



## Original article

# The effect of white noise on high school students' sleep quality at Unit B of Rajawali Girls Dormitory Makassar<sup>☆</sup>



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## ABSTRACT

**Objective:** To know the effect of white noise on the sleep quality at high senior students in Putri Rajawali Makassar.

**Aim:** This study aimed to evaluate the effect of white noise on the sleep quality of high school students at Unit B of Rajawali Girls Dormitory Makassar.

**Methods:** This was an experimental study involving twelve subjects, ages 16–18, with a total sampling method. The JBL T5 speaker was placed in the subject's room to generate white noise for 30 days. The white noise was listened continuously from 10 pm to 5 am, and sleep quality was measured subjectively with the Pittsburgh Sleep Quality Index (PSQI) before and after the intervention. Then the data were analyzed by paired *t*-test.

**Results:** The mean of PSQI score before the intervention was  $8.50 \pm 2.5$  and significantly decrease into  $6.50 \pm 3.00$  after the intervention (*p*-value 0.019).

**Conclusion:** White noise decreased the score of PSQI, which interpreted as better sleep quality.

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## Introduction

Sleep is essential for children and adolescents that can affect learning, memory, and performance at school. Sleep can be defined as a state of active, recurrent, and reversible withdrawal of the environment. Healthy sleep requires adequate duration, appropriate time, quality, regularity, and the absence of specific disorders and diseases.<sup>1</sup> Sleep is related to brain processes at night, which are believed to affect cognitive, physical, and emotional performance throughout the day. The relationship between sleep, cognitive function, and performance in school is essential for neurocognitive function.<sup>2,3</sup> It based on the opinion that the lack of sleep disturbance can affect brain activity at night. Complex activities require abstract thinking, creativity, integration, and planning, which are mainly influenced by problems related to sleep. These activities present sublime cortical functions, all of which are characterized by the influence of the prefrontal cortex, which is known to be sensitive to sleep. Based on some evidence, poor or inadequate sleep quality during early adolescence can affect the executive function

of the prefrontal cortex and consequently reduce learning ability and performance in school.<sup>4</sup>

Sleep quality and duration can be seen as two different sleep domains. Although the two things overlap, there are qualitative differences between them. Sleep quality refers to subjectively how sleep experiences are, among others, feelings after awakening and satisfaction with sleep itself. Besides, sleep duration is a more objective domain of sleep, that is, the individual's time of actual sleep. Although these two domains are associated with sleepiness, emotional status, behavioral and cognitive functions, this is more strongly related to sleep quality than sleep duration.<sup>4</sup>

Several studies have shown that poor sleep quality, increased sleep fragmentation, late sleep, and early waking can affect learning abilities, performance at school, and student behavior.<sup>4</sup> Parental supervision and complaints of sleep disorders in children vary. Parents usually pay more attention to sleep problems in infants and toddlers than school-age children and teenagers. For example, based on a poll conducted by the National Sleep Foundation (NSF) found that only 7% of parents knew sleep disturbance in their teenage children, while 16% of teenagers were aware of it. One in 3 of these adolescents did not tell anyone about their sleep problems.<sup>5</sup> Problems with starting sleep and maintaining sleep are common in children and adolescents and can indicate poor sleep quality.<sup>4</sup> Based on a meta-analysis of children conducted from 20 countries concluded that children ages 13–18 have an increased ratio of accidents in children whose sleep duration is less than 7

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