

Prevalence of common sleep problems in school-aged Saudi students



Nora Alafif*

Department of Community Health Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

ARTICLE INFO

Article history:

Received 19 May 2020

Received in revised form

30 July 2020

Accepted 6 August 2020

Keywords:

Saudi children

School-age

Sleep problems

ABSTRACT

Sleep is a complex and multi-faceted behavior. Child sleep is identified as a critical marker of health and well-being with a familiar association between sleep duration, and numerous studies have confirmed that improper sleep can lead to obesity. The aim of this study was to investigate the prevalence of sleep problems among school-aged children in Riyadh. A total of 122 Saudi students (age range, 5–13 y) from various schools in the capital city were enrolled in this cross-sectional study. Of the students recruited, 46.8% were boys, and 53.2% were girls. Baseline characteristics including, body mass index, sleeping problems, and sleep habits, recorded based on questionnaire responses to help identify problematic sleep domains in school-aged children, particularly comorbid sleep disturbances and sleep behaviors. In this study, the most common sleep problem was that the child has difficulty getting out of bed in the morning (63.1%), followed by sleeping too little (40.2%) and restless sleep and moves a lot (34.4%). This study concludes that sleep problems are prevalent among 94.4% of school-aged children (5–13 y). Future studies should be conducted with larger sample sizes. Participation by educational programs and the community is also needed.

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1. Introduction

Sleep in children has been documented as an important marker for both well-being and health (Brazendale et al., 2019). Sleep is essential to maintain children's health. Poor or irregular sleep, or lack of sleep, in early childhood, can lead to excessive weight gain, which leads to overweight and obesity. The short duration of sleep is also associated with worse cognitive, cardiometabolic, and health outcomes in children (Miller et al., 2019; Matricciani et al., 2019). According to the National Sleep Foundation in the United States, the minimum required sleep duration is 14 to 17 hours for newborns (age, 0–3 mo), 12 to 15 hours for infants (age 4–11 mo), 11 to 14 hours for toddlers (age, 1–2 y), 10 to 13 hours for preschool children (age, 3–5 y), 9 to 11 hours for school-aged children (age, 6–13 y), 8 to 10 hours for adolescents (age, 14–17 years), 7 to 9 hours for young (age, 18–25 y) and middle-aged (age, 26–64 y) adults, and 7 to 8 hours for older adults (age, ≥65 y) (Ohayon et al., 2019). The

American Academy of Sleep Medicine recommends that preschool (3–5 y) children require a minimum of 10 to 13 hours of sleep and that school-aged children (6–13 y) require 9 to 11 hours of sleep for optimal health (Chaput et al., 2018). Childhood obesity has become one of the major health issues in the global population (Camp et al., 2020). The increasing prevalence of childhood obesity is associated with serious health issues and comorbidities related to obesity (Kumar and Kelly, 2017). Global health observatory data from the World Health Organization in 2017 documented a total of 340 million obese children and adolescents between the ages of 5 and 19 years of age (Faienza et al., 2020). Despite the significant escalation in the rate of obesity in children throughout the world during the past three decades, there is currently no clear treatment strategy (Cuda and Censani, 2019).

There have been few cross-sectional studies conducted in Saudi Arabia to identify sleep habits among Saudi children from 2005–2009 (BaHammam, 2006). The first study aimed to assess sleep problems in Saudi elementary school children ranging in age from 5 to 13 years. A total of 1012 complete questionnaires were included in the analyses. The results of this study show that daytime fatigue was the most prevalent sleep problem (37.5%), followed by bedtime resistance (26.2%) and delay of sleep onset (11.8%). The second study was conducted to estimate sleep duration in Saudi

* Corresponding Author.

