

The Relationship Between The Quality Of Sleep And Learning Concentration Among School-Age Children

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Abstract

Parallel to the operational concrete development stage, school-age children start to develop their skills in logical thinking and problem-solving. They need adequate concentration to grow at the stage successfully. One of the determining factors in achieving such concentration is the quality of sleep. The study aims to analyze the relationship between sleep quality and learning concentration among school-age children. This research is a cross-sectional descriptive quantitative study. The samples were taken by proportional stratified random sampling from 53 respondents of 111 populations. Data were collected using PSQI and concentration questionnaires and analyzed using chi-square. The results indicated that 47 children (88.7 %) had a low sleep quality and 33 children (62.3 %) on a middle range of learning concentration. The statistical analysis showed 58.5 % of children with low sleep quality had a middle learning concentration level and 30.2 % had a low concentration level with a p-value $(0.000) < \text{value } \alpha (0.05)$. It can be concluded that there is a significant relationship between the quality of sleep and the level of learning concentration for school-age children at SD IT Al-Maqom Cimahi. Nurses as healthcare professionals can cooperate with the school to provide health education for the students and their parents regarding decent sleep quality and its effect on their growth and development, especially in studying. The parents can modify their children's daily activities, especially before bedtime. One of them is rules about using gadgets and other electronic media in their bedrooms.

Keywords: concentration for studying, primary school students, quality of sleep

Introduction

Piaget's development theory stated that children between 6-12 years are in the concrete operational stage. According to the idea, their cognitive growth can be identified based on their ability to use logical and coherent thinking and problem solving. The age group can react to intellectual stimulation or cognitive skills such as reading, writing, and arithmetic (Yusuf, 2014). Also, the group is recognized as the intelligent and harmonious age of schooling. The students can be taught relatively quickly compared to previous or later age groups. Its success depends on the learning process.

There are four phases in the learning process: attentional, retention, reproduction, and (atmotivation phases. They need to be sequential to acquire the maximum results. According to Asmani, two factors function as references for measuring the learning process's success: the student's behavior change and their level of material mastery due to concentration.

According to Hakim in Setyani & Ismah (2018), some of the influencing factors of concentration are physical health, sleep and rest duration, diet, and normal senses, breathing, and the heart. A study of the relationship between sleep and difficulties in learning was conducted in Cape Town, South Africa, in 2010 on teenage students with 427 correspondents aged 16 and 276 teens aged 15. The results showed that those who experienced a low quality of sleep had problems concentrating (Fakier & Wild, 2011).

Quality of sleep also has effects on children's memory. A critical review by Kopasz et al., (2010) on the relationship between sleep and memory in healthy children showed that sleep facilitates well memory consolidation since their brains could exert more when they sleep better. Sleeping disorders include inadequate duration, difficulties in initiating sleep, dyssomnia, and parasomnia (conscious, partially conscious, and sleep phase transitions), resulting in excessive sleepiness (Tanjung & Sekartini, 2016). When children experienced it, the brain's oxygen supply lessened and lowered their concentration level in studying.

A preliminary study had taken by direct interview at SDIT Al-Maqom Cimahi with ten respondents reported that eight of them frequently were awoken by bad dreams, and a respondent stated their inability to sleep soundly, unlike one last respondent. The interview also taken directly with their teachers revealed an average final score of 73, two points short of the class average of 75. From the observation, nine out of ten respondents had difficulties focusing more than 15 minutes, while a respondent could concentrate throughout the lessons. Based on the phenomenon, the author is driven to conduct further study on the relationship of the quality of sleep and concentration in primary school students.

The difference with previous studies related to sleep quality in elementary school-aged children is that the sample in this research is children who attend integrated Islamic primary schools (SDIT). In the education system at SDIT, there are several additional contents such as basic Islamic materials and memorizing the Al Qur'an which requires more concentration in studying them.

Research Methods

The study is of analytical survey type with a cross-sectional approach to study the independent and dependent variables. In the study, the former is the quality of sleep, and the latter is the level of concentration during study periods. This research was conducted in May to July 2020, the population was the whole 5th- and 6th-grade students of SD IT Al-Maqom, which amounted to 111 students. The selection of samples in 5th- and 6th-grade students because these classes are included in the last period of children attending elementary school, they need more level of concentration to prepare for the graduation exam. In terms of developmental age, grades 5 and 6 have a better understanding of the sentences in the questionnaire.

