Int. J. School. Health. 2021; 8(4)

Published online 2021 October.

Original Article

Effects of Cognitive-Behavioral Therapy on Mental Health of High-School Students during COVID-19 Pandemic

Amir Dana[1]*, PhD; Sheida Ranjbari[2], PhD; Mir Hamid Salehian[3], PhD; Parastoo Shayan Matin[3], MSc Student

[1]Department of Physical Education, North Tehran Branch, Islamic Azad University, Tehran, Iran
[2]Department of Physical Education, Urmia Branch, Islamic Azad University, Urmia, Iran
[3]Department of Physical Education, Tabriz Branch, Islamic Azad University, Tabriz, Iran

Corresponding author:* Amir Dana, PhD; Department of Physical Education, North Tehran Branch, Islamic Azad University, Tehran, Iran. **Tel: +98-9116356581; **Email:** amirdana2010@gmail.com

Received May 22, 2021; **Revised** June 10, 2021; **Accepted** July 6, 2021

Abstract

Background: New mutations of COVID-19 and a lack of adequate vaccination necessitate finding certain methods to enhance mental health of adolescents during the pandemic. The present study aimed to investigate the effects of Cognitive-Behavioral Therapy on mental health of adolescents during COVID-19 pandemic.
Methods: The present research applied an experimental design with pretest and posttest in 2020. The subjects herein included 65 high-school students, randomly divided into the intervention and control groups. The intervention group received three months of intervention based on Cognitive-Behavioral Therapy while the control group performed regular daily activities. Depression, anxiety, and stress were measured using standard questionnaires before and after the intervention as well as three months later. Independent *t* test and ANCOVA were utilized for data analysis.
Results: At the baseline, 58 students (89.2%) had moderate depression, 37 students (56.9%) had severe anxiety, and 45 students (69.2%) had moderate stress. No significant differences were observed between the groups at the baseline (all P>0.05). Following the intervention, 53 students (81.6%) had moderate depression, 37 students (56.9%) had moderate anxiety, and 31 students (47.7%) had moderate stress. These results remained almost the same in the follow-up test. Moreover, Cognitive-Behavioral Therapy significantly reduced depression (P<0.001), anxiety (P<0.001), and stress (P<0.001) in the posttest and follow-up compared with those in the control group.
Conclusion: These results highlighted the importance of developing strategies such as Cognitive-Behavioral Therapy for improving mental health of adolescents during COVID-19 pandemic.

Keywords: COVID-19, Mental health, Intervention, Adolescents

How to Cite: Dana A, Ranjbari S, Salehian MH, Shayan Matin P. Effects of Cognitive-Behavioral Therapy on Mental Health of High-School Students during COVID-19 Pandemic. Int. J. School. Health. 2021;8(4):201-208. doi: 10.30476/INTJSH.2021.92100.1165.

1. Introduction

Coronavirus (COVID-19) disease broke out in 2019 in Wuhan, China, and spread worldwide in early 2020. Numerous people have been infected and died due to this viral disease. As a result, countries have chosen isolation and strict quarantine as a comprehensive preventive strategy to reduce the prevalence of this disease. One of the strategies adopted by the governments was the closure of educational centers, including schools and universities. In Iran, educational centers have been closed from early 2020, and education in Iran, in addition to that in other countries, has been followed up virtually and through online courses. Thus, children and adolescents spend more time at home (1). This situation occurred while children and adolescents (students) used to spend most of their time at school. Being at school or even outside school has several benefits for students, including physical activity and social activities (2-4). The spread of Coronavirus and staying home has deprived children of such activities (5-9).

In the meantime, several studies have reported that social distance seriously changed the mental health and physical activity level of children and adolescents during COVID-19 quarantine (1, 5-9). Gul and Demirci (1) found that stress, anxiety, depression, and negative social behavior have been increased among children and adolescents during COVID-19 pandemic. Additionally, certain studies have revealed further reduction in physical activity level and further increments in inactive times of children before beginning of COVID-19 periods (5-9). These findings have indicated that mental health and physical activity level of children and adolescents are negatively affected during COVID-19 pandemic.

