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THE IMPACT OF SLEEP QUALITY ON ACADEMIC PERFORMANCE IN CHILDREN IN THE 1st CYCLE

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Abstract

Problem Statement: It is to verify the sleep habits and their disturbances, as well as the sleep quality of the children and their influence on school performance. Research Questions: Does the quality of sleep in children of the 1st cycle influence their academic performance? Purpose of the Study: To analyze the sleep quality of Portuguese children in the first cycle and how it influences the academic performance. Research Methods: The sample are 66 children between 7 and 10 years. The instruments: CSHQ-PT, PSQI, Academic Performance Scale and Sociodemographic Questionnaire. Findings: The sleep disorders are most frequent in the female gender, like nightmares, increased sleep latency and nocturnal awakenings. The most frequent disorders of the male gender are daytime sleepiness, obstructive sleep apnea and snoring. The quality of sleep influences the performance, the students with poor sleep hygiene demonstrate worse academic performance. Conclusions: Sleep quality influences the academic performance of children in the 1st Cycle of Basic Education, it was found that all sleep quality indexes are correlated in a significant and negative way with academic performance. Sleep is essential for children's learning and health, so a good night's sleep depends on good sleep hygiene

Keywords: Sleep, sleep disturbances, routines, academic performance.

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1. Introduction

In humans, sleep is an active and fundamental process, being vital for its survival (Paiva, 2015). Sleep is characterized as a physiological event of brain activity, natural and periodic, in which the state of consciousness changes, reducing sensitivity to environmental stimuli, followed by specific motor and body postures, as well as autonomous changes (Gomes, Quinhones, & Engelhardt, 2010). The same authors argue that good sleep hygiene is essential for physical and mental well-being, although sleep is sometimes altered or disturbed by biological and environmental factors.

Sleep is an inherent condition of life itself, as it is considered as a normal and periodic form of rest, characterized particularly by the suspension of consciousness, the relaxation of the senses and muscles, and the decrease in respiratory and circulatory rhythm. Thus, sleep is a primary physical necessity for a healthy life, as it allows for physical and psychological restoration, protecting the human being from the tiredness and natural fatigue of the waking hours (Stores, 2001).

Sleep is characterized by five fundamental stages. These stages differ according to the EEG pattern and the presence or absence of rapid eye movements (REM), as well as other changes such as muscle tone and cardiorespiratory pattern. The five stages of sleep form the cycle, each stage lasting about ninety minutes (Fernandes, 2006).

The two phases of sleep are REM (Rapid Eye Movement) and NREM (Non-Rapid Eye Movement). The NREM phase corresponds to 75% of the sleep period, is divided into four phases: stage one, corresponds to the sleepiness phase, where the individual begins to feel the first feelings of sleep; stage two usually lasts 5 to 15 minutes, where cardiac activity is reduced, muscles are relaxed and body temperature is low; stage three is identical to stage four, differing only at the depth level, and at this stage the depth is slightly smaller; The fourth stage lasts about 40 minutes (Fernandes, 2006).

The NREM phase is critical to the body because it is at this stage that the growth hormone is released, which is crucial for energy recovery. It is in the NREM phase that, effectively, there is deep rest and less neural activity. After the fourth phase, the individual returns to the previous stages until the REM phase (Albuquerque, Cardeal, & Campos, 1998).

REM sleep is characterized by intense brain activity, very similar to wakefulness, where rapid eye movements occur, so this stage is important for emotional recovery and dream emergence (Albuquerque et al., 1998).

According to Halal and Nunes (2014), knowing the child's sleep and its maturation is relevant, as it prevents physiological phenomena, in certain periods of life, from being understood as a sleep disorder.

The same authors report that the prevalence of childhood sleep disorders is high, affecting about one in three school-age children, which may lead to learning disabilities, behavioral changes, and increased predisposition to accidental injury and obesity.

The definition of sleep disorders in children presents great difficulty due to the different sleep patterns that occur during the child's development and the different tolerability of parents to their children's sleep pattern. Some of these disorders are behavioral in origin, and their prevention and treatment are possible through sleep hygiene measures, such as environmental and behavioral changes by parents and children that can promote good quality sleep and sufficient duration (Halal & Nunes, 2014).

