RESEARCH ARTICLE

Gresa Carkaxhiu Bulut [1]
Sebla Gokce [2]
Funda Gumustas [3]

[1] Galata University, Department of Psychology, Istanbul, Türkiye
[2] Maltepe University Medical Faculty, Department of Child and Adolescence Psychiatry, Bağlarbaşı, Maltepe, Istanbul, Türkiye
[3] Private Clinic, Istanbul, Türkiye

Corresponding Author:
Gresa Carkaxhiu Bulut
mail: gresacarkaxhiu@gmail.com

Received: 30.07.2023
Acceptance: 18.09.2023
DOI: 10.18521/ktd.1334880

Konuralp Medical Journal
e-ISSN1309–3878
konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

Adapting to a New Normal: Changes in Behavioral Symptoms in Children with ADHD During Online Education

ABSTRACT

Objective: Children with neurodevelopmental disorders, such as Attention-Deficit Hyperactivity Disorder (ADHD), are considered a particularly vulnerable group due to the distress caused by the COVID-19 pandemic and associated social isolation measures. This study aimed to examine the alterations in symptoms of children with ADHD during the COVID-19 outbreak.

Methods: Sociodemographic data and ADHD symptom scores, measured using the Swanson, Nolan, and Pelham scale (SNAP-IV) parent form, were obtained from patient files from the same educational year prior to the pandemic. In addition to pandemic-related inquiries, parents were requested to complete the SNAP form again to assess their children's current conditions.

Results: Of the total 104 cases, 28.8% were female with a mean age of 10.5 (SD=2.4). There were no significant differences in ADHD symptom scores before and during quarantine. Participants who received regular online education had a significantly lower rate of externalizing problems. Children with parents who developed new onset negative emotional problems exhibited a significantly higher rate of internalizing problems. Participants whose fathers worked from home had a significantly lower rate of internalizing problems compared to children with fathers working in an office or who were unemployed.

Conclusions: The pandemic did not induce changes in the core symptoms of ADHD. It is inferred that educational planning for children, parental well-being, and accommodating parents' employment opportunities are among the most critical factors in maintaining the well-being of children and adolescents with ADHD during the pandemic period.

Keywords: ADHD, Covid-19, Online Education, Behavioral Symptoms, Children.

Yeni Normale Uyum Sağlamak: Çevrim-içi Eğitim Döneminde DEHB'li Çocukların Davranışsal Belirtilerindeki Değişimler

ÖZET

Amaç: Dikkat Eksikliği Hiperaktivite Bozukluğu (DEHB) gibi nörogelişimsel bozuklukları olan çocuklar, COVID-19 pandemisinin neden olduğu sıkıntılar ve ilişkili sosyal izolasyon önlemleri nedeniyle, özellikle hassas bir grup olarak kabul edilmektedir. Bu çalışmada, COVID-19 pandemisinde DEHB'li çocukların semptomlarındaki değişikliklerin incelemesi amaçlanmıştır.

Gereç ve Yöntem: Sosyodemografik veriler ve Swanson, Nolan ve Pelham ölçeği (SNAP-IV) ebeveyn formu kullanılarak ölçülen DEHB semptom skorları, pandemi öncesinde aynı eğitim yılındaki hasta dosyalarından elde edilmiştir. Pandemiyle ilgili sorulara ek olarak, ebeveynlerden çocuklarının mevcut durumlarını değerlendirmek için SNAP formunu tekrar doldurmaları istenmiştir.

Bulgular: Toplam 104 katılımcının yaş ortalaması 10.5 (SS=2.4) olup örneklemin %28.8'i kızlardan oluşmaktadır. Katılımcıların karantina öncesi ve sırasında DEHB semptom skorlarında anlamlı bir fark saptanmamıştır. Düzenli çevrim içi eğitim alan katılımcıların dışsallaştırma problemleri anlamlı derecede daha düşük bulunmuştur. Yeni başlangıçlı olumsuz duygusal problemler yaşayan ebeveynlere sahip çocuklarda içe yönelim sorunları anlamlı derecede daha yüksek oranda görülmüştür. Babaları evden çalışan katılımcıların içe yönelim sorunları, babaları ofiste çalışan veya işsiz olan çocuklara kıyasla anlamlı ölçüde daha düşük bulunmuştur.

