Os dados analisados resultaram de duas amostras independentes recolhidas em 2022 e 2024, no âmbito do Observatório de Saúde e Bem-Estar Psicológico da Direção-Geral de Estatísticas da Educação e Ciência (OSPBE/DGEEC). Recorreu-se a testes t para amostras independentes e ao qui-quadrado de Pearson para analisar as diferenças de género, bem como à análise de variância (ANOVA) para examinar as diferenças na duração do sono.

Resultados: Participaram no estudo um total de 7.306 estudantes, 4.295 em 2022 e 3.011 em 2024. Em 2022, 52,2% dos participantes eram do sexo feminino, com uma média de idade de 13,40 anos ($DP = 2,44$). Em 2024, a proporção de participantes do sexo feminino diminuiu para 50,5%, e a idade média subiu para 13,64 anos ($DP = 2,53$). Foram observadas diferenças estatisticamente significativas com base no género, desempenho académico e duração do sono. As raparigas, os adolescentes com menor desempenho académico e os que dormiam menos de oito horas por noite apresentaram piores indicadores de bem-estar e saúde mental.

Conclusão: Estes resultados reforçam a importância de fornecer aos adolescentes o conhecimento e os recursos necessários para adotar comportamentos que promovam a saúde, e reduzir os potenciais comportamentos de risco associados à privação de sono.

Palavras-chave: sono; bem-estar; saúde mental; sintomas; adolescentes

ABSTRACT

Introduction: Sleep plays a vital role in the physical and mental health, well-being, and academic performance of adolescents.

Objective: Examine the association between sleep duration, health, well-being, and academic performance among Portuguese adolescents.

Methods: Data were analyzed from two independent samples collected in 2022 and 2024 as part of the Psychological Health and Well-being Observatory of the Directorate-General for Education and Science Statistics (OSPBE/DGEEC). Independent samples t-tests and Pearson's chi-square test were used to analyze gender differences, as well as analysis of variance (ANOVA) to examine differences in sleep duration.

Results: A total of 7,306 students participated in the study, 4,295 in 2022 and 3,011 in 2024. In 2022, 52.2% of participants were female, with a mean age of 13.40 years ($SD = 2.44$). In 2024, the proportion of female participants decreased to 50.5%, and the mean age rose to 13.64 years ($SD = 2.53$). Statistically significant differences were observed based on gender, academic performance, and sleep duration. Girls, adolescents with lower academic performance, and those who slept fewer than eight hours per night exhibited poorer indicators of well-being and mental health.

Conclusion: These findings underscore the importance of equipping adolescents with the knowledge and resources necessary to adopt health-promoting behaviors and reduce potential risk behaviors associated with insufficient sleep.

Keywords: sleep; well-being; mental health; symptoms; adolescents

RESUMEN

Introducción: El sueño desempeña un papel fundamental en la salud física y mental, el bienestar y el rendimiento académico de los adolescentes.

Objetivo: Examinar la asociación entre la duración del sueño, la salud, el bienestar y el rendimiento académico en adolescentes portugueses.

Métodos: Se analizaron datos de dos muestras independientes, recopiladas en 2022 y 2024, en el ámbito del Observatorio de Salud y Bienestar Psicológico de la Dirección General de Estadística de Educación y Ciencia (OSPBE/DGEEC). Se utilizaron pruebas t de muestras independientes y la prueba de chi-cuadrado de Pearson para analizar las diferencias de género, así como análisis de varianza (ANOVA) para examinar las diferencias en la duración del sueño.

Resultados: Un total de 7306 estudiantes participaron en el estudio, 4295 en 2022 y 3011 en 2024. En 2022, el 52,2% de los participantes eran mujeres, con una edad media de 13,40 años ($DE = 2,44$). En 2024, la proporción de mujeres participantes disminuyó al 50,5%, y la edad media se elevó a 13,64 años ($DE = 2,53$). Se observaron diferencias estadísticamente significativas en función del género, el rendimiento académico y la duración del sueño. Las niñas, los adolescentes con menor rendimiento académico y quienes dormían menos de ocho horas por noche presentaron peores indicadores de bienestar y salud mental.

Conclusión: Estos hallazgos subrayan la importancia de dotar a los adolescentes de los conocimientos y los recursos necesarios para adoptar comportamientos que fomenten la salud y reducir los posibles comportamientos de riesgo asociados con la falta de sueño.

