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## The duration of sleep in adolescent student in Denpasar (p. 2706-9)

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I Gusti Agung Gede Ari Swanda, I Putu Eka Widyadharma, Rindha Dwi Sihanto, Desak Ketut Indrasari Utami

Department of Neurology, Faculty of Medicine, Udayana University, Bali, Indonesia



## Abstract

**Aim:** To determine the duration of sleep of adolescents in high school in Denpasar.

**Material and Methods:** A cross-sectional descriptive study, using a randomized sampling technique Performed in high school in Denpasar by the questionnaire-based survey. The inclusion criteria are adolescents of high school-aged 12-18 years agreed and signed a letter of approval as the subject of the study. Samples with medical disorders, psychiatric disorder, neurological disorders excluded. Research variables included: 1. Teen sleep duration in one day; 2. Variety of activities carried out by the subject both in & out school; 3. Sports habits; 4. Body Mass Index. Retrieving Data with the Pittsburgh Sleep Quality Index (PSQI), the Hamilton Halt Rating Scale (HARS) depression scale, obtained from the questionnaire the value of sleep duration and sleep quality index. Data were processed using SPSS 22.

**Results:** 183 samples and 18 samples excluded because of medical illness. As many as 59.3% of women, the average age of 16.04 years, of which 54.5% sleep duration 8 hours with an average of 6-6.5 hours per day and started to sleep at 23.00 and 24.00, BMI 61,8% normal. The regular event of the subject is 1.72 hours per day outside the routine learning activities in the classroom, with the highest number of hours of exercise each day is 3 hours.

**Conclusion:** The average sleep duration of adolescents in high schools in Denpasar is lacking and tends to prefer to sleep late at night.

**Keywords:** Duration of sleep; lacking; adolescents; high school.



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# The duration of sleep in adolescent student in Denpasar

I Gusti Agung Gede Ari Swanda, I Putu Eka Widyadharma, Rindha Dwi Sihanto, Desak Ketut Indrasari Utami

Department of Neurology, Faculty of Medicine, Udayana University, Bali, Indonesia

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## INTRODUCTION

Sleep can be said to be a primary activity in brain development. Teenagers are not only a time of transition from brain and body development to being an adult, but also a difficult period including the occurrence of hormonal fluctuations, permanent brain reorganization, and very rapid progress (2). Adolescence is a time of increasing independence and the need to do social roles, where all of them will influence behavior, including sleep behavior (1). Adolescents, according to WHO 2018, are at the age of 12-18 years.

Sleep is one of the primary behaviors in adolescents who spend more than a third of the time in a day. Brain activity during sleep in adolescents provides a unique picture of the development of cortical maturity and completes brain maturity when awake. Rest actively supports cognitive function when awake in adolescents. The relationship between sleep and development is significant; reducing sleep time during adolescence can permanently change brain development and behavior (1). Sleep characteristics

in adolescents tend to prefer to sleep late at night. Teens sleep more frequently than children, even though waking time has spent in school and work (3,4). This tendency influenced by the many external factors, such as night work schedules, the number of academic assignments, midnight television viewing, and social interaction activities (5).

Drowsiness during the day in adolescents becomes an epidemic, the cause of this drowsiness comes mostly from social factors compared to an increase in homeostatic sleep urges. Many teenagers have a busy schedule while at school to reduce sleep time. Unlike adults, teens need more time to sleep, 9-10 hours per night, but 45% reported as teenagers sleeping less than eight hours per night (2,6). According to The National Sleep Foundation, the recommended duration of sleep for adolescents is 8-10 hours (1). The Ministry of Health of the Republic of Indonesia also supports the need for sleep according to age, where at the age of 12-18 years it is recommended to sleep with a duration of 8-9 hours (3,6).

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**Corresponding Author:** I Putu Eka Widyadharma, Department of Neurology, Faculty of Medicine, Udayana University, Bali, Indonesia

**E-mail:** eka.widyadharma@unud.ac.id

The researcher aimed found out the average duration of sleep in high school in Denpasar and to examine more deeply the characteristics of the teenager.

## MATERIAL and METHODS

This study is a descriptive cross-sectional study. The inclusion criteria specified in this study are 1. Adolescents of high school aged 12-18 years; 2. Have agreed and signed a letter of approval as the subject of the study. Exclusion criteria are 1. Having certain medical disorders such as pulmonary or cardiovascular disease and chronic pain that is occurring during the study, or other medical conditions, so it is not possible to participate in research; 2. Having severe psychiatric disorders such as schizophrenia, mania, depression; 3. Having certain neurological disorders, such as dementia, parkinsonism, and 4. Disagreeing informed consent. Research variables included: 1. Teen sleep duration in 1 day; 2. Activity is a variety of activities carried out by the subject (adolescent) both in school or outside school; 3. Sports habits are sports activities that are routinely carried out by subjects (teenagers) at least three times a week; 4. Body mass index is the ratio of body weight to height using the formula of weight (in kilograms) divided by height (in meters). Divided into 4 categories, namely underweight (<18.5), normal (18.5-25), overweight (> 25-30) and obese (> 30). Retrieving data with the PSQI questionnaire, the HARS depression scale, obtained from the questionnaire the value of sleep duration and sleep quality index. Data were processed using computer assistance SPSS 22 program and analyzed descriptively..