Email Address: nalafeef@ksu.edu.sa

<https://doi.org/10.21833/ijaas.2020.12.011>

Corresponding author's ORCID profile:

<https://orcid.org/0000-0003-0273-0130>

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elementary school children between the ages of 6 and 13 years and to compare the results with data published in other societies. The results of this study found that nighttime sleep duration is shorter in Saudi school children compared with reports published in other parts of the world (BaHammam, 2006). The present study aims to investigate the prevalence of sleep problems in Saudi school-aged children between the ages of 5 and 13 years.

2. Materials and methods

2.1. Recruitment of children

This cross-sectional study was conducted at the female campus of the Department of Community Health Sciences in the College of Applied Medical Sciences at King Saud University in the capital city of Saudi Arabia. A total of 122 children (age range, 5–13 y) were recruited for this study based on a multistage stratified sampling technique. Of the 122 participants, 46.8% were boys, and 53.2% are girls. The participants were recruited from the north, west, south, and eastern regions of Riyadh and included students from international, non-profit, and national private schools from each region. The inclusion criteria for the children were: From the Riyadh region and aged between 5 and 13 years. The exclusion criteria were: Age younger than 5 years or older than 13 years and free of chronic disease.

2.2. Study instruments

Study assessments included sleep habits, sleep duration, sleep problems, and body mass index (BMI). Sociodemographic questions were used to identify the social class, job, education level, and accommodations of the children's parents. Information was gathered using online questionnaires, which were sent electronically, then completed and returned by parents and guardians. The short questionnaire developed by the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development, known as the children sleep habits questionnaire (CSHQ), was used to measure the sleep habits in the children in this study. The CSHQ is a parent-reported sleep screening instrument designed specifically for use with school-aged children. The CSHQ consists of questions related to bedtime resistance, sleep onset delay, sleep duration, night walking, sleep-disordered breathing, and daytime sleepiness, which reflect important sleep domains covering the major medical and behaviors sleep disorders (Waumans et al., 2010).

This authenticated questionnaire was selected after a review of the literature found this particular questionnaire is often used to assess the sleep habits of children. For example, Abou-Khadra et al. (2013) performed case-control studies to assess sleep problems in children with attention-deficit or hyperactivity disorder.

2.3. Anthropometric and other measurements

Obesity is measured through BMI, which is determined using a combination of weight in kg and height in cm. Based on BMI values, children may be categorized as obese, overweight, normal weight, or underweight. BMI classifications are based on the World Health Organization BMI for ages 5 to 19 years old.

2.4. Statistical analysis

Data were analyzed using SPSS (version 15.0; IBM Corp., Armonk, NY) and were presented as percentages (%). Data was used to examine the prevalence of sleep problems among school-aged children. Descriptive statistics are provided as a means and standard deviations (Khan et al., 2019).

3. Results and discussion

This study included a total of 122 children from numerous schools in the capital city of Saudi Arabia. The children were between the ages of 5 and 13 years (mean age, 9.41 ± 2.61 y). In this study, 54.9% of the children were girls, and 45.1% were boys. The mean weight and height of the children were 35.1 ± 17.9 kg and 125.52 ± 24.3 cm, respectively. The BMI of the study group was 22.6 ± 11.56 kg/m². The anthropometric details for the study group are provided in Table 1. BMI is shown in Table 2. Most of the students were categorized as underweight (45.1%), followed by normal BMI (23.8%), overweight (18.8%), and obese (12.3%). None of the students in this study were found to be morbidly obese.

Table 1: General characteristics of school children

General characteristics	Frequency	Percentage
Age (y)	9.41 ± 2.61	—
Sex (male:female)	55:67	45.1%:54.9%
Weight (Kg)	35.1 ± 17.97	—
Height (cm)	125.52 ± 24.3	—
BMI (kg/m ²)	22.6 ± 11.56	—

BMI, body mass index

Regarding sleep, the results of this study showed that 93.4% of the children have poor sleep habits, whereas only 6.6% demonstrated good sleep habits. There was no significant correlation found between sleep duration and BMI (Pearson correlation coefficient (r) = 0.014; P = 0.875).