Although many studies have been conducted on the effects of COVID-19 pandemic on students' physical activity and mental health, little research has

been done on intervention exercises that can improve their physical activity and mental health during the quarantine. Recently, an interventional study was conducted on the online physical education classes and showed that compared with regular training methods, the autonomy-based exercise training intervention within the online physical education classes during COVID-19 pandemic was capable of increasing intrinsic motivation, intention, and participation in physical activity in adolescent students (10). Nevertheless, to the best of our knowledge, no interventional studies have been performed aiming to increase the mental health of students during COVID-19 pandemic.

On the other hand, due to new mutations of COVID-19 and a lack of adequate vaccination in many countries, restrictions have been continued in many countries; it is unclear when students will return to normal educational conditions. Therefore, it is essential to improve students' mental health using home-based interventions. The objective of the current study was; therefore, to investigate the effects of a home-based intervention on stress, anxiety and depression among adolescent students during COVID-19 pandemic. In the current research, the intervention was based on the guidelines of the Cognitive-Behavioral Therapy (11-13). Cognitive-Behavioral Therapy is known to be an efficient treatment strategy for a variety of mental and psychological problems, including anxiety and depression. This strategy seeks to provide individuals with approaches to identifying negative thoughts, adopt self-based strategies to overcome them, and, improve the quality of life (11-13). Certain studies, conducted before the outbreak of Coronavirus, have revealed that school-based interventions have positively affected the mental health of students (14, 15). The aim of this study was to examine the effects of a home-based intervention based on Cognitive-Behavioral Therapy on mental health among adolescent students during COVID-19 pandemic. Herein, we hypothesized that this intervention would improve mental health' status of adolescents.

2. Methods

The present study used an experimental design with a pre-test and post-test. The Ethics Committee of Islamic Azad University of Aliabad Katoul approved the research method with the code of IR.IAU.AK.REC.1400.001. Both participants and their parents provided written informed consent.

2.1 Participants

The participants included 65 male students aged 15 to 17 between years (mean age of 16.29 years) in the 10th and 11th grades from two regular primary schools of Gonbad Kavous city, Golestan province, Iran, in 2020. They were chosen utilizing a convenience sampling method and randomly assigned to the intervention (n=33) or control (n=32) groups. To this end, we used a simple random coin-throwing method for allocating the classes either to an intervention or a control group. The specified sample size was selected according to G*Power statistical software with an effect size of 80%, a test power of 0.8, and a significance level of 0.05 (16).

2.2 Measures

The dependent variables in the present study were different mental health disorders namely, depression, anxiety, and stress.

2.2.1 Depression: We utilized the Beck's Depression Inventory-Second Edition (17) for measuring the level of depression among the students. The Revised Beck's Depression Inventory (BDI-II) comprises 21 items with four options and the scores range from zero to three. Student choose an option presenting their current circumstances. The total score ranges from zero to 63. The total score of 0-13 is considered as normal range, 14-19 as mild, 20-28 as moderate, and 29-63 as severe depression (17). This questionnaire consists of three parts assessing emotional (sad mood and/or loss of interest in life), cognitive (negative or distorted thinking, difficulty concentrating, forgetfulness, or memory loss), and physical symptoms (fatigue and decreased energy, insomnia, excessive sleep, and persistent aches or pains) of depression. The internal reliability of this instrument has been reported to be 0.73 to 0.92 with an average of 0.86 and alpha coefficient for the healthy group of 0.80 (16). In Iran, the internal reliability (Cronbach's alpha coefficient of 0.87) of the Persian version of this questionnaire was measured and confirmed by Ghassemzadeh and colleagues (18). In this study, 10 experts evaluated and confirmed the validity of the Persian version of this questionnaire (CVI=0.90, CVR=0.87). Moreover, in the present paper, Cronbach's alpha coefficient of this questionnaire was 0.91.