Palabras clave: sueño; bienestar; salud mental; síntomas; adolescentes

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INTRODUCTION

Sleeping an adequate number of hours, with good quality and regularity, and without sleep disturbances, is essential for a healthy life (Ramar et al., 2021; Paruthi et al., 2016). According to the literature, the ideal amount of sleep for adolescents ranges from 8 to 10 hours per night (American Academy of Sleep Medicine, 2025; Hirshkowitz et al., 2015; Paruthi et al., 2016).

A range of changes characterizes sleep during adolescence. At this developmental stage, adolescents tend to go to bed later, participate in more evening activities, and sleep fewer hours each night. These changes are driven by both internal factors, such as shifts in circadian rhythms, alterations in sleep architecture and hormonal changes, and external influences, including increased academic and social demands (Colrain & Baker, 2011; Meneo et al., 2025), greater involvement in extracurricular activities, and changes to school schedules (Colrain & Baker, 2011; Meneo et al., 2025; Paruthi et al., 2016).

Despite these normative developmental changes and the general decrease in sleep duration during adolescence, it is important to emphasize that sleep deprivation and poor sleep quality at this stage have a significant impact on mental health. These effects are particularly evident in areas such as attention and cognitive functioning (Agathão et al., 2020; Colrain & Baker, 2011).

Obtaining an adequate amount of sleep is associated with improvements in attention, behavior, learning, memory, emotional regulation, quality of life, and both physical and mental health (Paruthi et al., 2016). Conversely, insufficient sleep is linked to many negative outcomes. These include a higher risk of hypertension, obesity, and diabetes. It also increases the chances of accidents and injuries. Lack of sleep can cause attention, learning and memory issues, and it may also lead to behavioral problems and emotional instability, such as a raise of depressive symptoms. Among adolescents, it increases the risk of self-harm and suicidal thoughts or suicide attempts. It is also linked to a greater use of alcohol and other substances (Baranwal et al., 2023; Colrain & Baker, 2011; Dutil et al., 2022; Paruthi et al., 2016).

The literature highlights significant differences between girls and boys. Regarding sleep, although boys tend to report better sleep quality, they also engage more frequently in risky sleep behaviors, such as going to bed later or sleeping fewer hours. In contrast, girls report more difficulties related to sleep, including trouble falling asleep, insomnia, or waking earlier than intended (Amaral et al., 2016; Meers et al., 2019).

In terms of mental health, girls tend to report higher levels of anxiety, depression, and stress (Bao & Han, 2025; Campbell et al., 2021; Gomez-Baya et al., 2022; Morken et al., 2023), along with lower indicators of well-being (Yoon et al., 2023). The increase in symptoms among girls is associated with academic stress, sleep difficulties, peer relationships, perceived competence, academic performance, and perceived social support (Andrei et al., 2025; Bao & Han, 2025). Regarding academic performance, the literature remains inconclusive about gender differences. Studies suggest that various factors may influence the relationship between gender and academic outcomes (Marcenaro-Gutiérrez et al., 2018; Nasir et al., 2025).

Well-being and good mental health are important contributors to academic achievement (Monzonís-Carda et al., 2025). Furthermore, going to bed early and maintaining good sleep quality are associated with better academic performance (Hysing et al., 2016; Khare et al., 2024). In contrast, insufficient sleep and late bedtimes are linked to poorer cognitive functioning and lower academic achievement (Dutil et al., 2022; Hysing et al., 2016).

Given the importance of sleep in adolescent well-being, mental health, and academic performance, the present study aims to examine the relationship between sleep duration, health, well-being, and academic performance among adolescents in the years 2022 and 2024. The study also seeks to analyze gender differences, variations in sleep duration, and academic performance in relation to the other variables under investigation.

1. METHODS

The present study was conducted within the framework of the Psychological Health and Well-being Observatory of the Directorate-General for Education and Science Statistics (OSPBE/DGEEC) (Matos et al., 2022; 2024). The study aimed to characterize and understand the current state of psychological health and well-being in Portuguese schools.

The first wave of data collection took place in 2022, followed by a second in 2024. A random selection of school clusters and non-clustered schools, along with their respective classes, was carried out according to the NUTS III regions. Data were collected using an online questionnaire, with each class and its participants provided with a unique login and password for access.

1.1 Sample

Through two independent samples, a total of 7,306 students from the 2022 and 2024 studies were included in the present analysis. Each sample is described in Table 1.

