The Effects of Gadget Use on Sleep Quality among Elementary Students in Grades 4-6 in a Private School in Lucena City, Quezon Province*

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Abstract

OBJECTIVE: The study aimed to determine whether prolonged gadget use will have an effect in the child's sleep quality. The study also aimed to ascertain if there is a significant relationship between the parameters of CSHQ and the average length of sleep, average length of gadget use, and frequency of gadget use.

DESIGN: Descriptive research design was used, particularly the survey method. Simple random sampling was used.

SETTING: Private school in Lucena City, Quezon Province

PARTICIPANTS: Parents of Grades 4-6 students in a private school in Lucena City. Sample size was computed at n=131.

RESULTS: 53.4% of the respondents were males, 29.8% of which are 11 year-old, grade 6 students (35.9%). The average length of sleep of most children was at 6-8 hours (57.3%), with an average length of gadget use at 5-10 hours daily (58%), 5-7x a week (61.8%). Weighted means computation showed that parents agreed to the positive statements of the CSHQ but key problems based on the CSHQ statements were identified upon further analysis.

CONCLUSIONS: With an $\alpha = 0.05$, significant relationships were established between the parameters of the CSHQ and the average length of gadget use ($p = 0.012615 < 0.05$), as well as the frequency of gadget use ($p = 0.000116 < 0.05$). Generalization should be made with caution due to the small sample size and non-diversity of the samples. Recommendations are due to improve generalizability by increasing sample size and diversity of the samples.

Keywords: Quality of Sleep, Children's Sleep Habits Questionnaire, CSHQ

INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a global pandemic in March 2020, necessitating temporary school closures as part of efforts to contain the virus's spread among the general population. Globally, the peak of school closures occurred in April 2020, when 199 countries closed schools (World Food Program, 2020). Each country has prepared contingency plans in response to the worldwide school closures to ensure that affected students receive an education.

Individual countries and teachers were forced to adapt to the online learning system across all educational levels, where a variety of methodologies and skill assessments were used to determine whether a student has mastered the topics being taught. To ensure learning continuity given the online learning set-up brought by the COVID-19 pandemic, the Philippine Department of Education developed a series of Modular Distance Learning (MDL) programs in which students utilize Self-learning Modules (SLM) based on the Department of Education's Most Essential Learning Competencies (MELCS) (Gonzales, 2021).

Gadgets (e.g., mobile phones, tablets, personal computers, and laptops) have emerged as one of the most important instruments for schools to use in order to deliver ongoing education to displaced students. They have indeed emerged as the principal channel through which teachers instruct the pupils. Gadgets

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and other devices, whether used for synchronous (live discussion of courses) or asynchronous (modules, pre-recorded videos, worksheets) instruction, have become essential tools for students to get critical information, lessons, and research to cope with the demands of online learning. Likewise, our current generation of students is preoccupied with the use of electronic devices. They frequently want to get the most recent release of these gadgets,in order to satisfy their cravings for amusement and be the first to own the newest and greatest devices. As a result, pupils are more likely to incorporate technological devices into their daily routines.

Researchers have identified several key alarming concepts that may stem from excessive gadget use: (1) language problems and delays (Hinkley et al., 2021); (2) mental and emotional problems, as well as social behavioural concerns, and cognitive and socio-emotional development concerns (Wahyuni et al., 2019; Frashini et al., 2018; & Zahid, 2021); (3) visual acuity problems and computer vision syndrome (Wahyuni et al., 2018; Ahmad et al., 2021); (4) poor sleep quality and shorter sleep duration (Jaisawal et al., 2020; Mak et al., 2014; Brambilla et al., 2017; LeBourgeoiset al., 2017; Xi et al., 2018; Falbe et al., 2015; Hale et al., 2018; Gradisar et al., 2013; Magee et al., 2014; &Merinelli, 2015); and (5) body mass index problems (Fulleret al., 2017).

While there is a wide breadth of researches on the effects of gadget use on a child's sleep quality, there is still a dearth of knowledge and research in the local setting. With this in mind, the researcher aimed to determine the effects of gadget use on the quality of sleep among grades 4-6 elementary school students undergoing online education in a private school in Lucena City, Quezon Province.

Statement of the Problem and Objectives

At the outset, the study aimed to determine the effects of gadget use on the quality of sleep among grades 4-6 elementary school students undergoing online education in a private school in Lucena City, Quezon Province. Subsequently, the study also sought to answer the following specific questions:

1. What is the profile of the respondents in terms of the following:
    a. Age
    b. Gender
    c. Average length of sleep
    d. Length of time of gadget use
    e. Frequency of Gadget use

2. Using the Children's Sleep Habits Questionnaire, what are the sleeping habits of the grades 4-6 students based on the following parameters:
    a. Bedtime behaviors
    b. Sleep behaviors
    c. Waking up during the night
    d. Morning wake up

3. Is there a significant relationship between the respondents' quality of sleep based on the parameters of CSHQ and the average length of sleep, length of time of gadget use, and frequency of gadget use?

Statement of the Hypothesis

With an $\alpha = 0.05$ (95% confidence), the following hypotheses were formulated:

H_o: There is no significant relationship between the respondents' quality of sleep based on the parameters of CSHQ and the average length of sleep, length of time of gadget use, and frequency of gadget use.

H_a: There is a significant relationship between the respondents' quality of sleep based on the parameters of CSHQ and the average length of sleep, length of time of gadget use, and frequency of gadget use.