2.2.2 Anxiety: We used Beck's Anxiety Inventory (BAI-II) (19) for measuring the level of anxiety among students. Beck's Anxiety Inventory consists of 21 items consisted of four choices in which each question is scored from 0 to 3. Each test item depicts one of the most prevalent indications of anxiety consisted of mental (apprehension, distress, dread, nervousness), physical

(feeling of restlessness, shortness of breath, racing heart, muscle tension), and panic (uneasiness, worry, fear or terror, or panic) indications. The overall score ranges from 0 to 63. The total score of 0-7 is considered as normal range, 8-15 as mild, 16-25 as moderate, and 26-63 as severe anxiety (19). The internal stability of this instrument has been reported to be 0.71 to 0.93 with an average of 0.87 and alpha coefficient for the healthy group of 0.86 (19). Kaviani and Mousavi (20) assessed and confirmed the internal reliability (Cronbach's alpha coefficient of 0.92) of the Persian version of this questionnaire. In this study, 10 experts evaluated and confirmed the validity of the Persian version of this questionnaire (CVI=0.95, CVR=0.88). In addition, Cronbach's alpha coefficient of this questionnaire was 0.88 in this work.

2.2.3 Stress: We measured stress by employing the Lovibond and Lovibond's Scale (DASS) (21). This scale comprises three parts; herein, we used the stress part with seven questions, each scored in four-parts ranging from 0 to 3. The total score is in the range of 0 to 21. Total score of 0-7 is considered as normal range, 8-9 as mild, 10-12 as moderate, and 13-21 as severe stress (21). The internal stability of this instrument has been reported to be 0.95 (21). Samani and Jokar (22) measured and confirmed the internal reliability (Cronbach's alpha coefficient of 0.87) of Persian version of this questionnaire. In this study, the validity of the Persian version of this questionnaire was assessed and confirmed by 10 experts (CVI=0.91, CVR=0.93). Furthermore, in the current study, Cronbach's alpha coefficient of this questionnaire was estimated to be 0.92.

2.3 Procedure

The pretest was initially completed and the post-test was administered immediately following the intervention. A follow-up test was administered three months after the intervention. All the tests were completed at home and under guidance of the experimenter. He explained any terms students were confused about. During the experiment, the intervention group, were trained for three months and one session per week under the supervision of a psychologist within an online class on WhatsApp mobile application. For this purpose, we asked a psychologist (aged 41 years old) to join this project. For implementing the experiment, we created a group on WhatsApp and all the participants of the intervention group were added into this online class.

Prior to starting the intervention, the psychologist received three sessions of training and weekly supervision from expert physicians. In the present study, the treatment was based on the Cognitive-Behavioral Therapy (11-13). This method is based on how a person's thoughts, actions, and emotions affect each other. Cognitive-Behavioral Therapy usually attempts to change the patterns of unhelpful thoughts and behaviors by helping individuals to identify distortions in thinking, which influence mood, and then reevaluate them based on the reality. To this end, students learn to take a better control on their thoughts, utilize problem-solving skills to overcome severe conditions, and build further confidence in their abilities. The treatment protocol consisted of 12 sessions in which three topics were discussed (four sessions for each topic). The first topic (first four sessions) explained how thoughts affect mood. The second topic (next four sessions) discussed how daily activities change the mood. Finally, the last topic (i.e., last four sessions) addressed how interactions with others influence mood. In this research, Cognitive-Behavioral Therapy consisted of muscle relaxation and attention-grabbing techniques (concentrating on an object, concentrating on enjoyable thoughts and imaginations, sensory information in the surroundings, mental practices, and interesting activities). Moreover, it included recognizing unhelpful beliefs and awareness of its behavioral outcomes and believe that these unhelpful beliefs could change (14, 15).