The sampling techniques employed the proportional stratified random sampling comprised of 53 respondents. Each 5th and 6th grade has 2 unit classes, so a total of 53 samples were obtained from the 4 classes taking into account the quota for each class so that 15 samples were obtained from class

5A, 13 samples from class 5B, 12 samples from class 6A, and 13 samples from class 6B. Furthermore, sampling is done randomly by drawing the names of children according to the list of students' names for each class.

The quality of sleep was measured using the Pittsburgh Sleep Quality Index (Carole et al., 2012). The instrument has been proven to be efficient as a means of measuring the quality of sleep. It was developed to measure and distinguish individuals based on their good (or bad) quality of sleep. Its Indonesian language version comprises nine questions. The overall score ranges from 0 to 21 accumulated from seven components: subjective value for the quality of sleep, duration to initiate sleep, sleep duration, sleep efficiency, sleep disturbances during the night, medication for sleeping, and sleep disorders the day. The higher the score, the lower the quality of sleep. An advantage of PSQI is that it has high validity and reliability (0.83 of Cronbach's alpha). However, one of its weaknesses is the need for guidance for the respondents to complete the questionnaires correctly. Each component ranges from 0 to 3, with 0 as never within the corresponding month, 1 being once a week, 2 being twice a week, and 3 being three or more in a week. The scores of the seven components are compiled as a global score with the 0-21 range. Its interpretation in Bahasa Indonesia is that ≤ 5 indicates poor and >5 as good qualities.

The learning concentration questionnaire was adapted from a study by Dewi (2016).

Research Results

Table 1 below showed that most of the 5th- and 6th-grade students (88.7 %) had a poor sleep quality.

Table 1 The Frequency Distribution of the Quality of Sleep of Primary School Students at SD IT Al-Maqom Cimahi Tahun 2020 (n=53)

Quality of Sleep	Frequency (n)	Percentage (%)
Poor	47	88.7
Adequate	6	11.3
Total	53	100

The concentration levels of primarily 5th- and 6th- grade students can be seen in Table 2 below. More than half of the respondents (62.3%) were able to maintain a moderate level of concentration.

Previous researchers have tested the validity and reliability of this questionnaire. Therefore, in this study, the researchers only tested the validity of the content. The minimum and maximum scores of each indicator are 1 and 4, respectively. A respondent was given a maximum score of 52 as they could provide full concentration, while students who did not concentrate were given a minimum of 13 points.

Regarding the pandemic conditions, researchers conducted online data collection. After obtaining permission from the principal, the researcher joined the WhatsApp group of parents to explain the objectives, benefits, research procedures and send an informed consent file to be signed by the parents. The next day was the filling out the sleep quality and learning concentration questionnaire through the google form. The researcher explained to the parents to let the respondent fill out the questionnaire by himself according to the respondent's opinion. The univariate analysis employed the frequency distribution. The bivariate analysis used the chi-square to investigate the relationship between the quality of sleep and concentration during study periods in primary school students. The study also considered the ethical principles of researching by receiving consent forms from each respondent and maintaining privacy. The Board made the ethics review of Ethics of STIKES Jend. Achmad Yani Cimahi, issued in Cimahi, 5th May 2020 by number 02/KEPK/V/2020 .

Table 2. Frequency Distribution of Concentration of Primary School Students at SD IT Al-Maqom Kota Cimahi 2020 (n = 53)

Studying Concentration	Frequency (n)	Percentage (%)
Low	16	30.2
Moderate	33	62.3
High	4	7.5
Total	53	100

Source: Primary Data (2010)

The relationship between quality of sleep and the level of concentration can be seen in Table 3:

Table 3 The Relationship between Quality of Sleep and Concentration in Primary School students of Sekolah Di SD IT Al-Maqom Kota Cimahi 2020 (n = 53)

Quality of Sleep	Level of Concentration						Total		p-Value
	Low		Moderate		High				
	n	%	n	%	n	%	n	%	
Poor	16	30.2	31	58.5	0	0	47	88.7	0.000
Adequate	0	0	2	3.8	4	7.5	6	11.3	
Total	16	30.2	33	62.3	4	7.5	53	100	

Source: Primary Data (2020)

In Table 3, It could be concluded that all respondents with poor quality of sleep had low to moderate levels of concentration. It showed a significant relationship between the quality of sleep and the attention during study periods with the p-value $0.000 < \text{value of } \alpha$.