Significance of the Study

At its inception, the study served to benefit the following groups of people:

General Population – This study can serve as a reminder that, though the perceived "norm" nowadays is that gadgets are an integral part of the children's lives, it is emphasized that there are adverse effects that may result from excessive gadget use, especially in children.

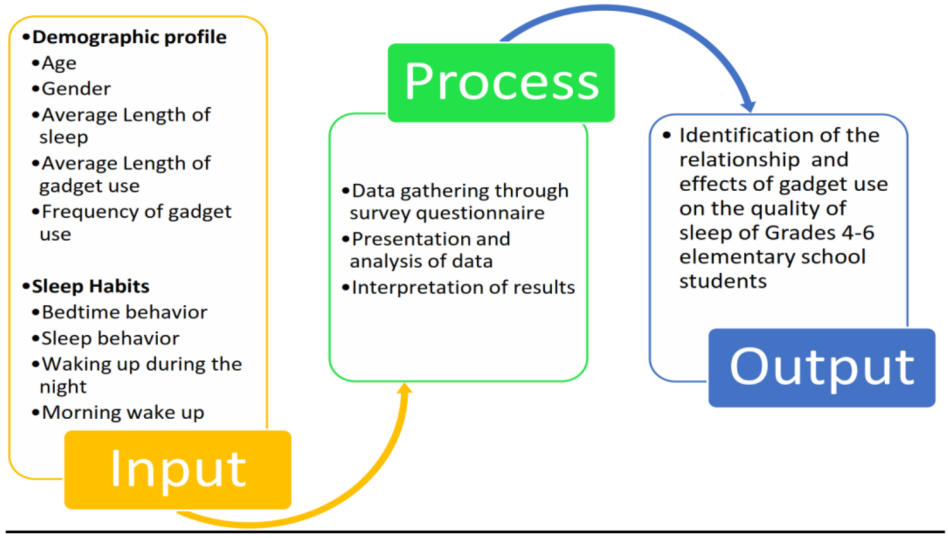
Parents – The study will give the parents the necessary information to help them understand that, although gadgets are necessary asthey are used to provide a continuum in the child's education, there should still be a limit as to the number of hours of screen time to avoid unnecessary problems brought about by gadget usage.
Medical Doctors – This study can be a benchmark through which they can advise their clients regarding the adverse effects of gadget use in the children's quality of sleep. Moreover, this study will also provide them with more concrete evidence on other possible side effects of excessive gadget use, which can greatly help them in clinical decision making.

Prospective Researchers – The study can serve as a springboard for future local setting research on the effects of gadget use in the different aspects of the child's well-being. Additionally, this study will be of great benefit to future researchers who may wish to conduct follow-up studies with larger populations by providing insights about the possible areas that need to be studied in terms of the effects of gadgets in children.

Scope and Limitations of the Study

The study was limited to determining the effects of gadget use on the quality of sleep of Grades 4-6 elementary school students in a private school in Lucena City, Quezon Province. Likewise, the study was limited to a smallsample size so generalization of data may be complex. Furthermore, the study did not take into consideration other effects of gadget use aside from the child's quality of sleep, as perceived by their parents based on the parameters set by the CSHQ. Moreover, the study did not attempt to determine statistical within-group relationships of the parameters as stated in the Children's Sleep Habits Questionnaire, nor did it attempt to consider possible co-morbidities (Autism, ADHD, history of mental health issues, seizure disorder/epilepsy, significant physical illnesses, and diagnosed sleep disorders), whether the children were under medications (melatonin and other medications to address co-morbidities), and the lower grade level of other students. The study also did not consider the distribution of respondents according to grade level.

Conceptual Framework



Definition of Terms

Terms	Definition
Online learning	Online education is education done via the internet. It is also known as "e-learning". However, online learning is merely one sort of "distance learning," which is any learning that occurs outside of a regular classroom and may include self-paced materials (modules), instructional videos, research activities, and the like.
Modular Distance Learning Program	Modular Distance Learning offers personalised teaching and self-learning modules (SLMs) in print or digital format/electronic copy. The teacher is in charge of monitoring the students' progress.
Self-learning Modules	Self-learning modules allow learners to choose what, how, when, and where to learn. Lessons can be completed at the learner's own speed.
Most Essential Learning Competencies	This refers to a set of competencies that students must exhibit in every class and learning activity as set by the Department of Education.
Gadgets	Mobile phones, tablets, laptops, and the like are all examples of small mechanical or electronic devices that have a useful purpose yet are typically viewed as a novelty. Gadget use refers to the amount of time the gadget is being used inan entire day.
Synchronous instruction	The term "synchronous learning" refers to online or remote learning that is both interactive and two-way with a teacher in real time.
Asynchronous instruction	It is a type of learning without real-time teacher-led engagement. Asynchronous learning takes place over the internet and via premade resources.
Language delay	A child is said to be experiencing a language delay if he or she has difficulty comprehending or expressing themselves verbally in everyday situations. Atypical for the child's age, these issues are troubling. Learning new words or saying one's first words might be a challenge for some people, more so creating sentences by combining words.
Socio-emotional development	An important part of the child's social-emotional development includes his or her ability to express his or her feelings and form pleasant and rewarding interactions with other people.
Visual acuity	Visual acuity is one's ability to detect characters or numerals at a certain distance according to a fixed standard.
Computer vision syndrome	Extended computer use can create a group of associated eye and vision disorders. Eye discomfort and weariness, dry eye, impaired vision, and headaches are all symptoms of computer vision syndrome.
Sleep quality	The quality of your sleep is measured by how restful and restorative your sleep is—in other words, how well you're sleeping. It is distinct from sleep satisfaction, which relates to a more subjective evaluation of how you feel about the sleep you are experiencing.
Sleep duration	The overnight or 24-hour sleep duration is commonly used to describe how much sleep a person gets.
Blue Light	Blue light is emitted by your mobile device's screen, which can disrupt your sleep during the daytime, but it's safe to use throughout the day. Using your phone or tablet before night can keep you awake because blue light can stimulate your brain and deceive it into believing it is daytime, keeping you awake if you do so.