In the online class, the psychologist in the intervention group asked his students to follow these instructions and activities. The students were allowed to ask the psychologist any questions about the guidelines. The students in the control group performed their regular daily activities during the quarantine.

2.4 Data Analysis

In the current study, we employed descriptive statistics consisting of means and standard deviations to characterize the research variables. Independent t test was employed to compare the means of groups in pretest. To compare the post-test and follow-up scores, we utilized ANCOVA. In this study, a P-value less than 0.05 (typically<0.05) was considered to be statistically significant.

3. Results

The participants included 65 male students aged 15 to 17 between years (mean age of 16.29 years) in the 10^{th} and 11^{th} grades. The inclusion criteria were

being healthy and without any physical problems. Student who did not fill in the questionnaires or attend the intervention sessions were excluded from the experiment. The means and standard deviations of the participants' age in the intervention and control groups were 16.33±0.47 and 16.25±0.11 years-old, respectively. No significant differences were found between the age of students in the two groups (t=0.577, P=0.566). Moreover, descriptive results revealed that the means and standard deviations of the participants' height in the intervention and control groups were 165.42±10.69 and 164.01±11.10, respectively. There were no significant differences between the height of the students in the two groups (t=0.251, P=0.853). The means and standard deviations of participants' weight in the intervention and control groups were 57.89±10.43 and 54.98±10.05, respectively. There were no significant differences between the weight of the students in the two groups (t=0.864, P=0.549). Ethnicity of the participants was a mixture of Fars and Turkmen.

3.1 Pre-test

Descriptive statistics revealed that 58 students (89.2%) were at the level of a moderate depression and seven students (10.8%) were at the level of a severe depression; however, the highest value of depression among our participants was 33 which indicated a border line of severe depression. Regarding anxiety, the findings demonstrated that 28 students (43.1%) had a moderate level of anxiety and 37 (56.9%) were at the level of severe anxiety; nevertheless, the highest value of anxiety among our participants was 43, indicating an almost high level of anxiety. Ultimately, the results indicated that 45 students (69.2%) had a moderate level of stress. Furthermore, 20 students (30.8%) were at the level of severe stress, and the highest value of stress among our participants was 16, which indicated an almost high level of stress.

The results of independent *t* test implied no significant differences between the groups in the pre-test regarding all the research variables (Table 1). Therefore, all the study groups had similar conditions prior to the intervention.

3.2 Comparison of the Pre-test with the Post-test and Follow-up

3.2.1 Depression: Regarding the post-test, descriptive results revealed that nine students (13.8%) were at the level of mild depression, 53 students (81.6%) were at the level of moderate depression, and only three students (4.6%) were at the level of a severe depression with the highest value of 33. This value showed a border line of severe depression. The results of ANCOVA indicated significant differences between the groups (F=86.65, P<0.001). According to the means of the groups (Table 2), it was observed that the intervention group had significantly lower scores in comparison with the control group in the post-test, indicating that the intervention decreased the level of depression in adolescents.

Concerning the follow-up, descriptive results revealed that 12 students (18.5%) were at the level

Table 1: Comparison of the mean scores of the groups in the pretest

Variables	Groups		Comparison
	Intervention M±SD	Control M±SD	
Depression	26.03±2.15	26.75±2.74	t=-1.117 P=0.244
Anxiety	27.42±4.72	26.34±2.14	t=1.181 P=0.242
Stress	12.57±1.14	13.06±1.64	t=-1.388 P=0.170

Table 2: Comparison of the mean scores of the groups in depression

Test	Groups		Comparison
	Intervention M±SD	Control M±SD	
Posttest	19.87±3.03	26.46±2.53	F=86.65 P<0.001
Follow-up	20.06±3.84	26.68±2.40	F=65.63 P<0.001

of mild depression, 50 (76.9%) were at the level of moderate depression, and only three (4.6%) were at the level of severe depression with the highest value of 35, which indicated a border line of severe depression. The findings of ANCOVA implied significant differences between the groups (F=65.63, P<0.001). According to the means of the groups (Table 2), the intervention group had significantly lower scores in comparison with the control group in the follow-up test; this shows that the positive effects of the intervention maintained with the passage of time.

