

The Effect of Distance Teaching to Mothers on Primary School Boys' Sleep Habits Related to Computer Games: A Quasi-experimental Study

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Abstract

Background: Computer games have often been considered to have a negative impact on children's sleep. The aim of this study was to determine the effect of distance teaching for mothers on the sleep habits related to computer games among the primary school boys living in Zahedan, Iran, during 2020.

Methods: The present quasi-experimental study was carried out on the primary school students. 144 male students were randomly selected in two groups of intervention and control. Data collection tools included the Child Sleep Habits and demographic information Questionnaires. If the student was in the intervention group, before the intervention, the researcher held a face-to-face meeting with his mother to complete the questionnaire. Then, I created a group for mothers in Telegram and WhatsApp. The intervention was conducted in 4 weeks, during which the researcher sent the educational texts and videos to the students' mothers, three times a week. Eight weeks later, the Sleep Habits Questionnaire was completed by the mothers. If the student was assigned to the control group, the demographic information and Sleep Habits Questionnaires were completed by the mothers, as the pre-test. No intervention was made for this group; and the post-test was completed after 8 weeks by the mothers. Data analysis was performed through IBM SPS.

Results: The results revealed that the mean and standard deviation of the sleep habits score and its dimensions were not significantly different in the intervention and control groups ($P>0.05$) before the intervention. However, after the intervention, the sleep habits score and its dimensions showed significant differences between the two groups ($P<0.05$).

Conclusion: Maintaining the physical and mental health of students is an important responsibility of pediatric nurses and parents. It is suggested that teaching sleep habits to mothers should be considered.

Key Words: Achievement goals, cheating behavior.

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1- INTRODUCTION

Sleep is one of the basic and fundamental human needs, which is essential for survival and health (1). It is an active physiological process during which the body regenerates its energy and causes the secretion of growth hormone, protein synthesis, and cell differentiation that are necessary for growth and development (2). It reduces stress and anxiety, increases concentration, and helps a person regain energy for greater concentration, adjustment, and enjoying daily activities (1). Sleep plays an important role in children's development and affects physical, behavioral, and emotional development, and cognitive function (3). Therefore, it is recommended that adolescents and children sleep 7 to 9 hours a night (4). Sleep habit is a dynamic process that is formed in childhood according to family and cultural backgrounds; and the person tries to maintain it (5). Sleep disorders are one of the most common phenomena in children (6) and are defined as a decrease or excessive increase in sleep according to age, or different types of abnormal behaviors during sleep that can affect children's body, behavior, and cognitive function (7).

Javadi et al. reported that sleep disorders in childhood are more than 25% (8). Mishra et al. demonstrated that 15 to 75% of primary school children do not get enough sleep (9). Sleep disorders can directly and indirectly affect students and their families and the most serious complications of sleep deprivation are anxiety and behavioral problems that ultimately lead to educational failure as well as familial, psychological, and social tensions (10). Therefore, identification and prevention of sleep problems and their complications are very important (7).

Computer games and the use of the Internet are also associated with being awake during sleep and the formation of

sleep disorders in children (11). However, nowadays, computer games are one of the gifts of technology for human beings, the use of which is increasing, indiscriminately, among children and adolescents (12). A study in the United States has shown that children between the ages of 8 and 10 use digital devices 8 hours a day (13). The negative effects of computer games are physical injuries, educational and psychological injuries, isolationism, laziness of mind, negative impact on family relationships, and academic failure (14). A number of negative psychological effects associated with the use of computer games include the decreased self-esteem, depression, social isolation, and sleep disorders (15). In addition to the negative effects of using computer games, there are positive effects in using computer games such as the increase in creativity, eye and hand coordination, and abstract thinking. However, it seems that the negative aspect of these games prevails over their positive aspect (16).

Edward et al. concluded, in their study, that computer games affect the quality of sleep and health of children (12). Durkin and Barber showed that these games can replace other social activities such as watching TV, doing homework, sports, and relationships with peers and lead the child to gradually distance himself from those around him and friends (17).