Table 2: BMI categorization of children

Categorization of BMI	Frequency	Percentage
Underweight	55	45.1%
Normal	29	23.8%
Overweight	23	18.8%
Obesity	15	12.3%
Morbid obesity	0	0%

BMI, body mass index

Table 3 details the children's problems associated with sleep. Sleep disturbance was rare for 73% of the participants, whereas 22.1% of the children

usually experienced this, and 4.9% sometimes experienced this.

In this study, 6.5% of the children sometimes snore, whereas 27.1% of them usually snore, and 66.4% of children rarely snore. Some of the children (4.1%) were reported to stop breathing during their sleep, whereas only 0.8% experienced this problem sometimes, and 95.1% experienced it rarely. Among the children included, 13.1% were reported to usually wet the bed during sleep, only 6.5% were reported to sometimes wet the bed, and 80.4% of them were reported to rarely wet the bed. In this study, 34.4% of children experienced restless sleep and moved a lot daily, 22.1% were sometimes restless, and 43.5% were rarely restless. Only 13.9%

of the children were reported to usually grind their teeth during sleep, 10.7% sometimes grind their teeth, and 75.4% rarely grind their teeth.

Only 5.7% of the children were reported to have a regular sleepwalking disorder, whereas 0.8% of them sometimes experienced sleepwalking, and 93.5% of them rarely sleepwalk. Sleep talking was reported for 28.6% as usual, 5.8% as sometimes, and 65.6% as rare. Nightmares were reported as follows: 27.1% of the children experienced them usually, 2.4% sometimes, and 70.5% rarely experienced nightmares. Only 4.9% of the children usually wake from sleep screaming, 3.3% sometimes do, and 91.8% of report this as very rare.

Table 3: Children with sleeping problems

Sleeping problems	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)
Sleep disturbance (frequent awaking)	27 (22.1%)	06 (4.9%)	89 (73%)
Snoring	33 (27.1%)	08 (6.5%)	81 (66.4%)
Stop breathing during sleep	05 (4.1%)	01 (0.8%)	116 (95.1%)
Bed wetting	16 (13.1%)	08 (6.5%)	98 (80.4%)
Restless and moves a lot	42 (34.4%)	27 (22.1%)	53 (43.5%)
Grinds teeth during sleep	17 (13.9%)	13 (10.7%)	92 (75.4%)
Sleep walking	07 (5.7%)	01 (0.8%)	114 (93.5%)
Talking during sleep	35 (28.6%)	07 (5.8%)	80 (65.6%)
Nightmares	33 (27.1%)	03 (2.4%)	86 (70.5%)
Screaming while asleep	06 (4.9%)	04 (3.3%)	112 (91.8%)

The sleep behaviors of the children in this study are shown in Table 4. A total of 40.2% were reported to regularly sleep little, 10.6% were reported to sometimes sleep little, and the remaining 49.2% were reported to rarely sleep little. More than 63.1% of the children were reported to have difficulty getting out of bed in the morning regularly, 8.2% were reported to have difficulty sometimes, and 28.7% were reported to rarely have difficulty. A total

of 36.9% were reported to usually experience sleep latency (difficulty falling asleep within 20 minutes after going to bed), whereas 52.4% of the participants experienced this sometimes, and only 10.7% of them experienced sleep latency rarely. Only 27.1% of the children were reported to consistently be tired during the day, 5.7% were sometimes tired during the day, and 62.2% were tired during the day erratically.

Table 4: Sleep behavior among children

Sleep behavior	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)
Sleeps too little	49 (40.2%)	13 (10.6%)	60 (49.2%)
Child has difficulty getting out of bed in the morning	77 (63.1%)	10 (8.2%)	35 (28.7%)
Falls asleep within 20 minutes after going to bed	45 (36.9%)	64 (52.4%)	13 (10.7%)
Feels tired during the day	33 (27.1%)	07 (5.7%)	82 (62.2%)

A total of 27.9% of the children were reported to regularly fall asleep while watching television, whereas 7.4% sometimes fall asleep, and 64.7% very rarely fall asleep watching television. On a daily basis, 50% of the children rarely fall asleep in a vehicle, 41.8% do on occasion, and 8.2% fall asleep in a vehicle sometimes.