3.2.2 Anxiety: In the post-test, descriptive results revealed that one student (1.5%) was at the level of the minimum anxiety, six (9.3%) were at the level of mild anxiety, 37 (56.9%) were at the level of moderate anxiety, and 21 (32.3%) were at the level of severe anxiety with the highest value of 37; this indicated a border line of severe anxiety. Based on the results of ANCOVA, there were significant differences between the groups (F=62.93, P<0.001). According to the means of the groups (Table 3), it was observed that the intervention group had significantly lower scores compared to the control group in the post-test. Hence, the intervention decreased the level of anxiety in adolescents.

Regarding the follow-up, descriptive results revealed that five students (7.7%) were at the level of mild anxiety, 29 (44.9%) were at the level of moderate anxiety, and 31 (47.7%) were at the level of severe anxiety with the highest value of 38, which indicated a border line of severe anxiety. ANCOVA demonstrated significant differences between the groups (F=94.58, P<0.001). Given the means of the groups (Table 3), the intervention group had significantly lower scores in comparison with the control group in the follow-up test, indicating that the positive effects of the intervention maintained with the passage of time.

3.2.3 Stress: Descriptive results in the post-test revealed that three (4.6%) were at the level of minimum stress, 9 (13.9%) were at the level of mild stress, 31 (47.7%) were at the level of moderate stress, and 22 (33.8%) were at the level of severe stress with the highest value of 15. This value presented a border line of severe stress. The findings of ANCOVA indicated significant differences between the groups (F=22.93, P<0.001). According to the means of the groups (Table 4), it was observed that the intervention group had significantly lower scores compared to the control group in the post-test, implying that the intervention decreased the level of stress in adolescents.

In the follow-up test, descriptive results illustrated that seven students (10.7%) were at the level of minimum stress, seven (10.7%) were at the level of mild stress, 32 (49.3%) were at the level of moderate stress, and 19 (29.2%) were at the level of severe stress with the highest value of 17, which indicated almost high-level stress. ANCOVA exhibited significant differences between the groups (F=29.11, P<0.001). According to the means of the groups (Table 4), the intervention group had significantly lower scores in comparison to the control group in the follow-up test. Thus, the positive effects of the intervention remained stable with the passage of time.

4. Discussion

Research has shown that mental health of children

Table 3: Comparison of the mean scores of the groups in anxiety

Test	Groups		Comparison
	Intervention M±SD	Control M±SD	
Posttest	18.63±5.27	27.00±3.63	F=62.93 P<0.001
Follow-up	19.93±4.03	28.40±3.49	F=94.58 P<0.001

Table 4: Comparison of the mean scores of the groups in stress

Test	Groups		Comparison
	Intervention M±SD	Control M±SD	
Posttest	9.81±2.02	12.21±1.77	F=22.93 P<0.001
Follow-up	9.33±1.97	12.18±2.13	F=29.11 P<0.001

and adolescents has been negatively affected during COVID-19 pandemic, which has led to several mental disorders (stress, anxiety, depression, and negative social behavior). Due to the lack of global vaccination, it is not clear when quarantine will be ended. Hence, it is necessary to apply home-based interventions for promoting mental health of students. The current work; therefore, aimed to investigate the effects of a home-based intervention on mental health of adolescents during COVID-19 pandemic. In the present study, the intervention was based on the Cognitive-Behavioral Therapy (11-13) that seeks to provide people with strategies so that they could identify negative thoughts, adopt self-based strategies to overcome them, and, improve the quality of life. In the present study, it was hypothesized that this home-based intervention would decrease depression, anxiety, and stress in adolescents.