One of the non-pharmacological methods for children with sleep deprivation is providing the parents with sleep-related information (18). The field of education and learning is one of the fields that has undergone extensive changes in recent years (19). Mobile technology is one of the manifestations of information and communication technology that, like other communication technologies, has entered the field of education and has been introduced as mobile-based education. The use of mobiles in education can improve

the learning process (20). Mobile technology can expand the access, discovery, discussion, and exchange of information (21). In most families, the mother, due to constant communication with the child, can participate more effectively in child care (23) and has the main role in this regard (22). On the other hand, nurses have an important role in promoting the health level of society (24) and are among the most influential people who can provide the necessary knowledge and information to people of the society (25). Nurses are in an obviously unique situation of transmitting the new knowledge about sleep and health promotion (14). Therefore, this study was conducted to investigate the effect of distance teaching for mothers regarding the proper and e-game oriented sleep habits on the sleep quality (habits) of the primary school boys.

2- MATERIALS AND METHODS

2-1. Study design and population

The present quasi-experimental study was conducted on 144 primary school boys of Districts 1 and 2 of Zahedan in 2020. The sampling process continued from November 2020 to May 2021.

The sampling was done in a multi-stage method, so that a list of all public primary schools for boys in Districts 1 and 2 of Zahedan was, first, prepared. Then, 2 schools from each district (Districts 1 and 2) were selected using a simple random method (a total of four schools). In the next stage, from among the selected schools of each district, one school was assigned to the control group and one school to the intervention group via drawing lots. Then, in each school, one class from each grade (1 to 6) was selected using drawing lots (a total of 6 classes, one class from each grade). Next, with the cooperation of the school principal, the students who were eligible to participate in the research and also willing to participate

were identified from each grade, and 6 students were selected from each class through a lottery (6 students and a total of 36 people in each school).

The sample size was estimated at 34 participants in each group using the formula for "the average score of total Quantity of students' sleep " with 95% confidence interval and $\alpha=0.05$, based on a study performed by Mosaalrezaie et al. (26). Nonetheless, 72 participants were recruited in each group to guarantee the adequacy of the sample size and possible attrition.

2-2. Inclusion and exclusion criteria

The inclusion criteria for students consisted of being 7 to 12 years, the child's playing games for more than 3 hours a day, using the phone and tablet, playing net games, the child's not suffering from chronic diseases such as asthma, seizures, heart diseases, kidney diseases and other diseases that cause sleep disorders, as well as not using sleeping pills. Inclusion criteria for mothers consisted of having WhatsApp and Telegram applications on the phone and using it, being literate, and having physical and mental health. Exclusion criteria were the mothers' absence in the virtual group created for education, their unwillingness to continue their participation in the study, and transferring the student to another school.

2-3. Measurement tools

The data collection tools included demographic information form (age, educational level, mother's job, father's job, mother's contact number, number of children, type of computer games, etc.) and the Child Sleep Habits Questionnaire. This questionnaire is used by Owens et al. (27) in 45 phrases, 33 of which are utilized. This instrument is designed to measure the sleep quality and habits of four- to twelve-year-old children and is completed by parents. This questionnaire

has 8 subscales: 1) Resistance to sleep with six phrases and a score range of 6-18, 2) Sleep onset delay with one phrase and a score range of 1-3, 3) Sleep duration with three phrases and a score range of 3-9, 4) Sleep anxiety with two phrases and a score range of 3-6, 5) Nocturnal awakening with three phrases and a score range of 3-9, 6) Parasomnia with seven phrases and a score range of 7-21, 7) Respiratory sleep disorders with three phrases and a score range 3-9, and 8) Drowsiness during the day with eight phrases and a score range of 8-24.

Each phrase has a value between 1 and 3 (from rarely to usually). The participants are asked to mark the "usually" option if the behavior is repeated 5-7 days a week (score 3), the "sometimes" option if the behavior is repeated 2-4 days a week (score 2), and the "rarely" option if the behavior is repeated 0-1 days a week (score 1). All questions are scored directly except 1, 2, 3, 10, 11, and 26, which are scored in reverse. The score range is between 33 and 99. The total score of sleep problems is the sum of the scores of all subscales, and the score of each subscale is the sum of the scores of the phrases related to that component. Higher scores in the Sleep Habits Questionnaire mean more sleep problems. Judith et al. estimated the Cronbach's alpha reliability of this instrument to be 0.62 to 0.78 (28). In Iran, Najafi et al. estimated the reliability of the instrument at 0.79 (29). The internal consistency of the instrument in the present study was estimated at 0.75 through the Cronbach's alpha coefficient method.

