



## ORIGINAL ARTICLE

# Factors associated with short sleep duration in adolescents



Érico Pereira Gomes Felden<sup>a,\*</sup>, Douglas Filipin<sup>a</sup>, Diego Grasel Barbosa<sup>a</sup>,  
Rubian Diego Andrade<sup>a</sup>, Carolina Meyer<sup>a</sup>, Fernando Mazilli Louzada<sup>b</sup>

<sup>a</sup> Universidade do Estado de Santa Catarina (Udesc), Florianópolis, SC, Brazil

<sup>b</sup> Universidade Federal do Paraná (UFPR), Curitiba, PR, Brazil

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### PALAVRAS-CHAVE

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### Abstract

**Objective:** This study aimed to investigate the prevalence and factors associated with short sleep duration in adolescents from Maravilha – Santa Catarina (SC), southern Brazil.

**Methods:** The sample consisted of 516 adolescents aged 10–19 years of both genders. Issues associated with short sleep duration and difficulty falling asleep, chronotype, daytime sleepiness, physical activity, sedentary behavior and weight status were investigated.

**Results:** The prevalence of short sleep duration (<8h on school days) was 53.6%. Adolescents aged 17–19 years showed a 2.05-fold (95%CI: 1.20–3.50) greater prevalence of short sleep duration than those aged 10–12 years. The ones studying in morning and evening shifts had a higher prevalence of short sleep duration compared to those in the afternoon shift. Older age and school shift were the main factors associated with short sleep duration.

**Conclusions:** Adolescents from Maravilha showed high prevalence of short sleep duration, and older adolescents that studied in the morning and evening shifts showed reduced sleep.

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### Fatores associados à baixa duração do sono em adolescentes

#### Resumo

**Objetivo:** Investigar a prevalência e os fatores associados à baixa duração do sono de adolescentes do município de Maravilha (SC), Brasil.

**Métodos:** A amostra foi formada por 516 adolescentes, de 10 a 19 anos, de ambos os sexos. Foram investigadas questões associadas à baixa duração do sono, como dificuldade de pegar no sono, cronotipo, sonolência diurna, atividade física, comportamento sedentário e *status* de peso.

\* Corresponding author.

E-mail: [ericofelden@gmail.com](mailto:ericofelden@gmail.com) (É.P.G. Felden).

**Resultados:** A prevalência de baixa duração do sono (<8h nos dias com aula) foi de 53,6%. Os adolescentes com 17-19 anos tiveram 2,05 (IC95% 1,20-3,50) vezes mais chances de apresentar baixa duração do sono do que os com 10-12 anos. Aqueles que estudavam nos turnos manhã e noite apresentaram maior prevalência de baixa duração de sono, com relação aos do turno da tarde. Idade mais avançada e turno escolar foram os principais fatores associados à baixa duração do sono.

**Conclusões:** Os adolescentes de Maravilha apresentaram alta prevalência de baixa duração do sono. Os mais velhos, que estudam de manhã e à noite, apresentaram sono reduzido.

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## Introduction

Human beings go through transformations throughout life, both in physical aspect and in behavior.<sup>1</sup> In this context, especially in adolescence, it is possible to observe significant changes in the expression of the sleep/wake cycle, including a delay in the sleep phase, characterized by going to sleep and waking up at late hours.<sup>2,3</sup> This biological tendency may be exacerbated by behaviors such as the use of electronic media during the night, which, added to social engagements early in the morning, increase the prevalence of short sleep duration in this population.<sup>4</sup>

Over the years, in adolescence, the prevalence of short-duration, poor quality of sleep and excessive daytime sleepiness tends to progressively increase.<sup>1-8</sup> This trend was identified in the study by Bernard et al.,<sup>9</sup> with adolescents from São Paulo. The authors observed that the prevalence of short sleep duration was 5% at 10 years of age, 14% at 12 years, reaching 59% at the end of adolescence.

Recent studies have been trying to understand which factors are associated with the reduction of sleep hours in adolescence.<sup>3,8,10-12</sup> In this context, some biological variables, as well as social and behavioral ones, are analyzed in order to better understand the expression of the sleep/wake cycle at this stage of life. This issue becomes more important as the short sleep duration, particularly during adolescence, is associated with cognitive deficits and decrease in health status.<sup>13-15</sup>

Considering the negative effects of short sleep duration in adolescents and the few population-based studies found in Brazil, especially in small municipalities, this study aimed to investigate the prevalence and factors associated with short sleep duration in adolescents from the municipality of Maravilha, in the state of Santa Catarina, southern Brazil.

## Method

The sample consisted of 516 adolescents (263 males), with a mean age of 14.57 (1.77) years. This sample was based on a population of 2969 adolescents aged 10–19 years, of both genders, regularly enrolled in public schools in the municipality of Maravilha, state of Santa Catarina, southern Brazil in 2013.<sup>16</sup>

The sample size was defined using the proposal of Luiz and Magnanini,<sup>17</sup> considering a sampling error of five percentage points and 1.5 for the design effect. Based on this

calculation, a minimum of 513 adolescents was estimated to constitute a representative school-based sample in the municipality. Sample selection was performed by clusters and proportional to the age groups of 10–14 and 15–19 years, taking into account the population of students in the final years of elementary school and in the three years of high school.

The adolescents answered a structured questionnaire containing questions on the following factors: sociodemographic, related to sleep and health.

As for sociodemographic factors, the following were assessed: gender, age, place of residence (rural or urban), school shift (morning, afternoon and evening), income (minimum wages received by the family) and schooling of the household head. Regarding income, the adolescents were classified as low income (up to 3 minimum wages – MW), middle income (3–6 MW) and high income (more than 6 MW).

Regarding factors related to sleep, the following data were analyzed: sleep duration was evaluated according to the time in bed, based on the times when going to sleep and waking up on school days. The adolescents with less than 8 h a day in bed were considered as having short sleep duration.<sup>3,9,18</sup> Additionally, the time when going to sleep and waking up were investigated considering specific days of the week: from Monday to Thursday, from Friday to Saturday, from Saturday to Sunday, and from Sunday to Monday. The difficulty in falling asleep was investigated through the question “Do you have difficulty in falling asleep?”, with the following response options: (a) never, (b) sometimes, (c) always.<sup>3</sup>

Daytime sleepiness was assessed using the Pediatric Daytime Sleepiness Scale (PDSS).<sup>19</sup> This scale consists of eight multiple-choice questions. Each question has five response options, using a Likert scale: 0=never; 1=almost never; 2=sometimes; 3=frequently and 4=always. At the end, question scores were summed, with the scale score ranging from zero to 32. High scores indicate more daytime sleepiness. As there are no classifications for this scale, the adolescents were allocated considering the tertiles. Thus, those adolescents at the third tertile (highest score of PDSS) were classified as having more daytime sleepiness.

Chronotype was investigated using the Munich Chronotype Questionnaire (MCTQ).<sup>20</sup> In this questionnaire, the chronotype definition is given as a phase of the sleep/wake cycle, represented by the corrected half-sleep phase, also considering the free days. The chronotype in MCTQ is given in hours, ranging from 0 to 12h; lower values represent

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