REVIEW OF RELATED LITERATURE

Many parents worry about their kids' sleep habits. Sleep deprivation is one of the prevalent plagues of modern cultures, according to Oginska and Pokorski (2006), and Yu et al. (2007). However, such issues aren't new and have existed for over a century. Accordingly, these long-standing worries led to early attempts to suggest sleep durations for children and adolescents, dating back to 1897. According to Holden (1993), the same message rings true today, with groups like the National Commission on Sleep Disorders Research pushing for a “radical transformation in how society interacts with sleep.”

Insufficient sleep has been linked to poor physical and mental health, including reduced concentration and memory, mood problems, motor skill impairment, and overall health and immunological function. Inadequate sleep in children has been linked to poor academic performance, obesity, accidents, suicidal thoughts, and drug and alcohol usage. Adequate sleep for kids has thus become a health problem (Matricciani et al., 2012). Loureiro (2011) also connected sleep to optimal physical, cognitive, and behavioral development in children. In the study of Bonuck et al., (2017), they explicitly stated that when young children do not get enough sleep or have poor quality sleep, it has a negative impact on their behavior and cognitive function. Preschool age (3-5 years) is a critical period for sleep problems, with around 25% of children experiencing behavioral sleep problems (BSPs) during this period. BSPs are classified by the International Classification of Sleep Disorders as difficulties falling asleep or remaining asleep, such as bedtime resistance and night-waking; they correlate to the insomnia diagnosis under the 2014 classification of sleep disorders (Sateia, 2014). Healthy sleep practices (e.g., normal bedtime, nighttime routine) and behavioral therapies (e.g., extinction), on the other hand, promote healthy sleep and addresssleep issues, respectively. In fact, the majority of BSPs in young children do not necessitate specialized care (Bonuck et al., 2017). Turnbull et al. (2013) stated in their study that behavioral sleep issues are the most common sleep difficulties experienced by children in the general population, and they occur most frequently in boys. From their research, they quoted that, according to the National Sleep Foundation, between 15% and 30% of 2- to 5-year-old children have regular difficulties falling asleep (also known as bedtime troubles) or sleeping through the night (i.e., night waking). When compared to preschool children, fewer school-aged children suffer from behavioral sleep disorders, but these issues still affect 11 percent to 15 percent of school-age children (6-12 years).

Due to the withdrawal of approximately 1.5 billion children from school since April 2020, many of these students are spending more time using electronic devices to complete school assignments as part of learning from home, communicate with peers, and play video games to recall activities. Because of the lockdown, people are unable to go outside (Pratiwi et al., 2020). Continual use of gadgets will have a negative impact on children's daily behavior patterns; children who have a tendency to use gadgets constantly will become very reliant on them and will routinely incorporate it in their daily activities, playing gadgets more often than learning and interacting with their surroundings (Moh, 2017).

In accordance with the American Academy of Pediatrics and the Canadian Children's Society, children between the ages of 0 and 2 should not be exposed to any form of technology. Children aged 3-5 years are only allowed to use technology for one hour per day, while children aged 6-18 years are only allowed to use technology for two hours per day. It is possible for children to suffer from sleep deprivation and a lack of concentration, which can result in potentially unhealthy sleep cycles since youngsters are sleepier during the day and sleep less at night. If a child uses a gadget every 15 minutes, this equates to a loss of 60 minutes of sleep time per night. As reported by the American Academy of Children, sleep deprivation affects 75 percent of children aged 9-10 years who are exposed to technology without adult supervision (Pratiwiet al., 2020).Children's biopsychosocial development is greatly aided by their ability to sleep well. As a result of the shortage of sleep time experienced by a child who has difficulties sleeping, the youngster gets overly hyperactive and acts inappropriately approaching bedtime. Drowsiness, difficulty waking up in the

morning, and irritability during the day are all signs that a child is suffering from a sleep deficiency in young children (Moh, 2017).

Based on the findings of some studies, the more time youngsters spend on smart phones, tablets, electronic games, and other handheld devices, the greater the likelihood that the child would experience delays in expressive speech. Interactions with other people will help children develop their ability to talk and communicate. This is the only way they will learn to communicate effectively; if they are not communicating, they will not be learning anything. Every one minute that your youngster spends in front of a screen is one minute that he or she could be conversing or learning with other people. Screen time refers to the amount of time your child spends in front of a screen, whether it is a television or any other gadget. Screen time deprives a youngster of time that he or she could be spending conversing and communicating with other children or adults (Sundus, 2018).Orji et al., (2017) stated that every child is entitled to proper sleep hygiene because it is a necessary and important indicator of overall health. The lack of proper sleep hygiene does not only predispose children to behavioral and cognitive impairment, but it also has a negative impact on their physical health, which may further predispose them to sleep troubles. Accordingly, an examination of sleeping patterns such as the bedtime routine and the sleeping environment may identify elements that are contributing to the sleep impairment. These factors may include the use of technological devices in the bedroom, such as televisions and computers, having a large meal immediately before bedtime, and drinking stimulants before bedtime (such as sodas, chocolate, tea, and coffee).