## RESULTS

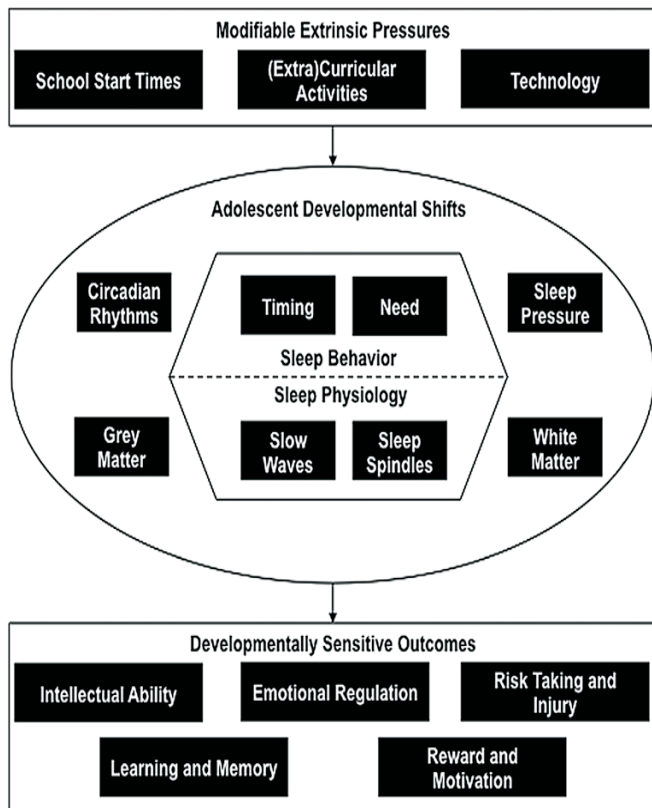
This study involved 183 research subjects who were high school students in Denpasar and conducted data collection according to the research flow. Data collection was carried out in 2018. Of the 183 subjects collected, 18 items were excluded due to medical illness, drug use, and other sleep disorders that occurred at the time of the study. The total items analyzed were 165 subjects. The characteristics of the research subjects included age, gender, activity, exercise habits, sleep duration. The primary characteristics of the research subjects studied in this study were gender, age, BMI, daily activities outside of school activities, exercise habits and the presence or absence of sleep disorders during the last one month. Based on gender, 40.7% of men and 59.3% of women. The age of the study subjects averaged 16.04 years with a range of 14 years to 17 years. This age range included in the age range of teenagers in high school. The body mass index of the study subjects divided into four categories, namely underweight (<18.5), normal (18.5-25), overweight (> 25-30), and obese (> 30). Activity is a variety of activities carried out by the subject (adolescents) both in school and outside school, seen from the number of long hours of the operation carried out every day. Sports habits are sports activities that are routinely carried out by subjects (teenagers) at least three

times a week, divided into two categories, namely yes and no. The duration was calculated from the period of deep sleep at night <8 hours, 8-10 hours, and >10 hours. From the demographic data questionnaire that the authors provided, the characteristics of 165 respondents obtained as follows (Table1).

**Table 1. Characteristics Subjects (n=165)**

Characteritics	Frequency	%
<b>Sex</b>		
Male	67	40.7%
Female	98	59.3%
<b>Body Mass Index (BMI)</b>		
Underweight	42	25.4%
Normal	102	61.8%
Overweight	11	6.6%
Obese	10	6.2%
<b>Activity</b>		
0 hour/day	10	6.0%
1 hour/day	72	43.6%
2 hours/day	64	38.8%
3 hours/day	19	11.6%
<b>Exercise</b>		
Yes	126	76.4%
No	39	23.6%
<b>Sleep disorder</b>		
Yes	81	49.1%
No	84	50.9%
<b>PSQI</b>		
Good	75	45.5%
Poor	90	54.5%
<b>Sleep Length</b>		
< 8 hours	90	54.5%
8-10 hours	75	45.5%
>10 hours	-	-

The subject's body mass index ranged from 15.6 kg / m2 to 33.5 kg / m2, with an average BMI of 20.97 kg / m2. Forty-two subjects (25.4%) had BMI in the underweight category, 102 subjects (61.8%) in the healthy group, 11 subjects (6.6%) in the overweight group and ten subjects (6.2%) in the obese group. Subject activities are quite diverse, both in school and outside of school. The regular event of the subject is 1.72 hours per day outside the routine learning activities in the classroom, with the highest number of hours of exercise each day is 3 hours. As many as 76.4% of subjects have the habit of routinely exercising with a span of 1 to 3 hours. While the remaining 23.6% do not have the habit of using. Judging from the sleep disturbance, 49.1% had poor sleep quality. Also, 50.9% had good sleep quality. Based on the PSQI value, 75 subjects (45.5%) had good sleep quality scores, and as many as 90 subjects (54.5%) had poor sleep quality values. Subjects obtained sleep duration <8 hours 90 subjects with an average sleep duration of 6.5 hours per day, nominally 8-10 hours 75 subjects (45.4%).



