The Effect of Sleep Pattern Modification on Increasing Academic Self-efficacy of Elementary School Students

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Abstract

Background: Self-efficacy beliefs can affect the enhancement of the skill levels of people in different conditions. Yet different cognitive and non-cognitive factors can cause decreasing self-confidence and declining academic self-efficacy; these factors include sleep disorder. The current study is done with the aim of examining the role of sleep pattern correction on increasing academic self-efficacy of elementary students.

Method: The present study has used pre-test post-test quasi-experimental design with control group, encompassing all of female sixth grade students of Kerman elementary schools in the academic year 2019-2020. The initial population comprised of 341 individuals, from whom 40 students with the highest scores in sleep disorders and the lowest scores in academic self-efficacy were selected as the participants of the study. They were then randomly assigned into the experimental and control groups. The data collection instruments included the Sleep Disorder Scale for Children designed by Bruni (1996) and the Academic Self-Efficacy Questionnaire by Mecca Ilroy and Bunting (2002). The experimental group received sleep-related trainings for 6 weekly sessions, along with the program for sleep pattern correction based on the model of Barbaresi et al. (2005). After the end of the treatment, post-tests were distributed among both groups.

Results: Sleep pattern correction was revealed to have a significant effect on academic self-efficacy of elementary students, with an effectiveness rate of 48.9%.

Conclusion: The results of the present study indicated that sleep pattern correction can help strengthening the academic self-efficacy of elementary students. And thus, it might be said that in case children have a regular sleep pattern, they will obtain better test results. It is recommended that parents attempt to arrange a regular sleep program for children.

Key Words: Effect, Elementary Students, Sleep Pattern, Self-efficacy.

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1- INTRODUCTION

The belief of self- efficacy is an important factor in human constructive competence system (1). It affects similar skills in various peoples or skills of a person in different conditions; therefore the concept of perceived self-efficacy is a significant factor for successful implementing of performance (2). Self-efficacy is defined as a product of our interaction with the world, and also as an influential factor on the quality of our interactions (3). As beliefs of self-efficacy affect our attempts and the cognitive sources that we apply for interaction with our surrounding world (4). Moreover, this concept includes the individuals' judgment from their own abilities, which directly contribute to their implementation of an especial duty (5). Self-efficacy in fact indicates one's expectation from oneself, which has the strongest contribution to human motivation and action, from among different expectations (3).

In this regard, motivation researchers have conceptualized the beliefs of students' self-efficacy in the fields of their capability to do school homework (6) and have revealed a positive relationship between beliefs of self-efficacy and academic performance (7). The scores of exams and academic motivation have shown a correlation between beliefs of self-efficacy and academic performance (8). However, various cognitive and non-cognitive factors can reduce self-confidence and decrease academic self-efficacy and self-concept, or intensify such disorders in children; one of these factors is sleep disorder (9).

Sleep is a dynamic and highly organized biological process; Disturbed sleep is considered as an important cause of human suffering and pain at any age (10). According to the research conducted in this field, 21% of children suffer from insomnia disorder in their sleep; and the rate of sleep disorders in students at the age of 7 to 11 years is reported to be 23% (11). Esmailzadeh (2014) has reported that the rate of sleep disorders among the fifth grade students is 31% (12). The quality of sleep at night can affect a person's cognitive performance and the level of his or her focus on doing daily activities (13). Part of the poor academic performance of the students and adolescents is attributed to their inadequate sleep; factors such as early school start and delay in stages of sleeping lead to reducing sleep time among adolescents; and insomnia at night can severely reduce students' learning and academic performance level (14).

The sleep course is strongly correlated with the individuals' mental awareness and professional performance; and sleep deprivation can affect students' academic status (15). Therefore, it seems that one of the ways to strengthen academic self-efficacy and improve academic performance, especially in childhood, is to correct students' sleep patterns; that affects academic performance and self-efficacy (16). However, to the best of our knowledge, domestic researchers have not yet investigated the role of sleep patterns in the academic self-efficacy of elementary students. The purpose of the current study was thus to examine the role of sleep pattern correction on increasing the academic self-efficacy of elementary students.

2- METHODOLOGY

2-1. Study design and population

The current study follows a pre-test post-test quasi-experimental design with control group. The statistical population included all of female sixth grade students of Kerman elementary schools in the academic year 2019-2020. The initial sample size for screening according to Morgan's table was 341, from whom 40 subjects were selected. Inclusion criteria included students who had the highest score in sleep disorders in children (SDSC)

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and the lowest score in academic self-efficacy. The samples were entered the study after obtaining informed consent and were randomly divided into the experimental and control groups, 20 participants in each.