2-4. Intervention

After the verification and approval of the proposal by the Vice Chancellor for Research and Technology and the ethics committee of the university and the faculty, receiving a letter of introduction for the Department of Education, and receiving a letter of introduction from

there to the schools, the researcher went to the selected schools, introduced herself to the school principals, stated the aims of the study, and provided them with the necessary explanations on the research process, and began the sampling.

With the cooperation of school principals, eligible students in the selected grades were selected. Then, the mobile numbers of the students' mothers were taken from the schools and during the telephone communication; if desired, a face-to-face meeting was also held (in groups of 6 people for each grade, due to observing the health protocols related to COVID-19). In those meetings, the researcher explained the purpose of the study and provided the mothers with the informed consent forms to read and sign, if agreed. Then, as the pre-test, demographic information questionnaire and sleep habits questionnaire were completed by the mother of the child in the presence of the researcher. The post-test was completed by the mothers after 8 weeks (2 months).

The control group received no education. However, in the intervention group, before the intervention, the researcher created a Telegram and WhatsApp group including all mothers (according to the mothers' opinions). Then the intervention was made during 4 weeks. The researcher sent an educational text and sometimes a video three times a week, to the mothers at 18-20 o'clock. All texts and videos discussed the dimensions of sleep habits and were prepared based on the textbooks and articles under the supervision of two faculty members of nursing holding a PhD. After taking the post tests, the mothers in the control group were provided with a researcher-made booklet including the instructions given to the intervention group.

2-5. Ethical Considerations

This research was approved By the Ethics Committee of Zahedan University of

Medical Sciences under the code of ethics ([IR.ZAUMS.REC.1399.412](#)). All participants signed written informed consent and were fully aware of the research process. Moreover, they were informed of the possibility of study withdrawal at any research stage and the confidentiality of information in this study.

2-6. Statistical Analysis

All data were presented as mean, standard deviation, and percentage. The statistical analysis was performed using the descriptive statistics, Kolmogorov-Smirnov tests (to determine the normality of the variables), Chi-square test, paired t-test, and independent-samples t-Test. All analyzes were carried out in the SPSS software (version 21) (IBM Corp, Armonk, NY, USA). A p-value less than 0.05 was considered statistically significant.

3- RESULTS

3-1. Demographic Characteristics

The results of the Kolmogorov-Smirnov test showed that the normal distribution of the data ($p > 0.05$). Therefore, the parametric tests were used. Each of the 6 grades of primary school equally comprise 16.7 % of the participants (12 students from each grade): and the intervention and control groups had no significant difference in terms of the frequency distribution of the grades.

Besides, **Tables 1** and **2** show that there is no significant difference between the two groups in terms of individual variables.

3-2. sleep habits

The results of the study showed no significant difference between the two groups in the dimensions of sleep habits, before the study. However, this difference was significant after the intervention. Moreover, the pre-post difference was significant in the intervention group in which the mean scores of sleep habits dimensions had significantly reduced; but this difference was not significant in the control group (**Table 3**).

4- DISCUSSION

This study aimed to determine the effect of distance teaching on e-game oriented sleep habits for mothers of the primary school boys in Zahedan. The results showed that the implementation of the distance teaching program for mothers had a positive effect on sleep habits related to computer games, so that the educational intervention could reduce the mean scores of sleep resistance, sleep onset delay, sleep duration, sleep anxiety, nocturnal awakening, parasomnia, daytime drowsiness, respiratory disorders and the total score of the Child's Sleep Habits Questionnaire in the intervention group. However, in the control group no significant difference was observed.