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Table 1 - Sociodemographic characteristics of the sample

	n	%	M	SD	Min.	Max.
2022 Survey						
Gender						
Female	2,241	52.2				
Male	2,054	47.8				
Age			13.40	2.44	9	20
2024 Survey						
Gender						
Female	1,522	50.5				
Male	1,489	49.5				
Age			13.64	2.53	9	20

Note: M = average; SD = Standard deviation

1.2 Data collection instruments

The variables and measures used in the present study are described in Table 2.

Table 2 - Variables and measures used in the present study

Variables	Measure
Gender	1 – Male; 2 – Female
Educational level	1- Basic education; 2 – Secondary education
Weekday sleep duration (Inchley et al., 2016; Matos et al., 2018)	1 – Less than 8 hours; 2 – Between 8 and 9 hours; 3 – 10 hours or more
Weekend sleep duration (Inchley et al., 2016; Matos et al., 2018)	1 – Less than 8 hours; 2 – Between 8 and 9 hours; 3 – 10 hours or more
Well-being (WHO, 1998)	5-item scale from 0 (never) to 5 (always). Total score ranges from 0 (worst well-being) to 25 (best well-being).
Psychological symptoms (Inchley et al., 2016; Matos et al., 2018)	A 5-item scale assessing symptoms such as sadness, irritability or bad mood, nervousness, difficulty falling asleep, and intense sadness that feels overwhelming. Responses use a 5-point Likert scale ranging from 0 ("Rarely or never") to 4 ("Almost every day"). Total scores range from 0 to 20, with higher scores indicating greater psychological distress.
Depression, Anxiety, and Stress Scale (DASS) (Lovibond & Lovibond, 1995; Pais-Ribeiro et al., 2004)	This scale consists of 21 items divided into three subscales measuring depression, anxiety, and stress. Responses are rated on a 4-point Likert scale ranging from 0 ("Did not apply to me") to 3 ("Applied to me most of the time"). The total score for each subscale ranges from 0 to 21, with higher scores indicating more severe negative emotional states.
Academic Performance (Inchley et al., 2016; Matos et al., 2018)	For middle school students (2nd and 3rd cycles), academic performance was assessed through a 5-item Likert scale (subjects: Portuguese, Mathematics, Natural Sciences, Visual Arts, and Physical Education), rated from 1 ("Poor") to 5 ("Excellent"). For high school students, a 3-item scale was used (Portuguese, Mathematics, Physical Education) rated on a 21-point Likert scale from 0 ("Poor") to 20 ("Excellent"). The final academic performance score was calculated as the mean of the items and categorized into three groups: 1 - Low (≤ 2.9 for middle school; ≤ 9.9 for high school); 2 – Medium (3.0–3.9 for middle school; 10.0–13.9 for high school); 3 – High (≥ 4.0 for middle school; ≥ 14.0 for high school).

1.3 Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 29. Initially, independent samples t-tests and Pearson’s chi-square tests were conducted to assess gender-related variations and to compare outcomes across the three academic performance levels. Finally, associations between sleep duration and the remaining variables were examined using analysis of variance (ANOVA).

2. RESULTS

According to Table 3, in 2022, statistically significant gender differences were observed in sleep duration [$\chi^2(2) = 20.507; p < .001$]. Female participants reported sleeping less than 8 hours per night, whereas male participants more often reported sleeping more than 8 hours. These differences were not observed in the 2024 study, where both female and male participants reported similar sleep durations.

Regarding well-being, statistically significant gender differences were found in both studies [$t(4269,296) = 17.007; p < .001$ in 2022 and $t(2898,641) = 10.976; p < .001$ in 2024], with boys reporting higher levels of perceived well-being compared to girls.

Statistically significant gender differences were also found in symptoms of psychological distress [$t(4234,518) = 19.359; p < .001$ in 2022 and $t(2902,787) = -12.187; p < .001$ in 2024], anxiety [$t(2887,934) = -17.147; p < .001$ in 2022 and $t(2830,056) = -9.317; p$

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< .001 in 2024], depression [$t(3012.336) = -14.366$; $p < .001$ in 2022 and $t(2847.071) = -5.547$; $p < .001$ in 2024], and stress [$t(3028.054) = -17.642$; $p < .001$ in 2022 and $t(2817.040) = -9.121$; $p < .001$ in 2024], with female participants exhibiting worse outcomes than their male counterparts in both studies.

Finally, in the 2022 study, statistically significant differences were found in academic performance [$\chi^2(2) = 19.379$; $p < .001$], with female participants demonstrating higher academic achievement. This difference was not observed in the 2024 study, where academic performance did not show statistically significant gender differences.