Discussions

up, and the feeling of freshness after waking up. By adopting the habit of a sleep routine, a person can increase their concentration and recuperate the next morning to engage well in their activities (Hidayat, 2012).

An Overview of the Quality of Sleep in Primary School Students

The study results on the quality of sleep of primary school students showed that the majority of the respondents in SD IT Maqom had poor quality of sleep (88.7%). The quality was thought to have a crucial effect on a child's physical and mental condition. According to Tanjung & Sekartini (2016), there were indicators effective to determine the quality of sleep, for instance sleep latency, frequency of wakes during sleep, the return to sleep after waking up and sleep efficiency. From the analysis, indicators pointed to low quality of sleep, namely frequently waking up to go to the toilet, bad dreams, feeling hot or cold, and not being

able to sleep immediately. The results also showed that the respondents slept 7-8 hours on average daily. Good quality of sleep was marked by easiness in initiating sleep at bedtime, maintaining sleep, returning to sleep after waking up at night, a smooth transition from sleeping to waking

sleep. It was caused by the specific level of the depth of sleep reached, where there was balance in the phases of rapid (REM) and non-rapid eye movements (NREM). The study on the relationship between sleep patterns and the concentration of students at SDN Kembangan Utara 06 Pagi showed that 50.8 % of respondents had poor sleep patterns, influenced by the student's activity before going to bed, one of which is a lot of exposure to electronic media (Zulfa & Mujazi, 2021). Another study by Pujiana (2017), regarding the same issue but on 6th-semester students of the Bachelor's Degree program in Healthcare, Stikes Muhammadiyah Palembang, showed that most respondents (49 students or 66.2%) who were young adults had a bad quality of sleep. One of the common causes for late-night bedtime was using their handphone or laptop before sleeping and waking up early to begin their college routines and its effect on concentration while studying.

An Overview of Concentration while Studying

The results showed that the students at SD IT Al-Maqom had low, moderate, and high concentrations of 30.2%, 62,3%, and 7.5%, respectively. According to Slameto (2015), there are two influencing factors on concentration: internal and external factors. The internal factors are that of physiological, psychological, and fatigue. External factors depend primarily on the surroundings. The physiological factor influential towards concentration is physical health. A sleep-deprived person can experience attention, nutrition, and fluid deficiencies. Additionally, there would be symptoms of rapid fatigue, lack of enthusiasm, dizziness, sleepiness, and dysfunctions of senses and organs.

The indicators of this research are focused attention, focused thinking, and maintaining focus during study periods. The children's low concentration level found in the study was caused by the inability to maintain concentration during class. Distractions included talking with classmates, playing or disrupting other students, or boredom.

The study about the learning concentration level of students in SDN Kembangan Utara 06 Pagi showed that 52.3 % of students has a

low learning concentration (Zulfa & Mujazi, 2021). The study about relationship between quality of sleep and concentration of Nursing student's in Palembang showed that most of the students (35 respondents or 47.3%) had low concentration. Other factors included their environment, learning modality, associates, and psychology (Pujiana & Lestari, 2017).

The characteristics of students who could maintain concentration were seen through their focused attention on what their teachers conveyed or the subjects discussed. Concentration in studying is crucial. Without it, it is difficult to remember and comprehend any material learned. It is not a skill from thinking or a brain function, but it depends on attention control. Therefore, concentration occurs when the person is attentive to the subject at hand (Syah, 2011). Concentration level will affect the student's focus attention. The higher the concentration level, the better the ability to focus on learning. Research on learning concentration in Nursing Students at Padjadjaran University shows that the average students have a moderate level of concentration. The students at that level are students who use the gadget for more than 4 hours. Their level of concentration may affect their learning focus (Hanifah et al., 2018).

The Relationship between Quality of Sleep and Concentration in Primary School students

The research showed that out of 47 students with poor sleep quality, 16 students (30.2%) and 31 students (58.5%) had low and moderate levels of concentration, respectively. The statistics showed a p-value ($0.000 < \text{value of } \alpha (0.05)$), and it could be concluded that there was a significant relationship between the quality of sleep and concentration in students of SD IT Al-Maqom Cimahi in 2020. The results were parallel to that of Retnaningsih, where the relationship showed a p-value (0.000). Prasetya (2019) research on the same issue in 10th-grade students of class D at MA Al-Qodiri 1, Jember, showed a p-value (0.008). Effective learning can facilitate students to increase concentration at the desired level to reach instructional objectives. Factors

were affecting the attention of students' internal factors included the individual's intrinsic values such as lack of determination in learning, emotions, reaction to the environment, physical condition, rest and sleep deprivation, unrealistic learning goals, and personal issues (Slameto, 2015).