2-2. Measuring tools: validity and reliability

Data collection instruments in this study included the Sleep Disorders Scale for Children (SDSC) designed by Bruni (1996) (17). This questionnaire has 17 items along with a parental form, which assesses sleep disorders in three parts of difficulty at the beginning of sleep (5 questions), sleep continuity (7 questions) and waking up (5 questions) based on a 5-point Likert scale. The reliability of this scale has been confirmed in Iran, with a Cronbach's alpha coefficient of 0.73 (18).

The other instrument was the Academic Self-Efficacy Questionnaire consisted of 10 questions and designed by McElroy and Bunting (2002) in a seven-point Likert scale. The validity coefficient of this questionnaire and its reliability, having been calculated by McIlroy and Banting were respectively 83% and 81% (19). Moreover, the validity coefficient of this questionnaire and its reliability were respectively 82% and 86%, as confirmed by Zohrehvand in Iran, using the method of Cronbach's alpha (20).

2-3. Method

In this study, the members of experimental group received a 6-session sleep-related training along with sleep pattern correction based on the model of Barbaresi (2005) (21). Each treatment session took 45 minutes, and they were administered once a week; the sessions are summarized in **Table 1**; the control group did not receive any training during this period of time. After the end of the treatment, post-tests were distributed among both groups in terms of academic self-efficacy to examine the effect of didactic sleep correction on academic self-efficacy.

2-4. Data Analysis

In order to analyze data, the Analytic Covariance test (ANCOVA) was used. All statistical calculations were performed by SPSS software 23.0, considering the significance level of 0.05.

3- RESULTS

According to the results of **Table 2**, the academic self-efficacy mean scores of the experimental group in the pre- and post-tests were calculated as 44.4 and 49.9, respectively; while the control group represented the mean scores of 44.05 and 44.1 in the pre- and post-tests of this variable.

The Analysis of Covariance (ANCOVA) was applied for the inferential statistics. To examine the homogeneity of regression coefficients (slope), the first and second GLM factor of variance cross-analysis tests were used. Since the F ratio was greater than 0.05 ($F_{(6, 39)} = 0.135$, $P = 0.99$), it was found that the data had followed the assumption of homogeneity of regression slope. For testing the equality of post-test variances, the Levene's test was used; Due to the significance of the F ratio ($F_{(1, 38)} = 1.503$, $P = 0.193$), the homogeneity of variances in the dependent variable was confirmed between the two groups. To examine the normality of pre-test data distribution, the Kolmogorov-Smirnov test was implemented, according to which ($Z = 0.566$, $P = 0.906$) this assumption was also confirmed. Thus, all the three assumptions of analysis of variance-covariance (ANCOVA) were met, and we were permitted to use this method.

According to the results of **Table 3**, after adjusting the pre-test scores, sleep pattern correction is revealed to have a significant effect on academic self-efficacy of elementary students ($F_{(1,37)} = 35.38$, P

<0.05, $\eta 2$ = 0.489), and the rate of the effect of sleep pattern correction on academic self-efficacy in elementary students is 48.9%.

The results of **Table 4** show that the mean of the adjusted post-test scores in the experimental group (49.73) had been higher than that of the control group (45.27).

Table-1: Sleep pattern correction program

Session	Content
One session before the intervention	Introducing, establishing a relationship, welcoming, stating the research objectives and conducting the initial evaluation of the subjects by the Sleep Disorders Scale for Children (SDSC) and the Study Self-Efficacy Questionnaire.
1	Discussing the need for attention to sleep and its role in learning; asking students to verbally express their sleep and rest programs over the past week.
2	Discussion about the appropriate number of hours of sleep for a child of about 10 to 12 years, as well as the appropriate time of sleep during the day and summarizing about these topics and asking students to go to the bedroom and go to bed at 10 o'clock at night.
3	Reviewing the content of the previous session and asking the students about the time they had gone to their bedroom last week; asking the reasons for not implementing the program from those who had not reported failure in going to bed in time; attempting to find the roots and provide solutions for those who have had problems in this area.
4	Discussing the right time to wake up in the morning for children and the reasons behind the utility of early waking up and its tangible effects on health and advancing school goals, etc.
5	Reviewing the contents of the previous session and asking the students about the time they woke up during the week before, and asking the reasons from those who had not been able to implement the program regarding the wake-up times in the morning; attempting to find the roots and provide solutions for those who have had problems in this area.
6	Discussing the causes of not falling asleep early when children are in bed, the mental quality of children's sleep, and the effects of sleeping pills for children, the steps needed to have a deep sleep, etc. and providing them with programs for improving sleep quality during a week.
Final session of post-test implementation	Reviewing the contents of the whole sessions and discussing the contents and the amount of tangible changes occurred in the students' sleep pattern; administration of the post-tests.