Sonuç: Pandemi, katılımcıların temel DEHB semptomlarında belirgin değişikliğe yol açmamıştır. Pandemi döneminde DEHB'li çocuk ve ergenlerin esenlik halinin sürdürülmesinde eğitim planlamasının yanı sıra, ebeveynlerin esenlik düzeyinin ve istihdam olanaklarının en önemli faktörler arasında yer aldığı görülmektedir.

Anahtar Kelimeler: DEHB, Covid-19, Çevrim İçi Eğitim, Davranışsal Belirtiler, Çocuklar.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has presented an array of unprecedented challenges worldwide. While children appear relatively safe from severe illness, they are significantly impacted by the broader repercussions of the pandemic. Notably, children with neurodevelopmental disorders such as attention-deficit hyperactivity disorder (ADHD) constitute a particularly vulnerable group due to the distress precipitated by the pandemic and associated social isolation measures. ADHD is the most prevalent neurodevelopmental disorder in childhood, characterized by developmentally inappropriate symptoms of attention deficit and/or hyperactivity-impulsivity. It is reported to affect between 3% to 9% of children globally (1). ADHD often leads to behavior problems and social maladaptation (2). Children diagnosed with ADHD may struggle with low self-esteem and experience difficulties across various domains, including interpersonal relationships and academic performance (1, 3). ADHD is also associated with a diminished overall health-related quality of life and an increased risk for comorbidities in both children and adults (4, 5). The significance of ADHD treatment becomes more evident considering these potential outcomes. Treatment guidelines recommend pharmacological options, including stimulants & non-stimulants, as well as non-pharmacological psychosocial interventions such as behavioral therapy and school interventions (6, 7). Nevertheless, children with ADHD often face heightened challenges regarding academic and social achievement compared to their peers, underscoring their need for more structured environments (8).

The COVID-19 pandemic has profoundly altered daily life. In Turkey, schools closed early in the pandemic, and children were restricted from outdoor activities as a preventative measure. Educational activities have shifted to online platforms, disrupting traditional learning environments. Concurrently, parents have been working from home, adapting to new living conditions, and creating new routines, leading to evolving roles and boundaries within family structures. Children with ADHD are posited to be more susceptible to the distress caused by the outbreak and its consequences (9-11). Increased screen time and the lack of structured, face-to-face engagement offered in school environments could potentially exacerbate symptoms and precipitate emotional and behavioral changes in children with ADHD.

This study aims to investigate the behavioral symptoms of children with ADHD, believed to be influenced by significant changes in daily life, including quarantine and the shift to online education, during the COVID-19 outbreak. We hypothesize that ADHD symptoms would significantly worsen during quarantine, the frequency of new onset emotional and behavioral symptoms would increase compared to pre-pandemic assessments, and these changes would be associated with psychosocial factors during the pandemic.

MATERIAL AND METHODS

Our data collection took place from April 10th to 30th in 2020, during the online education period and curfew restrictions. We invited 150 parents of school-aged children with an ADHD diagnosis to participate in the study through phone calls, out of which 104 volunteered to participate. Parents provided online written informed consent, and measures were taken to ensure their anonymity. We collected sociodemographic data and ADHD behavioral symptom scores, which were measured using the Swanson, Nolan, and Pelham scale (SNAP-IV) parent form, from patient files from the same educational year before the pandemic. In addition to asking questions about the pandemic process, parents were asked to fill out the SNAP-IV scale to evaluate their children's current levels of inattentiveness and hyperactivity. The study received ethical approval from the Maltepe University Medical Faculty Ethics Committee (2021-90021).

Statistical Analysis: The data was analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 20. Descriptive statistics were presented as means with standard deviations or as frequencies (percentages). A 95% confidence interval was used for data interpretation. The chi-square test was employed to compare categorical variables such as gender, methylphenidate (MPH) usage, and internalizing and externalizing problems between groups. The independent sample t-test was utilized for evaluating continuous variables between two independent groups.