Table-1: Comparing the means and standard deviations of the quantitative characteristics in the two groups

Variable	Control Group	Intervention Group	P Value
	Mean \pm SD	Mean \pm SD	
Age	9.5 \pm 1.71	9.43 \pm 1.71	*p = 0.23
Playing Time Duration	6.88 \pm 1.64	7.27 \pm 1.61	*p = 0.79
Mother's Age	32.78 \pm 5.142	33.56 \pm 6.44	*p = 0.77
Father's Age	35.83 \pm 4.43	36.18 \pm 3.22	*p = 0.59
Number of Children	2.54 \pm 0.85	2.56 \pm 0.80	*p = 0.33

* Independent t-test

Table 2. Comparing the frequency distribution of the qualitative characteristics in the two groups

Variable		Control Group		Intervention Group		P Value
		Frequency	Percentage	Frequency	Percentage	
Playing Time	Morning	6	3.8	6	3.8	*p = 0.98
	Evening	24	4.33	25	4.33	
	Night	42	3.58	41	9.56	
	Total	72	100	72	100	
Game Device	Mobile	20	8.27	16	2.22	*p = 0.65
	Tablet	32	4.44	29	3.40	
	PS4	15	8.20	29	8.27	
	Computer	5	7	7	7.9	
	Total	72	100	72	100	
Mother's Level of Education	High school	14	4.19	13	1.18	*p = 0.66
	Diploma	31	1.43	27	5.37	
	Higher	27	5.37	32	5.44	
	Total	72	100	72	100	
Mother's Employment Status	Employed	26	1.36	32	4.44	* p = 0.39
	Unemployed	46	9.63	40	6.55	
	Total	72	100	72	100	
Father's Level of Education	High school	6	3.8	4	6.5	* p = 0.37
	Diploma	23	9.31	17	6.33	
	Higher	43	7.59	51	8.70	
	Total	72	100	72	100	
Father's Employment Status	Employed	51	8.70	50	4.69	* p = 0.85
	Unemployed	21	2.29	22	6.30	
	Total	72	100	72	100	
Economic Situation	Good	6	3.8	12	7.16	* p = 0.19
	Medium	59	9.81	50	4.69	
	Weak	7	7.9	10	9.13	
	Total	72	100	72	100	
Nationality	Fars	40	5.55	42	3.58	* p = 0.44
	Baloch	32	5.54	30	7.41	
	Total	72	100	72	100	

*Chi-square test

Table-3: Comparing the means of sleep habit dimensions before and after the intervention in the two groups

Time Variable		Before the Intervention	After the Intervention	Changes	P Value
		Mean \pm Standard Deviation	Mean \pm Standard Deviation	Mean \pm Standard Deviation	
Resistance to Sleep	Control	14.72 \pm 0.77	14.72 \pm 0.80	00 \pm 0.16	*p = 0.99
	Intervention	14.48 \pm 1.54	12.96 \pm 1.53	-1.59 \pm 0.74	*p = 0.001
	Test Results	**p = 0.49	**p = 0.001	**p = 0.0001	
Sleep Onset Delay	Control	3 \pm 00	3 \pm 00	00 \pm 0.16	*p = 0.85
	Intervention	3 \pm 00	2 \pm 0.35	1 \pm 0.74	*p = 0.001
	Test Results	**p = 0.31	**p = 0.001	**p = 0.001	
Sleep Duration	Control	7.79 \pm 0.40	7.80 \pm 0.39	0.1 \pm 0.48	*p = 0.81
	Intervention	8.56 \pm 0.54	6.71 \pm 0.79	1.85 \pm 0.26	*p = 0.001
	Test Results	**p = 0.34	**p = 0.001	**p = 0.001	
Sleep Anxiety	Control	8.5 \pm 0.63	8.72 \pm 0.77	0.22 \pm 0.12	*p = 0.50
	Intervention	8.58 \pm 1.44	7.26 \pm 0.59	1.32 \pm 0.79	*p = 0.001
	Test Results	**p = 0.63	**p = 0.001	**p = 0.001	
Nocturnal Awakening	Control	7.29 \pm 0.45	7.33 \pm 0.57	0.04 \pm 0.12	*p = 0.99
	Intervention	7.09 \pm 0.65	5.63 \pm 0.67	1.45 \pm 0.69	*p = 0.001
	Test Results	**p = 0.14	**p = 0.001	**p = 0.001	
Parasomnia	Control	14.08 \pm 0.88	14.07 \pm 0.95	0.01 \pm 0.59	*p = 0.84
	Intervention	13.97 \pm 0.76	12.54 \pm 1.42	1.43 \pm 1.59	*p = 0.001
	Test Results	**p = 0.42	**p = 0.001	**p = 0.001	
Respiratory Disorders	Control	4.22 \pm 0.41	4.16 \pm 0.41	0.05 \pm 0.37	*p = 0.20
	Intervention	4.27 \pm 0.61	3.43 \pm 0.91	0.84 \pm 0.66	*p = 0.001
	Test Results	**p = 0.052	**p = 0.001	**p = 0.001	
Sleep Drowsiness during the Day	Control	75.56 \pm 2.67	75.63 \pm 2.64	0.06 \pm 0.30	*p = 0.30
	Intervention	73.38 \pm 8.01	65.56 \pm 7.35	7.81 \pm 2.51	*p = 0.001
	Test Results	**p = 0.52	**p = 0.001	**p = 0.001	
Sleep Habits	Control	75.56 \pm 2.67	75.63 \pm 2.64	0.06 \pm 0.30	*p = 0.30
	Intervention	73.38 \pm 8.01	65.56 \pm 7.35	7.81 \pm 2.51	**p = 0.001
	Test Results	**p = 0.52	**p = 0.001	**p = 0.001	