Table-2: Descriptive statistics of students' academic self-efficacy

Group Statistics					
Self-Efficacy	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-Test	Control	20	44.05	4.71811	1.05500
	Experimental	20	44.4	3.29912	.73771
Post-Test	Control	20	45.1	4.77824	1.06845
	Experimental	20	49.9	4.42362	.98915

Table-3: Analysis of covariance for the effect of sleep pattern modification on academic self-efficacy

Tests of Between-Subjects Effects								
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	828.459[a]	2	414.230	73.848	.000	.800	147.696	1.000
Intercept	6.190	1	6.190	1.104	.300	.029	1.104	.176
Self-Efficacy, pre-test	598.059	1	598.059	106.621	.000	.742	106.621	1.000
Groh	198.434	1	198.434	35.376	.000	.489	35.376	1.000
Error	207.541	37	5.609					
Total	91286.000	40						
Corrected Total	1036.000	39						
a. R Squared = ,800 (Adjusted R Squared = ,789)								
b. Computed using alpha = .05								

Table-4: Average adjusted mean scores of students' academic self-efficacy in the post-test

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control	45.271[a]	.530	44.197	46.344
Experimental	49.729[a]	.530	48.656	50.803

4- DISCUSSION

The results of the present study indicate a significant effect of sleep pattern correction on academic self-efficacy in elementary students. This result is consistent with Samavi's findings (2018), based on which there is a direct and significant relationship between sleep quality, academic self-efficacy and academic achievements of students (22). The results of the present study are further in line with those of Davoodi (2019) showing a significant relationship between sleep pattern, academic self-efficacy and academic achievement of collegians (23) and also with the findings of Miltado (2001) revealing a significant relationship between sleep quality and academic self-efficacy (8). Then, in line with Eliasson et al., it can be claimed that if children have a regular sleep pattern, observing a specified time for sleeping and waking up, without

using sleep medication and painkillers, they can get better exam results; likewise, if they cannot realize and solve a problem for the first time, they will solve it with effort and struggling (14). Such effects can be explained the findings of studies which indicate to sleep as a special behavior, considered as a stage of awareness like awakening (24). Research suggests that the effect of sleep is more related to stabilizing the normal function of the brain than body relaxation; if the cause of sleep has been connected to the result of reduced brain function after fatigue, then the sleepy feeling equals to reducing the amount of sent sensory messages (16).

Sleep pattern is formed by components of a person's overall description of sleep (mental sleep quality), delay in falling asleep, duration of useful sleep, sleep adequacy (it is calculated on the basis of the ratio of useful sleep duration to total time spent in bed), sleep disorders (waking up at night), the amount of the taken sleep medication and morning performance (problems experienced by the person during the day result in insomnia). Insomnia at night can affect the quality of daily activities. Furthermore, the amount and manner of sleep at night can affect a person's cognitive function and level of his or her concentration for being involved in daily activities. Consequently, the person's psychological characteristics such as self-efficacy and academic performance will be affected (25). The limitations of this study included limiting the population to the sixth grade female students, due to which the generalizability of the results to other students should be done cautiously. The instrument of data collection was a self-report questionnaire, so the honesty of the research units may be out of control. Moreover, the intervening factors such as socio-economic level, mental health and other factors were out of control. It is then recommended that further studies investigate the factors affecting students'

sleep disorders in multifarious research environments.

5- CONCLUSION

Considering the results of the present study along with the previous research findings, it is recommended that the students have a regular sleep program controlled by the parents and counselors; in a way that students should appropriately sleep for 8 hours at night. Moreover, identifying and deriving the cases of sleep disorders and nightmares in children is of utmost importance. Attempts should be made to heal such disorders by creating mental relaxation for children and not taking medication and painkillers to the possible extent. The preparation of educational brochures by experts for children and parents and granting the students with low academic self-efficacy with nice sleep prizes can be effective on improving the regularity of their sleep patterns and, thereby, their academic outcomes.

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