**Figure 1.** Determinants and consequences of sleep in adolescents (1)

## DISCUSSION

Teenagers defined as social, emotional, and cognitive transition periods from childhood to adulthood. Based on the results of the above research, researchers can answer questions about the proportion of sleep duration of high school students in Denpasar. From a total of 165 respondents, it found that teen sleep duration was <8 hours with an average sleep duration of 6.5 hours per night. Based on the results of previous studies, it is appropriate, but 45% are reported to be teenagers sleeping less than eight hours per night (2,7). Sleep characteristics in adolescents tend to prefer to sleep late at night. Following with this study where teenagers in Bali began to relax between 23:00 and 24:00. Teens sleep more frequently than children, even though waking time has spent in school and work (3,4). This tendency influenced by the many external factors, such as night work schedules, the number of academic assignments, midnight television viewing, and social interaction activities (4). Teenagers need more time to sleep, 9-10 hours each night (8).

Duration characteristics of adolescents seen from gender, body mass index, activities outside of school, exercise habits, the severity of insomnia. From the results of the study, the percentage according to male sex was 40.7% and 59.3% of women. Following the discussion of several previous sources, which stated that the duration of sleep is shorter in women. Female sex is one of the risks of insomnia (9). Sleep disturbances found to occur more in women (10). That is said to be related to excessive

concerns in women and more introspective. Permanent risk factors for shorter sleep duration increased age, female sex, comorbid factors, low economic status of negative moods and increased emotional reactions, especially those related to visual responses. Sleep is not only an opportunity to rest the brain, but recent studies show that sleep also plays an active role in brain formation in adolescents. The study found during sleep was positively correlated with the volume of grey matter in the hippocampus and the substantive integrity of the alba (1).

Lack of sleep is associated with an increase in negative moods and an increase in emotional reactions, especially those related to visual responses. Sleep disturbances can see in patients with depression, ADHD, impaired impulse control, anxiety, bipolar disorder, indicating an essential role for sleep in adolescents in adolescent mental health. The mechanism of psychiatric conditions influenced by rest is still not fully understood to date (1).

In this study, the percentage of BMI 61.8% of subjects included in the healthy category. The category of increasing body weight 12.9% where short sleep patterns at night in adolescents were associated with an increase in body weight from 32 subjects (9). Increased ghrelin and decreased leptin, play a role in the relationship of sleep patterns with an increase in a diet, which ultimately leads to obesity. Low physical activity is a risk factor for the appearance of sleep disorders. Based on the results of the study, it found that adolescents with short sleep duration had a normal activity outside of school with 1.72 hours and regular exercise habits of 66% exercising regularly. Whereas in adolescents with sufficient sleep duration, the percentage of routine exercise that is greater is 86.2%.

## CONCLUSION

The average sleep duration of adolescents in high schools in Denpasar is lacking and tends to prefer to sleep late at night.

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*I Gusti Agung Gede Ari Swanda ORCID: 0000-0001-7531-2373*

*I Putu Eka Widyadharma ORCID: 0000-0002-4554-0348*

*Rindha Dwi Sihanto ORCID: 0000-0003-4774-0164*

*Desak Ketut Indrasari Utami ORCID: 0000-0002-2158-2922*

## REFERENCES

1. Tarokh L, Saletin JM, Carskadon MA. Sleep in adolescence: physiology, cognition, and mental health. *Neuroscience and biobehavioral reviews*. 2016;70:182-8.
2. Hagenauer MH, Lee TM. Adolescent sleep patterns in humans and laboratory animals. *Hormones and behavior*. 2013;64:270-9.
3. Crowley SJ, Acebo C, Carskadon MA. Sleep, circadian rhythms, and delayed phase in adolescence. *Sleep medicine*.



- 2007;8:602–12.
4. Gradisar M, Gardner G, Dohnt H. Recent worldwide sleep patterns and problems during adolescence: a review and meta-analysis of age, region, and sleep. *Sleep medicine*. 2011;12:110–8.
  5. Cain N, Gradisar M. Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Med* 2010;11:735–742.
  6. Angels MR. Gambaran Durasi Tidur Pada Remaja Dengan Kelebihan Berat Badan. *Jurnal e-Biomedik*. 2014;1:849-53.
  7. Carskadon MA. Sleep in adolescents: the perfect storm. *Pediatric Clin* 2011;58: 637–47.
  8. Moser D, Anderer P, Gruber G, Parapatics S, Loretz E, Boeck M, et al. Sleep classification according to AASM and Rechtschaffen & Kales: effects on sleep scoring parameters. *Sleep* 2009;32:139–49.
  9. Maume DJ. Social ties and adolescent sleep disruption. *J Healt Social Behavior* 2013;54:498–515.
  10. Baker FC, Turlington SR, Colrain I. Developmental changes in the sleep electroencephalogram of adolescent boys and girls. *J Sleep Res* 2012;21:59–67.