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Sleep plays a key role in child development, both in terms of physical growth, emotional development and behavior, and cognitive functioning, learning and attention (Januário, 2012). Some studies point out that there is a causal relationship between sleep problems and child well-being, constituting a diagnostic criterion for the various disorders, such as associations between sleepwalking or excessive movements during sleep and hyperactivity, difficulty falling asleep and emotional symptoms (anxious and depressive), bedtime resistance, restlessness and behavioral problems and nocturnal enuresis (Januário, 2012).

Owens, Fernando and McGuinn (2005) show that poor quality sleep, both in quality and quantity, is associated with deficits in memory, attention and behavioral disorders, and the impacts are expected to be greater as long as this duration. Lack of sleep often manifests in drowsiness and excessive daytime fatigue, deficits in various areas such as academic achievement, cognitive performance or behavior and some health problems.

1.1. The Importance of sleep and sleep in childhood

The growing phenomenon of industrial and technological development in society has contributed to the modification of lifestyles, the pleasures change and occupy the night time. In this context, sleep is an obstacle for work, productivity and economic interests, and is increasingly devalued (Paiva, 2015).

The author Richards (2015) shares the same conception, stating that today, the majority of the population is deprived of sleep. This problem, defined as the absence of sleep, is a lack caused by lack of opportunity, or time to sleep, by decision or other priorities. According to Paiva (2015), those who have a quality of sleep have a high capacity to adapt to adverse circumstances, such as stress, which is essential and assumes several functions, namely those associated with homeostasis, or the perfect balance of the body.

Sleep is defined as a physiological requirement of natural and periodic brain activity, representing a change in the state of consciousness, decreased sensitivity to environmental stimuli, followed by motor particularities and proper postures, as well as autonomous changes (Gomes, Ferreira, Silva, & Castro Caldas, 2017).

As people age, the duration of sleep decreases, which is considered a natural process, as in adulthood about 85% to 90% of healthy individuals sleep between 7 and 8 hours a night, and 5% need to sleep less than 6 hours and another 5% need to sleep between 9 to 10 hours per night (Paiva, 2015). Chronic sleep deprivation translates into excessive daytime sleepiness, decreased performance of school activities, and a decrease in quality of life due to cardiovascular and metabolic changes (Arriaga, Brito, Gaspar, & Luz, 2015).

Sleep quality is influenced by a combination of genetic, environmental, psychological and cultural factors. The achievement of a good night's sleep is fundamental for the maintenance of a healthy body and, consequently, it is assumed as a preventive method for the emergence of sleep disorders (Rios, Peixoto, & Senra, 2008).

Sleep plays an essential role in learning, memory organization and psycho-affective stability. Several functions are performed during sleep, including segregation of all anabolic hormones (growth hormone and prolactin), control of the production of catabolic hormones (cortisol), stabilization of immune

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processes, reduced metabolism and temperature of the brain, various cognitive processes are established and consolidated, especially those related to memory and learning, and emotional balance is restored through dreams. In addition to these functions, the main thing is to keep the individual awake, because if he does not get enough sleep he will be constantly sleepy or less able to perform daily tasks (Paiva, 2015).

Evolutionary, adaptive or protective theories consider that sleep has a physical and mental restorative function, and NREM sleep plays an essential role in restoring physical energy and REM sleep in restoring intellectual or cognitive energy (Rios et al., 2008). Thus, sleep has a heterogeneous structure, composed of different phases, being responsible for the individual's quality of life and having very important functions (Rios et al., 2008).

Sleep is related to physical, behavioral, emotional and cognitive growth and processes such as attention and learning (Chen, Wang, & Jeng, 2006). In childhood, learning and good psychological development are related to good sleep quality (number of sleep hours, wake up time, sleep interruptions, sleep disturbances and their daytime consequences) (Batista & Nunes, 2006). When sleep is not "respected", even by children, it affects quantity and quality and may result in psychomotor slowness, short-term attention and memory deficits, difficulty concentrating, mood swings and tiredness (Paiva, 2015), behavioral and emotional problems (greater emotional lability) (Januário, 2012).

All of these consequences will have school impact, so students must reconcile sleep schedules with school schedules to promote concentration and learning (Antunes, 2012). Excess and overload of children's activities and obligations may be responsible for an irregular sleep pattern and poor quality (Busse & Baldini, 1994).