Table 3 - Gender differences in sleep duration, health, well-being, and academic performance

		<i>M±SD or % (n)</i>		<i>t / χ²</i>
		Male (<i>n</i> =1,906)	Female (<i>n</i> =2,123)	
2022	Sleep Duration ¹			
	Less than 8 hours	34.5 (658)	41.3 (877)	20.507***
	Between 8 and 9 hours	56.7 (1080)	51.5 (1094)	
	10 hours or more	8.8 (168)	7.2 (152)	
	Well-being ²	16.60±4.96	13.91±5.37	17.007***
	DASS Anxiety ²	2.86±3.45	5.44±4.77	-17.147***
	DASS Depression ²	3.75±4.25	6.20±5.11	-14.366***
	DASS Stress ²	4.18±4.17	7.07±4.86	-17.642***
	Psychological symptoms ²	5.16±4.61	8.11±5.32	-19.359***
	Academic performance ¹			
	Low	9.5 (180)	7.4 (157)	19.379***
	Medium	47.7 (904)	43.0 (907)	
High	42.9 (813)	49.5 (1045)		
		<i>M±SD or % (n)</i>		<i>t / χ²</i>
		Male (<i>n</i> =1,391)	Female (<i>n</i> =1,444)	
2024	Sleep Duration ¹			
	Less than 8 hours	49.1 (683)	49.6 (716)	3.630
	Between 8 and 9 hours	46.0 (640)	47.0 (678)	
	10 hours or more	4.9 (68)	3.5 (50)	
	Well-being ²	16.74±4.78	14.74±5.01	10.976***
	DASS Anxiety ²	3.09±3.72	4.49±4.37	-9.317***
	DASS Depression ²	3.69±4.33	4.62±4.58	-5.547***
	DASS Stress ²	4.14±4.19	5.63±4.52	-9.121***
	Psychological symptoms ²	5.32±4.72	7.52±5.02	-12.187***
	Academic performance ¹			
	Low	9.1 (134)	7.0 (106)	4.357
	Medium	43.3 (636)	44.0 (662)	
High	47.6 (700)	49.0 (738)		

¹Chi-square test; ²t-test

*** $p \leq 0.001$

Note: In chi-square analyses, bolded values indicate adjusted standardized residuals > 1.96. In the t-test results, bolded values indicate statistically significant differences between groups.

Statistically significant associations between sleep duration and levels of academic performance were identified in both the 2022 [$\chi^2(4) = 49.051$; $p < .001$] and 2024 [$\chi^2(4) = 10.471$; $p < .001$] datasets. In 2022, students who reported sleeping fewer than 8 hours per night tended to have higher academic performance, while in 2024, those who slept between 8 and 9 hours performed better academically.

Statistically significant differences in well-being were observed only in the 2022 study [$F(2, 4120) = 17.676$; $p < .001$], with students reporting average academic performance showing the highest levels of well-being. Anxiety [$F(2, 2919) = 11.044$; $p < .001$ in 2022; $F(2, 2918) = 19.457$; $p < .001$ in 2024], depression [$F(2, 2919) = 9.573$; $p < .001$ in 2022; $F(2, 2881) = 29.246$; $p < .001$ in 2024], and stress [$F(2, 2921) = 13.290$; $p < .001$ in 2022; $F(2, 2850) = 3.439$; $p = .032$ in 2024] levels also varied significantly by academic performance in both studies. In 2022, students with lower academic performance reported more symptoms of anxiety and depression, while those with average performance experienced fewer stress symptoms. In 2024, students with higher academic performance reported fewer symptoms across all three mental health indicators.

Psychological distress symptoms also differed significantly in the 2022 study [$F(2, 4098) = 8.856$; $p < .001$]. Students with lower academic performance reported more symptoms, whereas those with average performance reported fewer. This pattern did not emerge in the 2024 data.