Hale and associates (2015) also did a systematic review of screen time and sleep among school-aged children and adolescents. In this study, they conducted a comprehensive review and update of the scientific literature on the relationship between screen time (e.g., television viewing, computers, video games, and mobile devices) and sleep outcomes among school-aged children and adolescents. They looked at 67 papers that were published between 1999 and the beginning of 2014. It was discovered that screen usage is connected with negative sleep outcomes (mainly shorter length and delayed timing) in 90 percent of the research they looked at. Additionally, some of the findings differed depending on the type of screen exposure, the age of the participants, their gender, and the day of the week. The study of Rashidet al., (2021) revealed that among all the technologies they checked, cell phones were the most frequently reported to be used daily by the participants (67.11 percent). Because of the current COVID-19 epidemic, 24.48 percent of those who answered the survey used electronic devices to participate in online classes. According to the participants, they use electronics much more in 2020 as compared to the year 2019. Children demonstrated a lower proclivity to participate in outside activities. More than half of those who took part in the study spent less than one hour each day participating in outdoor activities. In their research, they discovered a link between the usage of electronic devices and health concerns such as headaches, backaches, visual disturbances, and sleeping disturbances. However, the study of Brambilla et al. (2017) found out the use of video devices to be a negative predictor of sleep duration.

Children's health and well-being are widely recognized to be dependent on their ability to sleep, and that inadequate sleep is connected with a wide range of unfavorable health effects. This is underscored by the fact that, due to the current educational situation in our country, children spend more time in front of their gadgets most of the time. Additionally, with the advent of different social media platforms and the prevalence of online games, children spend less and less time interacting on a face-to-face basis, while some get lesser sleep duration in effect. A sequela of events is being predicted because of these factors, which is why this study is of paramount importance as a stepping-stone through which the general public will recognize the connection between sleep and gadget time in children. It is hoped that the parents will recognize the importance of sleep and limiting the screen time of their children in an “as needed” basis only instead of allowing them to spend longer periods tinkering with their gadgets.

METHODOLOGY

Study Design

The researcher used a Descriptive Research Design, more precisely a survey method, to determine the effects of gadget use on sleep quality of Grades 4-6 elementary school students in a private school in Lucena City, Quezon Province. This research design was chosen because the researcher focused on the how, what, when, and where of the research problem, rather than on the why, in order to adequately describe the population, situation, or phenomenon under study.

Locale of the Study and Sampling Method

The study was conducted at a private school in Lucena City, Quezon Province. Similarly, the researcher established the following criteria for determining whether a respondent should be included in the study:

1. Grades 4-6 students.
2. Must be undergoing online learning.
3. Can use gadgets for online learning and/or other miscellaneous activities (social media, research, entertainment, etc.)

In order to determine the participants of the study, the researcher utilized the simple random sampling method. The school administrator provided the roster and the total number of students in grades 4-6 (N=198), after which, the sample size was computed via Raosoft Sample Size Calculator, where the sample size of n=131 was determined. After determining the sample size, the researcher assigned a number to each student and then the fishbowl technique was used to determine who will be the participants.

Methodology and Data Gathering Procedures

Throughout the study's conduct, the following procedures were followed:

1. For this research, the researcher opted to use the Short Form of the CSHQ (22 items). Additionally, to maintain the questionnaire's integrity and validity, no additions or revisions were made. However, in order to establish relationships, weighted means and other statistical tools were used.
2. As indicated in the scope and sampling section of the research, the study included grades 4-6 students in a private school in Lucena City, Quezon Province.
3. Through simple random sampling, a total of n=131 samples were chosen. Each student was assigned a number, after which, the fishbowl technique was used to determine who will be able to participate in the study.
4. The parents of the chosen children were given a survey consent form to read and sign if they chose to participate in the study.
5. Questionnaires were subsequently distributed to the respondents by giving them the link to the survey tool's Google Forms.
6. After participants have completed the questionnaire, the researcher collated, checked, made sure that the responses were complete, scored, and tallied the results.

Ethical Considerations

The study was approved by the Research Committee of the De Los Santos Medical Center's Department of Pediatrics. Participants gave a written consent to participate in the study. At all times, confidentiality and privacy were maintained. Patient identifiers such as names were not included on the data collection forms. Rather than that, a unique study code was assigned to each patient. Only the researcher had access to the completed data collection forms. The encrypted data were stored on a password-protected laptop and were available for analysis only to the biostatistician. Completed data collection forms and encoded data will be retained for up to five (5) years after the study concludes. There is no risk or benefit to study participants directly; however, the study's findings may benefit the aforementioned medical institution as well as residents and attending physicians in the Pediatrics department of the same medical institution. The researcher may then present the findings of the study at conferences/symposia and publish in a scientific journal.

The researcher was responsible for all study-related expenses, including funding and other incidentals. To date, no conflict of interest has been declared.