In children, sleep problems are divided into two groups: "disorders characterized by abnormal behavioral events/parasomnias (night terrors, nightmares and sleepwalking) and disturbances with a change in sleep in quantity, quality and timing/dysomnia (insomnia and hypersomnias)" (APA, 2014, p. 597). In younger children, the most frequent sleep problems are: difficulty falling asleep, manifested by crying, attempts to get out of the room, or behaviors that delay bedtime (Hoban, 2010). All sleep-related brain processes throughout the night assume the primary function of influencing cognitive, physical, and emotional performance for the next day (Dewald, Meijer, Oort, Kerkhof, & Bogels, 2013).

When the adopted behaviors are not adequate and sleep deprivation occurs, there are multiple health repercussions, affecting most organs and systems. The effects on cognition can be immediate, so children may experience attention and concentration problems or memory impairment (Aldabal & Bahammam, 2011). Daytime sleepiness will cause severe sleep disturbance, short-term impairing the performance of most young people's cognitive domains, resulting in impaired attention, concentration and working memory (Lim & Dinges, 2010).

Growth hormone or somatotropin (GH) is also produced and released during sleep, which explains why quality sleep during birth and childhood is critical (Morris, Aeschbach, & Scheer, 2012). During adulthood, this hormone is not essential for growth participation but contributes to the protection of bones and muscles against wear and tear (Van Cauter & Plat, 2008). Leptin is another hormone released during sleep and acts on the appetite mechanism by inhibiting it. It also acts on glucose and fat metabolism, and poor sleep hygiene is a risk factor for obesity and diabetes (Van Cauter & Plat, 2008). Cortisol, a stress

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hormone, during sleep is inhibited by secretion, so if you do not get enough sleep you will see effects such as anxiety early in the morning (Morris et al., 2012).

1.2. Sleep quality and academic performance

Academic performance is considered to be a very complex and multidimensional educational variable, which is expressed as a result of various components that intervene in the subject's learning process. This is often explained through a quantitative classification that reflects the scope of particular learning (Santos, Barbosa, & Felden, 2015).

Sleep is necessary for executive functioning, involving abstract thinking, creative process, and directed and objective behavior. Sleep-related brain processes at night have the essential function of influencing physical, mental and emotional performance during the next day (Dewald et al., 2013). Sleep also plays an important role in children's memory, attention, behavior and learning (Santos et al., 2015).

Sleep has a relevant and essential role at the physical, emotional and school levels. In this sense, depriving the organism of sleep at night can cause damage to the level of attention and memorization, since all mental functioning is interconnected, and if there is impairment in the body some brain function, the performance of other functions may be affected (Rente & Pimentel, 2004).

During sleep brain activity keeps processing, especially concerning the maintenance of cognitive functions and the hormonal network, which has implications for memory consolidation being fundamental for learning ability and good school performance (Guyton & Hall, 2002). In this sense, the integrity of learning and memory processes are essential in school performance (Matos & Sampaio, 2009).

Studies by Curcio, Ferrara, and De Gennaro, (2006) and Dewald et al. (2013) show that interrupted or insufficient sleep is followed by inefficient and ineffective daytime behaviors, with greater variability in the individual's overall performance. Sleep-related problems have a noticeable impact on learning, school performance, school performance, health, family, and quality of life, and these problems are more common in Western and Eastern societies (Owens, 2005).

The school is the place where the primary symptoms of lack of sleep are perceived, as they occur through the decline of school performance, agitation and irritability, difficulty concentrating, following the lack of necessary hours of sleep at school age. . When the child sleeps less hours than necessary, his short-term memory is not properly processed, failing to transform the knowledge that has been learned, that is, the child will have difficulty learning new things (Neto, 2012).

Children usually have sleep disorders that vary with age and may manifest at school age with awakenings and night terrors. Sleep segmentation can be caused by respiratory disorders, neurological disorders, bruxism, sleepwalking and nocturnal enuresis (Reimão, 2004).

The need for sleep is individual and can be changed during the school period. Excessive use of electronic devices, excessive obligations and poor rest environment contribute to an uneven and uneven sleep pattern. In addition, sleep deprivation also adds negative consequences in several domains, such as academic performance, cognitive performance, emotional and behavioral regulation (Santos et al., 2015).

During sleep, brain activity remains in process, particularly with regard to maintaining the hormonal network and cognitive functions, this involves impairments in memory consolidation and is critical for learning ability and good academic performance (Curcio et al., 2006).

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For this reason, it is recommended that children aged 6-12 sleep between 10-12 hours per night to maintain adequate performance and performance during the day (Januário, 2012).