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Table 4 - Academic performance differences by sleep duration, health, and well-being

		<i>M</i> ± <i>SD</i> or % (<i>n</i>)			<i>F</i> / χ^2
		Low (<i>n</i> =317)	Medium (<i>n</i> =1,738)	High (<i>n</i> =1,818)	
2022	Sleep Duration ¹				
	Less than 8 hours	40.4 (128)	33.4 (581)	43.5 (791)	49.051***
	Between 8 and 9 hours	48.9 (155)	57.1 (992)	50.5 (918)	
	10 hours or more	10.7 (34)	9.5 (165)	6.0 (109)	
	Well-being ²	14.59±6.30	15.65±5.44	14.67±5.12	17.676***
	DASS Anxiety ²	5.55±5.27	4.17±4.39	4.14±4.29	11.044***
	DASS Depression ²	6.45±5.69	5.04±4.94	4.98±4.70	9.573***
DASS Stress ²	6.46±5.34	5.24±4.69	6.09±4.76	13.290***	
Psychological symptoms ²	7.35±5.89	6.39±5.29	7.00±5.04	8.856***	
		<i>M</i> ± <i>SD</i> or % (<i>n</i>)			<i>F</i> / χ^2
		Baixo (<i>n</i> =229)	Médio (<i>n</i> =1,234)	Alto (<i>n</i> =1,400)	
2024	Sleep Duration ¹				
	Less than 8 hours	55.0 (126)	50.9 (628)	47.4 (664)	10.471*
	Between 8 and 9 hours	39.7 (91)	44.6 (550)	49.0 (686)	
	10 hours or more	5.2 (12)	4.5 (56)	3.6 (50)	
	Well-being ²	15.40±5.73	15.83±5.18	15.63±4.78	0.931
	DASS Anxiety ²	4.79±4.79	4.19±4.43	3.37±3.76	19.457***
	DASS Depression ²	5.77±5.67	4.57±4.78	3.64±3.99	29.246***
DASS Stress ²	5.50±5.06	5.02±4.61	4.74±4.19	3.439*	
Psychological symptoms ²	6.48±5.48	6.50±5.21	6.44±4.74	0.040	

¹Chi-square test; ²ANOVA

p* < .05; **p* ≤ .001

Note: In chi-square analyses, bolded values indicate adjusted standardized residuals > 1.96. In ANOVA results, bolded values indicate statistically significant differences between groups based on post hoc tests.

Statistically significant differences in sleep duration were found for well-being [$F(2, 4155) = 347.251$; $p < .001$ in 2022 and $F(2, 2795) = 102.707$; $p < .001$ in 2024], anxiety [$F(2, 3000) = 114.478$; $p < .001$ in 2022 and $F(2, 2797) = 54.470$; $p < .001$ in 2024], depression [$F(2, 3000) = 159.443$; $p < .001$ in 2022 and $F(2, 2758) = 80.709$; $p < .001$ in 2024], stress [$F(2, 3000) = 128.001$; $p < .001$ in 2022 and $F(2, 2737) = 63.361$; $p < .001$ in 2024], and psychological distress symptoms [$F(2, 4145) = 274.349$; $p < .001$ in 2022 and $F(2, 2805) = 87.236$; $p < .001$ in 2024] in both studies. Adolescents who reported sleeping fewer than 8 hours per night showed lower levels of well-being and higher levels of psychological distress, anxiety, depression, and stress compared to those who slept 8 hours or more.

		Less than 8 hours		Between 8 and 9 hours		10 hours or more		<i>F</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
2022	Well-being	12.59	5.18	16.37	4.86	18.41	4.87	347.251***
	DASS Anxiety	5.56	4.87	3.19	3.64	3.33	4.21	114.478***
	DASS Depression	6.81	5.34	3.76	4.01	3.59	4.49	159.443***
	DASS Stress	7.24	5.00	4.61	4.22	3.98	4.36	128.001***
	Psychological symptoms	9.07	5.41	5.55	4.59	4.55	4.77	274.349***
2024	Well-being	14.36	5.02	16.92	4.58	17.68	6.10	102.707***
	DASS Anxiety	4.61	4.48	2.98	3.50	3.74	4.46	54.470***
	DASS Depression	5.23	4.86	3.06	3.72	4.10	4.99	80.709***
	DASS Stress	5.86	4.65	3.98	3.93	4.23	4.80	63.361***
	Psychological symptoms	7.68	5.10	5.28	4.51	5.05	5.67	87.236***

*** *p* ≤ .001

Note: In ANOVA results, bolded values indicate statistically significant differences between groups based on post hoc tests.

3. DISCUSSION

Sleep plays a fundamental role in supporting adolescents' physical and mental health, well-being, and academic performance (Colrain & Baker, 2011; Dutil et al., 2022; Hysing et al., 2016; Khare et al., 2024; Paruthi et al., 2016). Building on this evidence, the present study examined the associations between sleep duration, health, well-being, and academic performance among Portuguese adolescents, using data from 2022 and 2024.