Statistical Treatment of the Data

Encryption and processing of the data collected were performed using Microsoft Excel and Stata. The data were then tallied to calculate the frequency and percentage distribution of responses. After tallying, the data were treated using weighted means for each response. Additional statistical tools, such as the Analysis of Variance (ANOVA), was used to determine the statistical relationships of the parameters of CSHQ and the (1) average length of sleep, (2) average length of gadget use, and (3) frequency of gadget use. Verbal interpretations of the aggregated weighted means were as follows:

1.00 – 1.79	Disagree
1.80 – 2.59	Slightly Disagree
2.60 – 3.39	Neutral
3.40 – 4.19	Agree
4.20 – 5.00	Totally Agree

Additionally, since the abbreviated version of the CSHQ does not have a set cut-off score in determining problem areas and that this particular abbreviated form of the questionnaire uses a Likert-type scale, arbitrary interpretations were done instead to determine statistical significances.

Table 1: Frequency and Percentage Distribution of the Child's Demographic Profile

Gender	Frequency (f)	Percentage (%)
Male	70	53.4%
Female	61	46.6%
Total	n = 131	100%
Age	Frequency (f)	Percentage (%)
9 years old	28	21.4%
10 years old	27	20.6%
11 years old	39	29.8%
12 years old	37	28.2%
Total	n = 131	100%
Grade Level	Frequency (f)	Percentage (%)
Grade 4	42	32.1%
Grade 5	42	32.1%
Grade 6	47	35.9%
Total	n = 131	100%

Interpretation: The demographic profile of the child is depicted in Table 1, which shows the frequency and percentage distribution of the child's characteristics. The information provided was supplied by the parents, who were the primary respondents to the questionnaire. As indicated by the data, 53.4 percent of the respondents were males, while 46.6 percent of the respondents were females. Additionally, 29.8 percent of the respondents were 11 years of age, along with 28.2 percent at 12 years old, 21.4 percent at 9 years old, and 20.6 percent at 10 years old. Furthermore, 35.9 percent of parent/student respondents are currently in Grade 6, while 32.1 percent are currently in Grade 4 and the last 32.1 percent in Grade 5.

Table 2: Frequency and Percentage Distribution of Child's Average Length of Sleep

Average Length of Sleep	Frequency (f)	Percentage (%)
less than 4 hours everyday	0	0.0%
4 hours to 6 hours daily	13	9.9%
6 hours to 8 hours daily	75	57.3%
More than 8 hours daily	43	32.8%
Total	n = 131	100%

Interpretation: Table 2 shows the frequency and percentage distribution of the child's average daily sleep duration. As the data shows, the majority of children (57.3 percent) were able to get at least 6-8 hours of sleep per day, with 32.8 percent getting more than 8 hours of sleep per day and only 9.9 percent getting at least 4-6 hours of sleep per day. There were no responses recorded for those who slept less than 4 hours per day.

Table 3: Frequency and Percentage Distribution of Length of Time of Gadget Use

Length of Time of Gadget Use	Frequency (f)	Percentage (%)
1-5 hours a day	39	29.8%
6-10 hours a day	76	58.0%
11-15 hours a day	15	11.5%
15 hours of more a day	1	0.8%
Total	n = 131	100%

Interpretation: According to the amount of time spent using the gadget, the frequency and percentage distributions of responses are shown in Table 3. On average, 58 percent of children use their gadgets between 6 and 10 hours per day, with 29.8 percent using their gadgets between 1 and 5 hours per day. In addition, 11.5 percent of the children use their gadgets on a daily average of 11-15 hours, with 0.8 percent using their gadgets for 15 hours or more, according to the study.

Table 4: Frequency and Percentage Distribution of Frequency of Gadget Use per Week

Frequency of Use Per Week	Frequency (f)	Percentage (%)
Less than 1x a week	4	3.1%
1-3x a week	10	7.6%
3-5x a week	36	27.5%
5-7x a week	81	61.8%
Total	n = 131	100%

Interpretation: Table 4 shows the frequency and percentage distribution of responses based on the frequency with which the children use their gadgets on a weekly basis. Children use their gadgets 5 – 7 times per week, according to the majority of responses (61.8 percent); with 27.5 percent using their gadgets 3 – 5 times per week, according to the majority of responses. Aside from that, 7.6 percent of those surveyed use their gadgets once to three times per week, with only 3.1 percent using their gadgets less than once per week. As a result of the withdrawal of approximately 1.5 billion children from school since April 2020, many of these students have been increasingly reliant on electronic devices to complete school assignments as part of learning from home, communicating with peers, and playing video games to recall activities from their childhood (Pratiwi et al., 2020).

Table 5: Frequency and Weighted Mean Distribution of Responses Based on the "Bedtime" parameter of CSHQ

Probing Statements for "Bedtime"	Frequency (f)					Weighted Mean	Rank
	5	4	3	2	1		
Child goes to bed at the same time at night.	27	68	33	3	0	3.91	1
Child falls asleep within 20 minutes after going to bed.	15	70	37	8	1	3.69	2
Child falls asleep alone in own bed.	26	49	36	9	11	3.53	4
Child falls asleep in parent's or sibling's bed.	33	44	34	18	2	3.67	3
Child falls asleep with rocking or rhythmic move-ments.	8	18	40	37	28	2.55	9
Child needs special object to fall asleep (doll, special blanket, stuffed animal, etc.).	23	54	28	10	16	3.44	5
Child needs parent in the room to fall asleep.	20	31	39	20	21	3.07	8
Child resists going to bed at bedtime.	12	42	46	14	17	3.14	7
Child is afraid of sleeping in the dark.	9	62	29	15	16	3.25	6
TOTAL	n= 131		Grand Weighted Mean			3.36	

Interpretation: According to the "Bedtime" parameter included in the CSHQ survey questionnaire, the weighted means of the responses are shown in Table 5. The majority of parents believe their children go to bed at the same time every night (WM 3.91), and that they fall asleep within 20 minutes of going to bed (WM 3.69). Also, it was reported that some of parent respondents agree that their child falls asleep in their bed or in the bed of one of their siblings (WM 3.67), although some children do fall asleep alone in their own bed (WM 3.53). Parent respondents also mentioned that their child required special objects to fall asleep (WM 3.44), which may be indicative of anxiety or difficulty calming down.