A meta-analysis study by Dewald et al. (2013) found that better sleep quality is related to better school performance. It was also concluded that more sleep duration is associated with better school performance. Students with lower sleepiness values are associated with better school performance. The study concluded that the association between sleep duration and school performance is significantly lower than the association between sleep quality and school performance, which in turn is significantly lower than the association between sleepiness. and school performance and achievement.

2. Problem Statement

For school-age children, sleep is an indispensable and biological necessity for their normal growth and development (Grandner, 2017). Changes in sleep patterns have hostile effects on neuropsychological functioning, which is reflected in children's physical, psychological and emotional well-being. Lack of sleep in children is related to impaired neurocognitive functioning and increased maladjusted behaviors (Klein & Gonçalves, 2008). The answer to this question is: “To what extent does the quality of sleep influence the academic performance of children attending the 1st cycle?”

3. Research Questions

This study seeks to verify the relationship between sleep quality and academic performance in children attending primary school.

• Is the quality of children's sleep related to academic achievement?

• The use of electronic devices before bedtime affects sleep quality?

4. Purpose of the Study

This study has the following objectives:

- Check the sleep quality of the children in the sample;
- Check if there is a relationship between the use of electronic devices before bed and the quality of sleep;
- Find out if there is a significant relationship between sleep quality and academic achievement;
- Identify differences in gender and age.

5. Research Methods

5.1. Participants

The sample of this study consists of children who meet the criteria of our research, which are: attending the 1st cycle of basic education in both public and private schools in Lisbon area and aged between 7 and 10 years and both genders.

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As an exclusion criterion, we removed the children from the first year, as they would not have the ability to respond or write to the instruments directed at the children.

The sample consists of 66 children. Most are female (n = 34; 51.5%), with an average age of 8.2 years, ranging from a minimum of 7 to a maximum of 10 years. Forty-six children (69.6%) attend the 3rd and 4th grade.

5.2. Instrument and Procedures

We use in our research the following instruments:

- Sociodemographic questionnaire designed to collect the information intended for our study.
- Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; validated for the Portuguese population by Del Rio, Becker, Neves Jesus, and Santos Martins, (2017).
- Children's Sleep Habits Questionnaire (CSHQ-PT) (Owens, 2005; validated for the Portuguese population by Silva, Silva, Braga, & Neto, 2014).
- The Informal Academic Achievement Scale was created by us to benchmark teachers' assessment of the children in our study.

5.2.1. The sociodemographic questionnaire

This questionnaire was built based on the characterization of the specific study population. Its objective is to characterize the sample subjects by collecting some of their biographical, social and family data, in a total of 29 questions.

5.2.2. The Pittsburgh Sleep Quality Index

It is an instrument authored by Buysse et al. (1989), whose Portuguese version for research was developed by Del Rio et al. (2017) and its translation into Portuguese was done by Bertolazi et al. (2011).

The PSQI is considered stable for the evaluation of sleep quality and is very accessible, as it easily identifies individuals who have a good or poor quality of sleep (Córdoba & Schmalbach, 2005).

5.3. The Children's Sleep Habits Questionnaire

The Portuguese version (CSHQ-PT) was adapted and translated by Silva et al. (2014), with psychometric properties considered adequate, having as internal consistency (Cronbach's alpha) of .77, tested in a sample N = 315, higher than the value of .70 indicated in the original scale. A cutoff of _> 48 was established, which was adjusted for the Portuguese population (Silva, 2014).

This instrument is considered to be quick and easy to apply, reliable and suitable for clinical investigation in different age groups (Duarte, 2007).

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5.4. Academic Performance

The Academic Performance Scale was created by us to assess the teachers' assessment of the children in our study. The scale consists of only one question (Please tick the assessment that best fits the student's academic achievement) with multiple choice answers (Excellent; Very Good; Good; Sufficient; Insufficient and Bad). The teacher must indicate which grade corresponds to the academic performance of each student. The answers given will allow us to gauge the student's overall academic achievement.

5.5. Procedures

After informed consent, for parents to authorize their children's collaboration in the study, the investigation protocol was initiated. The data collected will be kept only until its necessary statistical accounting, after which it will be invalidated. The sample was taken from two schools in Lisbon area.

The test protocol was applied in a study room too small groups of children, in the case of one college, in the other college was applied in the classroom, with our help and the teacher. After answering, the teacher was given the children's sleep habits questionnaire (CSHQ-PT) to give to their parents.

The sample consisted of 66 participants, being 34 females (51.5%) and 32 (48.5%) males. All participants responded to all instrument items.