This study aims to explore the prevalence of sleep problems in school-aged Saudi children between 5 and 13 years of age. This cross-sectional study was conducted to determine common sleep problems among Saudi children between 5 and 13 years old. Moreover, this study provided information on sleep habits and practices in this age group in Riyadh, the capital city of Saudi Arabia. However, this relationship remains unclear because of the small sample size.

Tables 3, 4, and 5 demonstrate the sleeping issues that occurred in the Saudi children included in this study. Restless sleep and moving a lot during sleep

were commonly documented among Saudi children, with these being reported for 34.4% of the children on a regular basis. Restless sleep with a lot of movement might indicate leg or arm jerks during sleep. This is associated with negative physiological consequences and needs further clinical investigation.

Short sleep duration is defined as a total sleep duration of fewer than 6 hours per day for adults and less than 9 to 11 hours per day for children between the ages of 6 and 13 years. This is often identified using polysomnography on a single night. Inadequate sleep, defined as sleep duration that is less than the age-based recommendations, is common among school-aged children (Tambalis et al., 2018). In our study, 40.2% of the children were reported to usually sleep too little (Table 4).

Previous studies regarding sleep problems among Saudi children found that sleep problems, such as daytime fatigue, bedtime resistance, sleep onset

delay, and short nighttime sleep duration, are prevalent among children (BaHammam et al., 2012; BaHammam, 2006). Our findings are consistent with these previous studies in that sleep problems are highly prevalent. Among the children who participated in our study, 94.4% were found to have

sleep problems. The most common sleep problem identified was that the child has difficulty getting out of bed in the morning (63.1%), followed by sleeping too little (40.2%) and restless sleep and moves a lot (34.4%).

Table 5: Daytime sleepiness among children

Associated parameters	Usually (5–7)	Sometimes (2–4)	Rarely (0–1)
Sleeps while watching TV	34 (27.9%)	09 (7.4%)	79 (64.7%)
Sleeps in the vehicle	51 (41.8%)	10 (8.2%)	61 (50%)

In our study, the prevalence of sleep disorders was commonly high in boys when compared with girls; other studies do not demonstrate such variations. Furthermore, sleep latency was documented more in girls, whereas sleep interruption was more prevalent among boys. Regarding this, our study was in agreement with a previous study conducted in the Saudi population (BaHammam et al., 2006).

This study has several limitations: (1) small sample size because of time limitations; (2) the study has confirmed parental reports rather than the objective measures; (3) measurements of sleep were based on parental information and non-objective measurements, such as actigraphy, meaning that the sample reflected a majority of children with sleeping problems, which then affects the efficiency of the study results; (4) based on the cross-sectional study design, opportunities of recall bias may not be ruled out; (5) results are specific for Riyadh and cannot be inferred to rural or outlying cities in Saudi Arabia; and (6) other factors, such as puberty status and parental BMI, were not adjusted. The strength of this study lies in the fact that it is the initial study conducted in the population of Riyadh to identify sleeping behaviors in children. Finally, a valid questionnaire was used to conduct this study.

4. Conclusion

The results of this study show that sleep problems are prevalent among children between the ages of 5 and 13 years. Our findings provide some insight into previously unanswered questions regarding children with sleep problems and their sleep habits, and they identify problematic sleep domains in school-aged children. In particular, it is important to identify comorbid sleep disturbances, sleeping behaviors, and sleep latency in school children. Future studies should be conducted with larger sample sizes to ensure a definitive result. Overall, educational programs and community participation is needed.

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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