Regarding depression, it should primarily be stated that the results of this study revealed that the prevalence of depressive symptoms among adolescent students was higher than usual. The majority of students had moderate symptoms of depression and low percentage of them had severe depression. However, consistent with our hypothesis, following an online intervention based on the Cognitive-Behavioral Therapy, these symptoms were significantly reduced and remained stable until the follow-up test three months later. This finding is in line with those of previous studies, demonstrating that school-based interventions decrease symptoms of depression (14, 15, 23, 24). In addition to inferential findings, our results showed that in the post-test, 13.8% had mild symptoms of depression and 81.6% had moderate depression. Here, only 4.6% were at the level of a severe depression. These findings also indicated clinical improvement in the depressive symptoms of the students following the online intervention. More importantly, the outcomes revealed that 18.5% had mild depression, 76.9% had moderate depression, and only 4.6% had severe depression in the follow-up. Furthermore, positive clinical improvements in the depressive symptoms remained stable for almost a long time (three months).

Similar to depression, the results of anxiety revealed that the prevalence of anxiety symptoms among the adolescent students was higher than usual with a high percentage of severe anxiety (56.9%). However, exposure to an online intervention based on the Cognitive-Behavioral Therapy resulted in a significant reduction. The follow-up test also showed that this positive effect maintained stable in three months later. This finding is consistent with our hypothesis and with the results of previous studies, demonstrating that school-based interventions decrease symptoms of anxiety (14, 15, 23, 24). From the clinical point of view, we exhibited that following the intervention, 1.5% had minimal anxiety, 9.3% had mild anxiety, 56.9% had a moderate anxiety, and 32.3% had severe anxiety. These findings also indicated that our participants improved clinically concerning the anxiety symptoms after the online intervention. More interestingly, 7.7% were at the level of mild anxiety, 44.9% were at the level of moderate anxiety, and 47.7% were at the level of severe anxiety in the follow-up. The obtained results also revealed that positive clinical improvements in the anxiety symptoms remained stable for almost a long time (three months).

Finally, the prevalence of stress symptoms among our participants was higher than usual with 69.2% of the students having a moderate level of stress and 30.8% were at the level of severe stress. However, the post-test showed that an online intervention based on the Cognitive-Behavioral Therapy significantly reduced the stress symptoms in adolescent students. Additionally, in the follow-up test, this positive effect remained stable for three months. This finding confirmed our hypothesis and is consistent with those of previous studies, demonstrating that school-based interventions decrease symptoms of stress (14, 15, 23, 24). Herein, we also showed that after the intervention, 4.6% of the students were at the level of minimum stress, 13.9% were at the level of mild stress, 47.7% were at the level of moderate stress, and 33.8% were at the level of severe stress. These results also indicated that the students in the intervention group improved clinically in the stress symptoms after the online intervention. More interestingly, our results indicate that positive clinical improvements in the anxiety symptoms maintained stable for almost a long time (e.g., three month). Herein, 10.8% were at the level of minimal stress, 10.7% were at the level of mild stress, 49.3% were at the level of moderate stress, and 29.2% were at the level of severe stress.

The subjects of this paper included only boys, which is believed to be the limitation of the work. Therefore, the results should be interpreted with caution when generalizing them to girls. Socio-economic status of the students was not assessed here; thus, further research is needed to present a more comprehensive view of the effects of online interventions on mental health of adolescents. Small sample size could also be introduced as a limitation in this study. Further research with larger sample size is required to increase the reliability

of data. As another limitation to this study, we could state that our data were collected via self-report, which may lead to bias.