Some parents reported that their child is afraid of the dark (WM 3.25), and that at times, he or she resists going to bed (WM 3.14) or requires the presence of a parent in the room in order to fall asleep (WM 3.07). Others have reported that rocking or other rhythmic movements helped them fall asleep (WM2.55). Furthermore, it should be noted that children's biopsychosocial development is significantly aided by their ability to sleep soundly on a consistent basis (Moh, 2017). When it comes to a child's development, sleep is critical because it contributes to their ability to reach their full physical, cognitive, and behavioral potential (Loureiro, 2011). International Classification of Sleep Disorders classifies BSPs such as the ones listed above as difficulties falling asleep or remaining asleep, such as bedtime resistance and night-waking; they correlate to the diagnosis of insomnia in accordance with the 2014 International Classification of Sleep Disorders classification (Sateia, 2014). Moh (2017) went on to say that because of the lack of sleep time experienced by children who have difficulty sleeping, the youngster becomes overly hyperactive and behaves inappropriately as the time for bed approaches. When a child is suffering from a sleep deficiency, they may exhibit symptoms such as drowsiness, difficulty getting out of bed in the morning, and irritability throughout the day.

Table 6: Frequency and Weighted Mean Distribution of Responses Based on the "Sleep Behavior" Parameter of CSHQ

Probing Statements for "Sleep Behavior"	Frequency (f)					Weighted Mean	Rank
	5	4	3	2	1		
Child sleeps about the same amount each day.	23	82	24	2	0	3.96	1
Child is restless and moves a lot during sleep.	11	28	56	33	3	3.08	2
Child moves to someone else's bed during the night (parent, sibling, etc.).	10	24	45	32	20	2.79	4
Child grinds teeth during sleep (your dentist may have told you this).	3	19	25	45	39	2.25	6
Child snores loudly.	7	20	47	30	27	2.62	5
Child awakens during the night and is sweating, screaming, and inconsolable.	2	12	41	37	39	2.24	7
Child naps during the day.	6	28	60	23	14	2.92	3
TOTAL	n= 131		Grand Weighted Mean			2.84	

Interpretation: On the basis of the CSHQ parameter "Sleep Behavior," the weighted means of the responses are presented in Table 6. Parent respondents believe that their child sleeps approximately the same amount every day, according to data collected (WM 3.96). Their child is restless and moves a lot during sleep (WM 3.08), and they have also noticed that the child takes naps during the day (WM 2.92). The child has been reported to move to a different bed during the night (WM 2.79), while others have been found to snore loudly (WM 2.62), which would be indicative of either tiredness or other medically-related conditions such as sleep apnea, among other things. Teeth grinding, also known as bruxism, was observed (WM 2.25), and the child awakens in the middle of the night, sweating, screaming, and inconsolable. According to the 2014 International Classification of Sleep Disorders classification, BSPs are classified as difficulties falling asleep or remaining asleep, such as bedtime resistance and night-waking; they are associated with the diagnosis of insomnia (Sateia, 2014).

Table 7: Frequency and Weighted Mean Distribution of Responses Based on the "Waking During the Night" Parameter of CSHQ

Probing Statements for "Waking during the night"	Frequency (f)					Weighted Mean	Rank
	5	4	3	2	1		
Child wakes up once during the night.	7	47	44	25	8	3.15	1
Child wakes up more than once during the night.	4	18	25	59	25	2.37	2
TOTAL	n= 131		Grand Weighted Mean			2.76	

Interpretation: According to the CSHQ parameter "waking during the night," the weighted means of the responses are presented in Table 7. The data presented

shows that the majority of parents have observed their child wake up once during the night (WM 3.15), with a minority of parents reporting that their child wakes up more than once during the night (WM 2.37). Young children can suffer from sleep deprivation and a lack of concentration, which can result in potentially unhealthy sleep cycles because they are sleepier during the day and sleep less at night than their older counterparts when exposed to gadgets for longer periods of time than what was recommended (Pratiwi, et al, 2020).

Table 8: Frequency and Weighted Mean Distribution of Responses Based on the "Morning Wake Up" Parameter of CSHQ

Probing Statements for "Morning wake up"	Frequency (f)					Weighted Mean	Rank
	5	4	3	2	1		
Child wakes up by him/herself.	21	70	39	1	0	3.85	1
Child wakes up very early in the morning (or, earlier than necessary or desired).	14	51	57	9	0	3.53	2
Child seems tired during the daytime.	5	27	60	29	10	2.91	3
Child falls asleep while involved in activities.	7	26	29	47	22	2.61	4
TOTAL	n= 131		Grand Weighted Mean			3.23	

Interpretation: On the basis of the "Morning Wake Up" parameter of CSHQ, the weighted means of responses are presented in Table 8. The majority of parents have reported that their child wakes up on his or her own (WM 3.85), and that he or she wakes up much earlier in the morning than is desired or necessary (WM 3.53). In addition, the respondents stated that the child appears tired during the day (WM 2.91), and that they fall asleep while participating in activities (WM 2.61). It has been noted by both the American Academy of Pediatricians and the Canadian Children's Society that children can suffer from sleep deprivation and lack of concentration, which can result in potentially unhealthy sleep cycles because children are sleepier during the day and less sleepy at night. Furthermore, according to Moh (2017), drowsiness, difficulty waking up in the morning and irritability during the day are all signs that a child is suffering from a sleep deficiency in young children, as well as other symptoms.