6. Findings

The Pittsburg Sleep Quality Index cut-off values allow us to identify that 14 (21%) children have poor sleep quality. In the present study, it is evident that children usually go to bed at 9:30 pm, with a variation between 20-23 hours. Most children sleep alone, have no difficulty falling asleep, enjoy sleeping, and are controlled by their parents about bedtime, usually by their mother. It should also be noted that most children often watch TV and play games on the computer before falling asleep with a tablet and Playstation.

There is a significant and positive correlation between bedtime resistance, night waking, parasomnia, respiratory disturbance, daytime sleepiness, sleep habits and subjective sleep quality, sleep latency, sleep duration, sleep disturbance, dysfunction. daytime and sleep quality index. The higher resistance to go to bed, the more night waking up, daytime sleepiness and the later the onset of sleep the worse the quality and sleep habits and their indices. These results are in line with the studies by Mendes, Fernandes, and Garcia, (2004), Chorney, Detweiler, Morris, and Kuhn, (2008), Hoban (2010), Matwiyoff and Lee-Chiong (2010), Januário (2012), since the authors noted a relationship between various sleep disorders (sleepwalking, difficulty sleeping, bedtime resistance, restlessness, sleep-delaying behaviors, night waking, nightmares, parasomnias) and sleep quality. These disorders will influence children's quality of life, as well as cardiovascular and metabolic changes (Ferreira, Jesus & Santos, 2015).

Anxiety is also significantly and positively related to subjective sleep quality, sleep latency, sleep duration, sleep disturbance and sleep quality index, the higher the sleep-related anxiety the worse it is the quality of sleep and its rates.

The present study shows that children who watch TV before falling asleep or play games have significantly higher values of sleep latency and subjective sleep quality than other children. Among the activities most performed by children before bed, we highlight the use of television, social networks and

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computer games. These results corroborate the studies by Gupta, Saini, Acharya, and Miglani (1994), Owens et al. (2005), Jemmi and O´Connor (2005), Paavonen, Pennonen, Roine, Valkonen, and Lahikainen, (2006), Dworak, Schierl, Bruns, and Struder, (2007) and Pereira, Costa, Passadouro, and Spencer, (2007), as these authors observed a relationship between increased sleep onset delay, as well as night waking, difficulty falling asleep, and decreased sleep quality in children who watched TV and played computer before falling asleep. This is because when children watch TV or play a computer they are undergoing physiological and metabolic changes (heart rate, blood pressure, respiratory rate and energy expenditure), which leads to increased arousal status of the System. Nervous System and, consequently, the difficulty in falling asleep and the decrease in sleep quality.

Regarding the differences between female and male sleep quality, the present study has significantly higher values in male children, which is in line with the studies by Coren (1994).

By analyzing whether sleep quality influences the academic performance of children in the 1st cycle of primary education, it was found that all sleep quality indexes are significantly and negatively correlated with academic performance, except for the efficiency index of sleep. sleep and medication use. This means that the worse the quality of sleep, the worse the academic performance, which corroborates the studies by Owens (2005), Curcio et al. (2006), Boscolo, Sacco, Antunes, Mello, and Tufik, (2007), Dewald et al., (2013) and Souza and Tomaz (2018), because, according to the results obtained, sleep disorders influence academic performance, namely learning, academic performance, neuro-behavioral functioning, family and quality of life in general. In contrast, the study by Dewald et al. (2013) shows that better sleep quality and duration are related to better school performance and performance.

7. Conclusion

Sleep quality is relevant in the academic context, as children must be able to acquire new knowledge and consolidate existing knowledge. Thus, parents or family members should instill the same good sleep practices, avoiding symptoms such as restlessness and irritability, difficulty concentrating, lack of sleep, interactive and relational difficulties with disturbances and insufficiencies of sleep and wake rhythm, less attention span, mobilization of their intellectual resources and cognitive processes.

In this study, it was found that all sleep quality indexes are significantly and negatively correlated with academic achievement.

Sleep is essential in children, both physically and emotionally, so a good night's sleep lacks aspects such as: maintaining a healthy life, good sleep hygiene, regular bedtime, early bedtime, regular bedtime, absence of an adult when falling asleep, absence of electronic objects, especially television in the bedroom. Sleep is increasingly seen as a determining factor in child health, as it influences emotional regulation, behavioral, cognitive functions, commitment, involvement, academic achievement and, consequently, on children's overall quality of life.

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