* paired t

** independent t

The results of the study done by Hassan Tehrani et al. showed that in teaching appropriate sleep habits to mothers of young children, there was a statistically significant difference between the mean scores of sleep habits and its dimensions in the experimental and control groups before and after the educational intervention (30),

which was consistent with the results of the present study.

While in the study by Masnabadi et al. on female students, the combined educational intervention (teaching to mothers through social networks and games along with the entertainments for students), could reduce the mean scores of sleep resistance, daily drowsiness, parasomnia, sleep duration,

nocturnal awakening, and the overall score of the Child's Sleep Habits Questionnaire in the experimental group, but no significant difference was observed in the control group (31). The study mentioned that the education on sleep habits had no effect on sleep onset delay and sleep anxiety, which might be explained in terms of the individual characteristics of their participants.

Amin Shokravi et al. also studied the effect of the intervention conducted to improve sleep habits in 7- to 13-year-old children with hyperactivity. The mothers of the children in the intervention group received teaching through booklets, telephone calls, and educational texts, and the mothers in the control group did not receive any teaching. The results showed that two months after the intervention, the intervention group compared with the control group, showed a significant decrease in the mean of some subscales of the sleep habits questionnaire such as resistance to going to bed, sleep onset delay, the duration of sleep, sleep anxiety and daily drowsiness, and the total score of the questionnaire (32). These studies, unlike the present study, could not have an effect on parasomnia and nocturnal awakening. It might be, of course, due to the fact that the present study was performed on healthy children.

The results of the present study are not consistent with the intervention study by Rigney et al., in which no significant change in sleep knowledge and health status was observed in the experimental group compared to the control group, and no effect on sleep knowledge and sleep hygiene was observed in the follow-up. They suggested that it is difficult to change sleep patterns, and more intensive programs targeting different age groups can be effective (33). Perhaps the findings of the present study are related to the duration of training; in another study, Paavonen found that a three-week teaching

improved children's sleep patterns (34). And the present study has led to similar results with the duration of 4 weeks for the mothers' distance learning. Furthermore, these results are not consistent with the study conducted by Chehrazad et al, in which teaching was done only in three sessions (35). Thus, the duration of teaching can be effective in reducing sleep problems.

5- CONCLUSION

Since comfortable and uninterrupted sleep is very important in children and affects their growth and development, teaching proper sleeping habits to parents and children can increase their awareness and produce better performance on improving the child's sleep. The results of the present study showed that teaching proper sleep habits to mothers could improve the quality of sleep in school-age children. Therefore, it is recommended that teaching proper sleep habits to mothers and children be given due consideration. One of the limitations of this study was the lack of adequate face-to-face communication between the researcher and the mothers due to the current conditions caused by COVID-19; though the researcher attempted to deal with this problem through telephone communications.

6- AUTHOR CONTRIBUTORS

Fereshteh Dastres, Mahnaz Ghaljeh, Alia Jalalodini, fereshteh Ghaljaei conceived the study and contributed in the design of the study and the drafting of the manuscript; Fereshteh Dastres, Mahnaz Ghaljeh. Alia Jalalodini and Fereshteh Ghaljaei advised on the method of education, and Ali Navidian advised on data analysis; Mahnaz Ghaljeh revised and approved the manuscript.

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8- CONFLICT OF INTEREST

None.

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