Table 9: Summary Statistics of Children's Sleep Habits Questionnaire Responses

Parameters	Grand Weighted Mean	Rank	Interpretation
Bedtime	3.36	1	Neutral
Sleep Behavior	2.84	3	Neutral
Waking During the Night	2.76	4	Neutral
Morning Wake Up	3.23	2	Neutral

Interpretation: The summary statistics for the CSHQ questionnaire parameters are presented in Table 9. Based on the information provided in the preceding table, the majority of parent respondents agreed with the entries made under the "Bedtime" parameter (GWM 3.36), with the child going to bed at the same time every night and falling asleep within 20 minutes of going to bed, but at times falling asleep in their own bed or in the bed of their parents or siblings instead. Morning wake up is the second most important parameter (GWM 3.23), which refers to whether the child wakes up on his or her own or wakes up earlier than necessary in the morning. Another issue that has been identified is that the child appears tired throughout the day and may inadvertently fall asleep during the course of normal activities. Furthermore, respondents to the third-ranked parameter "Sleep behavior" (GWM 2.84) and the fourth-ranked parameter "Waking during the night" (GWM 2.76) reported that their child slept for the same amount of time every day. However, it was also noted that some respondents reported that their child sleeps listlessly, appears tired and naps during the day, and exhibits some signs of sleep disturbance, such as bruxism, requiring "comfort items" to fall asleep. As well, sleep has been proven to be extremely important in the development of a child's overall well-being, according to numerous studies. Because of the use of technology, some people have reported sleeping disturbances, which may have resulted from inadvertently causing them to lose sleep. While the vast majority of respondents stated that their child's sleep quality was not affected by gadget use, a small number of respondents reported sleep disturbances that should be investigated further.

Table 10: ANOVA Test Results and Relationships Between the CSHQ Parameters and the Average Length of Sleep, Length of Gadget Use and Frequency of Gadget Use per Week

Parameters	F-Value	P-Value	Remarks
Ave. Length of Sleep	0.067196	0.976295	Fail to reject H_o
Ave. Length of Gadget Use	5.556949	0.012615	Reject H_o
Freq. of Gadget Use	17.34608	0.000116	Reject H_o

Legend: If computed P-value is <0.05, reject H_0; if computed P-value is >0.05, fail to reject H_0

Interpretation: To determine whether there are any significant relationships between CSHQ parameters and the child's average length of sleep, average length of gadget use, and frequency of gadget use, the ANOVA computation was performed on the data presented in Table 10. Using the data by Average Length of Sleep (F = 0.067196, p = 0.976295), it was impossible to reject the null, confirming that there is no significant relationship between the child's average length of sleep and his or her CSHQ responses. In contrast, when the data were analyzed for the Average Length of Gadget Use (F = 5.556949, p = 0.012615), and the Frequency of Gadget Use (F = 17.34608, p = 0.000116), the computed p values were less than 0.05, prompting the researcher to reject the Ho, indicating that there is a statistically significant relationship between the average length of gadget use, and the frequency of gadget use, to the quality of the child's sleep. These findings were corroborated by a systematic review of the literature conducted by Hale and colleagues (2015), who discovered that screen usage is associated with negative sleep outcomes (primarily shorter sleep duration and delayed timing) in 90 percent of the research they reviewed. When Rashid and colleagues (2021) conducted their research, they discovered that, among the technology examined, cell phones were the most frequently reported to be used on a daily basis by those who took part in the study (67.11 percent). Possibly as a result of the current COVID-19 epidemic, 24.48 percent of those who responded to the survey of the above-mentioned study said they used electronic devices to participate in online classes. According to the survey participants of Rashid et al.'s study, they would use electronic devices significantly more in 2020 than they will in 2019. Children showed a lower proclivity to participate in outdoor activities than adults in the study. More than half of those who took part in that particular study spent less than one hour per day participating in outdoor activities, according to the findings. When they conducted their research, they discovered a link between the use of electronic devices and health problems such as headaches, backaches, visual disturbances, and sleeping disorders (among others).

SUMMARY

This study aimed to determine the effects of gadget use on the quality of sleep among grades 4-6 elementary school students undergoing online education in a private school in Lucena City, Quezon Province. The study tried to determine whether there is a relationship between the parameters of the abbreviated CSHQ and the average length of sleep, average length of gadget use, and frequency of gadget use. The researcher used a descriptive research design, specifically the survey method to gather data. The population of grades 4-6 students in the private school located in Lucena city is 198, and upon computation of the sample size, an n=131 was figured. Simple random sampling was used wherein after getting the roster of students in grades 4-6, they were assigned numbers from which lots were drawn to determine who the participants will be. After the sampling was done and the final roster of respondents was randomly selected, the link to the Google forms was subsequently sent to the selected participants. After the sample size target was reached, the data were tallied and analyzed, and frequencies and percentages were computed, along with the weighted means for the responses. Relationships between the variables were determined through computation of ANOVA.