5. Conclusions

In conclusion, the present study showed that the adolescent students had moderate to severe symptoms of depression, anxiety, and stress during COVID-19 pandemic. Moreover, compared with a regular condition in the COVID-19 pandemic for the students at home, the home-based intervention based on the Cognitive-Behavioral Therapy was able to reduce the symptoms of depression, anxiety, and stress in adolescent students. More importantly, the results of the present study revealed that the positive effects of the online intervention based on the Cognitive-Behavioral Therapy remained stable for almost a long time (three months afterward). Overall, an online intervention based on the Cognitive-Behavioral Therapy improved the mental health of our participants during COVID-19 pandemic. Our findings can have practical implications for parents during the COVID-19 pandemic. Based on the results of the present study, it could be recommended that parents get help from a psychologist or psychological methods based on the Cognitive-Behavioral Therapy to improve the mental health status of their children during COVID-19 pandemic.

Ethical Approval

The Ethics Committee of Islamic Azad University of Aliabad Katoul approved the protocol of this study with the code of IR.IAU.AK.REC.1400.001. The participants voluntarily participated in the present study and written informed consent was obtained from the subjects and their parents.

Acknowledgments

We thank all the participants and their parents.

Conflicts of interest: None declared.

References

1. Gul MK, Demirci E. Psychiatric Disorders and Symptoms in Children and Adolescents During the COVID-19 Pandemic: A Review. Eurasian Journal of Medicine and Oncology.2021;5(1):20-36.
2. Hosseini FB, Ghorbani S, Rezaeshirazi R. Effects of Perceived Autonomy Support in the Physical Education on Basic Psychological Needs Satisfaction, Intrinsic Motivation and Intention to Physical Activity in High-School Students. Int J School Health. 2020;7(4):39-46. doi: 10.30476/intjsh.2020.88171.1106.
3. Gholidahaneh MG, Ghorbani S, Esfahaninia A. Effects of Basic Psychological Needs Satisfaction in the Physical Education on Leisure-Time Physical Activity Behavior of Primary School Students: Mediating Role of Autonomous Motivation. Int J School Health. 2020;7(2):46-53. doi:10.30476/intjsh.2020.86028.1068.
4. Ghorbani S, Noohpisheh S, Shakki M. Gender Differences in the Relationship between Perceived Competence and Physical Activity in Middle School Students: Mediating Role of Enjoyment. Int J School Health, 2020;7(2):14-20. doi: 10.30476/intjsh.2020.85668.1056.
5. Hammami A, Harrabi B, Mohr M, Krustrup P. Physical Activity and Coronavirus Disease 2019 (COVID-19): Specific Recommendations for Home-Based Physical Training. Managing Sport and Leisure.2020. doi:10.1080/23750472.2020.1757494.
6. Gobbi E, Maltagliati S, Sarrazin P, di Fronso S, Colangelo A, Cheval B, et al Promoting Physical Activity during School Closures Imposed by the First Wave of the COVID-19 Pandemic: Physical Education Teachers' Behaviors in France, Italy and Turkey. Int J Env Res Public Health.2020;17(24):9431. doi: 10.3390/ijerph17249431. PubMed PMID: 33339228; PubMed Central PMCID: PMC7767079.
7. Roe A, Blikstad-Balas M, Dalland CP. The Impact of COVID-19 and Homeschooling on Students' Engagement with Physical Activity. Front Sports Act Living. 2021;2:589227. doi: 10.3389/fspor.2020.589227. PubMed PMID: 33585811; PubMed Central PMCID: PMC7873937.
8. Dunton GF, Do B, Wang SD. Early Effects of the COVID-19 Pandemic on Physical Activity and Sedentary Behavior in Children Living in the U.S. BMC Public Health. 2020;20(1):1351. doi: 10.1186/s12889-020-09429-3. PubMed PMID: 32887592; PubMed Central PMCID: PMC7472405.
9. Tulchin-Francis K, Stevens Jr W, Gu X, Zhang T, Roberts H, Keller J, et al. The Impact of the Coronavirus Disease 2019 Pandemic on Physical Activity in US Children. Journal of Sport and Health Science. 2021;10(3):323-332. doi: 10.1016/j.jshs.2021.02.005.
10. Dana A, Khajehaflaton S, Salehian MH, Sarvari S. Effects of an Intervention in Online Physical Education Classes on Motivation, Intention, and Physical Activity of Adolescents during the COVID-19 Pandemic. Int J School Health. 2021;8(3):141-149. doi: 10.30476/intjsh.2021.91103.1145.
11. Beck JS. Cognitive Behavior Therapy: Basics and Beyond. New York: The Guilford Press; 2011. pp. 19-20.