Results indicated that gender-related patterns varied across the two years. In 2022, girls reported sleeping fewer than eight hours per night and achieving higher academic performance. This trend did not persist in 2024. Existing literature suggests that girls generally report poorer sleep quality, whereas boys tend to sleep fewer hours and engage more frequently in risk-related sleep

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behaviors (Amaral et al., 2016; Meers et al., 2019). In terms of health and well-being, findings were consistent with prior studies, with girls reporting poorer outcomes (Bao & Han, 2025; Campbell et al., 2021; Gomez-Baya et al., 2022; Morken et al., 2023; Yoon et al., 2023).

Although previous evidence links sufficient, good-quality sleep with improved academic outcomes (Dutil et al., 2022; Hysing et al., 2016; Khare et al., 2024), results from this study revealed a different pattern. In 2022, students who slept less than eight hours per night reported higher academic performance. However, in 2024, better outcomes were associated with eight to nine hours of sleep. In the 2022 data, the association between sleep duration and academic performance varied across assessment periods, suggesting that contextual and behavioural factors (e.g., academic workload, engagement, and study habits) may influence this relationship (Dewald et al., 2010; Sharman & Illingworth, 2020). Although higher performance among some students with shorter sleep likely reflects increased study demands rather than a beneficial effect of reduced sleep, students reporting 8–9 hours of sleep generally achieved better outcomes, aligning with evidence that adequate sleep supports attention, memory consolidation, and executive functioning (Dewald et al., 2010; Okano et al., 2019). Additionally, the findings show that well-being, along with the absence of psychological symptoms, anxiety, depression, and stress are associated with better academic performance, reinforcing evidence that mental health and well-being contribute significantly to academic success (Monzonís-Carda et al., 2025).

Finally, the data indicate that adolescents sleeping fewer than eight hours per night consistently reported lower well-being and higher levels of psychological distress, including anxiety, depression, and stress. These findings align with previous research emphasizing the importance of adequate, regular, and high-quality sleep for maintaining both physical and mental health in adolescence (Colrain & Baker, 2011; Dutil et al., 2022; Hysing et al., 2016; Khare et al., 2024; Paruthi et al., 2016).

It should also be noted that this is a transversal study and therefore it is not possible to establish causal relationships between the variables sleep, well-being, and academic performance, limiting the conclusions to associations. Furthermore, the 2022 and 2024 samples are independent, which prevents conducting individual analyses over time.

CONCLUSION

This study underscores the vital importance of sleep for adolescents' physical health, mental well-being, and academic performance. Regularly achieving the recommended amount of sleep is fundamental for sustaining both physical and psychological health, as well as overall well-being. Adequate sleep contributes to the prevention of symptoms such as anxiety, depression, stress, and other forms of psychological distress. Additionally, sufficient sleep supports enhanced attention, memory, and learning abilities, all of which are critical for academic success. These findings emphasize the need to empower adolescents with knowledge and effective strategies to develop healthy sleep habits and minimize risky behaviors related to sleep, including late bedtimes, irregular sleep schedules, insufficient sleep duration, and voluntary sleep deprivation.

Drawing on recent, large-scale data from Portuguese adolescents (2022 and 2024), the findings reveal evolving patterns in sleep duration, mental health, and academic performance. Notably, shorter sleep predicted higher academic performance in 2022 – a pattern that shifted by 2024, reflecting changing dynamics over time. Additionally, it confirms ongoing gender differences in sleep quality and mental health, underscoring the complex relationships among sleep, well-being, and academic performance during adolescence. Therefore, key insights from this study include:

- Getting enough quality sleep (8–10 hours) is important for adolescents' mental health, well-being, and academic performance;
- Girls tend to report poorer sleep and mental health outcomes than boys, though patterns may change over time;
- Adolescents who sleep less than 8 hours show higher psychological distress and lower well-being;
- Better mental health and well-being are linked to higher academic achievement.
- Promoting healthy sleep habits is crucial to support adolescent health and academic performance.

AUTHORS' CONTRIBUTION

Conceptualization, M.R., A.C. and M.M.; data curation, M.M.; formal analysis, M.M. and M.M.; funding acquisition, M.M. and N.R.; investigation, M.M. and N.R.; methodology, M.R. and A.C.; project administration, M.M. and N.R.; resources, M.M. and N.R.; software, M.M. and N.R.; supervision, T.G., T.P. and M.M.; validation, T.G., T.P. and M.M.; visualization, M.R.; writing – original draft, M.R. and A.C.; writing – review & editing, T.G., T.P. and M.M.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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