DISCUSSION

Parents agreed with the "Bedtime" entries, with the child going to bed at the same time every night and falling asleep within 20 minutes, but sometimes in their own or their parents' or siblings' beds instead. The second most critical metric, “morning wake up”, relates to whether the youngster wakes up on his or her own or gets up sooner than necessary. The child also appears

fatigued throughout the day and may unknowingly fall asleep during normal activities. The third-ranked parameter "Sleep behavior" and the fourth-ranked parameter "Waking during the night" both reported that the child slept for the same amount of time every day, but that some respondents reported that their child sleeps listlessly, appears tired, naps during the day, and has signs of sleep disturbance such as bruxism and requiring "comfort items" to fall asleep. Numerous studies have also shown the importance of sleep in a child's overall development. Some people have reported sleep difficulties due to technology use, maybe due to unwittingly losing sleep. While most respondents said their child's sleep quality was not harmed by gadget use, a few indicated sleep difficulties that warranted additional investigation.

The null hypothesis for Average Length of Sleep data results could not be rejected, demonstrating there is no significant link between average length of sleep and CSHQ replies. Consequently, the researcher rejected the null hypothesis for Average Length of Gadget Use and Frequency of Gadget Use because the computed p-values were less than 0.05. According to the perceptions of the parent respondents, while there were some evidences that point to the relationship of length and frequency of gadget use, it was not enough to establish a direct relationship with the results of the CSHQ. Moreover, the data sets denoted that the average length of sleep of children have contributed more to the BSPs that the parents were able to identify in the CSHQ. The study of Hale and colleagues (2015) stated screen use is associated with unfavorable sleep outcomes (mainly lower sleep duration and delayed timing) in 90% of the research they reviewed. As well, Rashid and colleagues (2021) discovered that of all technologies tested, cell phones were the most commonly reported to be used daily by participants (67.11 percent). Perhaps due to the current COVID-19 outbreak, 24.48 percent of individuals surveyed claimed they used electronic devices to participate in online classes. While the studies have supported that increased length of screen and gadget time in children can affect, data gathered from the respondents have not proven that. The survey also found that kids were less likely to go outside compared to adults. According to the data, more than half of the study's participants spent less than an hour every day outside. They observed a correlation between electronic device use and health issues such headaches, backaches, vision impairments, and sleep disorders (among others).

At the outset, the data gathered were able to yield significant results. While most of the weighted means were verbally interpreted as “neutral”, the parents were able to identify key problems that they were able to observe during their child’s sleep time. Relationships were also established between the parameters of the CSHQ and the average length of gadget use, as well as the frequency of gadget use. This was corroborated by various studies stated in the literature review, that prolonged exposure or use of gadgets can adversely affect the different areas of the child’s growth, along with the child’s quality of sleep. Due to the small sample size, generalizability of the data should be taken with a grain of salt; however, the study can serve as the baseline through which a wide-based study can take off, with further analysis of relationships between other factors that were excluded from this study, as stated in the scope and limitations.

CONCLUSIONS

The following conclusions were drawn after data computations and interpretations:

1. Out of a sample size of 131, 35.9 percent were from grade 6, with 53.4 percent being males, and majority were 11 years of age at 29.8 percent.

2. On the average, 57.3 percent of the respondents sleep for 6 to 8 hours daily. They also use gadgets on an average of 6 to 10 hours daily at 58 percent, on a 5 to 7 times a week basis at 61.8 percent.

3. Collectively, most of the responses of the parent respondents were verbally interpreted as “neutral” based on the interpretation matrix. However, the computed grand weighted means yielded that the parent respondents mostly agreed to the positive aspects of the “Bedtime” parameters (GWM 3.36), followed by “Morning wake up” parameter (GWM 3.23), “Sleep behaviors” parameter (GWM 2.84), and finally, “Waking during the night” parameter (GWM 2.76). While most of the parents respondents agreed to the positive statements of the CSHQ

questionnaire, they were able to identify key problems, such as: (1) failing to fall asleep in their own bed or falling asleep in the parents' or siblings' bed; (2) needing a special object to lull them to sleep; (3) being afraid of sleeping in the dark and resisting going to bed; (4) rocking self to sleep, restlessness, snoring, and bruxism; (5) waking up more than once during the night; (6) waking up earlier than was necessary; and (7) seemingly tired during the daytime, and falling asleep during activity performance.

4. ANOVA results yielded statistically significant relationships were established between the average length of gadget use ($p = 0.012615$), and frequency of gadget use ($p = 0.000116$) with the parameters of the CSHQ, wherein the researcher rejected the null hypothesis on the premise that the computed p-value is less than 0.05. However, the study failed to establish a relationship between the average length of sleep and the parameters of the CSHQ ($p = 0.976295$).

RECOMMENDATIONS

1. Establish a more generalizable data set by getting more samples within a set population of students that use gadgets for online learning or other social media and entertainment activities.

2. Create an opportunity to include the respondents' demographic profiles in data analysis of relationships with the parameters of the CSHQ.

3. Facilitate baseline scores using the abbreviated CSHQ and compare it with the original CSHQ manuscript to determine possible problem areas in the child's quality of sleep.

4. While the educational situation in our country today necessitates gadget use, parents should be made aware of the possible adverse effects of prolonged use of gadgets in their child's health and well-being. Limiting the gadget exposure of the children post-online classes should be recommended in order to prevent these adverse effects from taking place.

5. Medical, educational, and other government professionals and officials should take into consideration educating the masses regarding the effects of gadget use in the quality of sleep of the children, as well as its effects in the other aspects of the child's health.

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