Thus, poor quality of sleep is a determining factor based on the findings discussed above. Difficulty in concentrating is primarily caused by sleepiness during the day or while engaging in an activity. Sleep deprivation or its poor quality may cause exhaustion, drowsiness, concentration difficulties, and a decrease in memory and scholastic performance. Children with poor sleep quality may have experienced a decrease in concentration and were usually unable to absorb the lesson the teacher conveyed.

According to Hidayat (2012), sleep may be divided into two phases, namely non-rapid eye (NREM) and rapid eye movements (REM). NREM sleep phase is indicated by decreased physiological functions, including metabolism and muscle movements, and vital signs such as blood pressure and breathing frequency. Another activity during NREM is the decelerated eyeball movements and the decrease of dreams. According to Saputra (2013) REM sleep is not as deep as NREM, and most of the dreams occur at this phase. REM sleep is crucial for mental and emotional stability. Moreover, the stage has a role in learning or concentration, memory, and adaptation. According to Asmadi (2010), the effect of REM and NREM sleep deprivation causes decreases in decision or consideration making, concentration, vision (blur), memory, clarity, hallucination, and illusions in seeing and hearing.

The brain stem controls the sleep activities by activating the reticular activating system (RAS) and Bulbar Synchoring Regional (BSR). RAS is located in the upper part of the stem and is believed to have specific cells that maintain alertness and consciousness. Also, it may give stimulation to vision, auditory, pain, and touch senses, as well as receive stimulation from the cerebral cortex, including emotion and thinking process. While conscious, RAS releases catecholamine to maintain alertness to remain awake. On the contrary, serotonin release and BS cause drowsiness that leads

to sleep. Being awake or asleep depends on the balance of impulse received in the brain's center and the limbic system (Hidayat, 2012).

Poor sleep quality may lead to decreased concentration and obstruct using memory for logical and mathematical calculations (Hidayat, 2012). The indicator which determines the quality of sleep is the physical state upon waking from sleep: if the person feels fresh and renewed, it entails that their need for sleep is fulfilled (Safitrie & Ardani, 2013). A study taken by Susanti (2018) shows there is a relationship between sleep patterns and learning achievement in Grade 4 and 5 SD Babad I Elementary School students. Children who experience sleep disorders will hinder the learning process at school, children will often feel sleepy and tired due to lack of sleep, concentration learning declines, and the child becomes difficult to receive the lessons given by the teacher.

A child's habit may be modified to overcome the poor quality of sleep. Factors that may lead to better sleep are limiting naps, avoiding heavy meals before bedtime since it causes the digestive system to work harder, and refraining from drinking coffee or smoking since they contain caffeine that causes the opposite of sleepiness despite forcing oneself to sleep and waking up in the middle of sleep. Otherwise, they can decrease the quality and the duration of sleep. They should also be limited in accessing their smartphones in their bedrooms to induce a more relaxed mind (Andrian, 2018).

Research on sleep hygiene behavior in adolescent students at Islamic boarding schools shows that good habits that can improve sleep quality include monitoring sleep time not exceeding 24.00, brushing teeth before bedtime, providing tea at dinner time, and monitoring student activities outside school hours (Alfiyah et al., 2018).

As part of their functions as healthcare givers and educators, nurses may also help alleviate students' poor sleep quality. By collaborating with schools, they can educate primary school students and their parents about modifications to be made in their daily activities, especially before bedtime. One of them is rules about using gadgets and other electronic media in their bedrooms.

Conclusions

The research results demonstrated a significant relationship between the quality of sleep and primary school children's concentration level, especially on 5th- and 6th-grade students. They tended to have low to moderate concentration levels should they had an inadequate sleep. Poor sleep quality may be caused by inadequate duration, difficulties in initiating sleep, reaching deep sleep, waking at night, and difficulty in returning to sleep. It causes fatigue, less freshness when waking in the morning, and obstruction to the learning process.

Based on this study, it is anticipated that the school collaborates with healthcare services to provide education to the students and parents to adjust their daily routines, make a regulated bedtime, limit naps, avoid heavy meals before sleeping, and modify the environment to decrease distractions in initiating sleep. Further research is required to analyze the quality of sleep concerning other children's growth and development aspects.

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