12. Benjamin CL, Puleo CM, Settipani CA, Brodman DM, Edmunds JM, Cummings CM, et al. History of Cognitive-Behavioral Therapy in Youth. Child Adolesc Psychiatr Clin N Am. 2011;20(2):179-89. doi: 10.1016/j.chc.2011.01.011. PubMed PMID: 21440849; PubMed Central PMC: 3077930.
13. Dana A, Soltani N, Fathizadan A, Rafiee S. Effectiveness of Mindfulness-Based Cognitive Behavioral Therapy on Cognitive and Resilience Abilities of Blind Athletes. Sport Psychology Studies. 2019;8(27):143-156. doi: 10.22089/spsyj.2018.5583.1586.
14. Araya R, Montgomery AA, Fritsch R, Gunnell D, Stallard P, Noble S, et al. School-Based Intervention to Improve the Mental Health of Low-Income, Secondary School Students in Santiago, Chile (YPSA): Study Protocol for a Randomized Controlled Trial. Trials. 2011;12:49. doi: 10.1186/1745-6215-12-49. PubMed PMID: 21333015; PubMed Central PMCID: PMC3050755.
15. Araya R, Fritsch R, Spears M, Rojas G, Martinez V, Barroilhet S, et al. School intervention to improve mental health of students in Santiago, Chile: a randomized clinical trial. JAMA Pediatr. 2013;167(11):1004-10. doi: 10.1001/jamapediatrics.2013.2361. PubMed PMID: 23999656.
16. Lee S, Lee E. Effects of Cognitive Behavioral Group Program for Mental Health Promotion of University Students. Int J Environ Res Public Health. 2020;17(10):3500. doi: 10.3390/ijerph17103500. PubMed PMID: 32429553; PubMed Central PMC: 7277724.
17. Beck AT, Steer RA, Brown GK. Beck Depression Inventory-Second Edition: Manual. The Psychological Corporation, San Antonio, TX; 1996.
18. Ghassemzadeh H, Mojtabai R, Karamghadiri N, Ebrahimkhani N. Psychometric Properties of a Persian-Language Version of the Beck Depression Inventory - Second edition: BDI-II-PERSIAN. Depress Anxiety. 2005;21(4):185-92. doi: 10.1002/da.20070. PubMed PMID: 16075452.
19. Beck AT, Steer RA. Manual for the Beck Anxiety Inventory. San Antonio, TX: Psychological Corporation; 1990.
20. Kaviani H, Mousavi AS. Psychometric Properties of the Persian Version of Beck Anxiety Inventory (BAI). Tehran Univ Med J. 2008;66(2):136-140. Persian.
21. Lovibond SH, Lovibond PF. Manual for the Depression Anxiety Stress Scales. Sydney: Psychology Foundation; 1995.
22. Samani S, Jokar B. Validity and reliability short-form version of the depression, anxiety and stress. J Soc Sci Humanit. 2008;26(3):65-77.
23. Punukollu M, Burns C, Marques M. Effectiveness of a Pilot School-Based Intervention on Improving Scottish Students' Mental Health: A Mixed Methods Evaluation. International Journal of Adolescence and Youth. 2020;25(1):505-518. doi: 10.1080/02673843.2019.164167.
24. Avitsland A, Leibinger E, Resaland GK, Solberg RB, Kolle E, Dyrstad SM. Effects of School-Based Physical Activity Interventions on Mental Health in Adolescents: The School in Motion Cluster Randomized Controlled Trial. Mental Health and Physical Activity. 2020;19(1):100384. doi: 10.1016/j.mhpa.2020.100348.