The paired sample t-test was used to compare the SNAP-IV Inattentiveness (IA) and SNAP-IV Hyperactivity/Impulsivity (H/I) scores from before and during the pandemic. One-way analysis of covariance was employed to adjust for socioeconomic status, MPH usage, and gender.

RESULTS

The analysis included 104 ADHD cases, of which 28.8% (n=30) were female, 71.2% (n=74) were male, and the average age was 10.5 (SD= 2.4, range: 6.3-15.0). Of the children, 53.8% (n=56) were in primary school, 41.3% (n=43) in secondary school, and 4.8% (n=5) in high school. 77.7% (n=80) of the mothers and 74.8% (n=77) of the fathers had university degrees.

During quarantine, 91.3% (n=95) of the children and adolescents with ADHD continued online education regularly, with an average daily duration of 3.4 (SD=1.7) hours. Of the sample, 69.2% (n=72) had regular reading times, 74% (n=77) participated in physical exercises regularly,

85.6% (n=89) were able to engage in outdoor activities, 92.3% (n=96) interacted online with relatives and friends, and 84.6% (n=88) played games with their families regularly.

In the same period, 34.6% (n=36) of mothers and 38.5% (n=40) of fathers started working from home, whereas 21.2% (n=22) of mothers and 52.9% (n=55) of fathers continued working at their offices. Meanwhile, 44.2% (n=46) of mothers and 8.7% (n=9) of fathers were unemployed, with 2.7% of fathers reporting job loss during quarantine. Only 1.8% of families reported COVID-19 infections, with no fatalities. In 69.2% (n=72) of the children, one or both parents reported negative emotional changes during the pandemic.

Average inattentiveness scores were 1.3 (SD=0.5) before quarantine and 1.2(SD=0.5) during quarantine, and mean hyperactivity scores were 1.1 (SD=0.7) before quarantine and 1.0 (SD=0.7) during quarantine. No significant differences were observed in inattentiveness and hyperactivity scores from before to during quarantine (p=0.094 and p=0.165, respectively). 57.7% (n=60) of the children were treated with MPH, and these children showed significant reductions in attention deficit and hyperactivity scores compared to children not on MPH (p=0.036 and p=0.047, respectively).

During the study, we adjusted for MPH use while evaluating whether ADHD symptoms differed from before to during quarantine based on the children's daily routines and parental negative emotional changes. We found no significant changes in inattentiveness and hyperactivity scores based on participation in regular online education, reading, physical activity, outdoor activities, playing with family members, and online interaction with friends and relatives. Likewise, parental negative emotional changes did not significantly affect ADHD symptom scores (Tables 1 and 2).

Table 1. Inattentiveness scores of children before and during quarantine

		Before		During Quarantine			
		Mean	SD	Mean	SD	F	*p*
Regular online education[a]	Yes	1.32	0.55	1.23	0.54	0.002	0.96
	No	1.52	0.76	1.44	0.69		
Reading books[a]	Yes	1.33	0.56	1.18	0.56	2.76	0.09
	No	1.34	0.58	1.41	0.53		
Regular physical activities[a,b]	Yes	1.32	0.60	1.22	0.57	0.074	0.78
	No	1.35	0.48	1.34	0.52		
Outdoor activities[a]	Yes	1.35	0.59	1.24	0.55	2.87	0.09
	No	1.20	0.40	1.34	0.59		
Online social interaction[a,c]	Yes	1.30	0.57	1.22	0.56	0.55	0.45
	No	1.65	0.39	1.63	0.35		
Family games[a]	Yes	1.33	0.56	1.24	0.53	0.06	0.80
	No	1.34	0.59	1.30	0.69		
Parental negative emotional changes[a]	Yes	1.40	0.55	1.16	0.54	1.03	0.36
	No	1.18	0.58	1.29	0.56		

[a]Adjusted for methylphenidate use, [b]Adjusted for gender, [c]Adjusted for socioeconomic status

Table 2. Hyperactivity scores of children before and during quarantine

		Initially		During Quarantine			
		Mean	SD	Mean	SD	F	*p*
Regular online education[a]	Yes	1.01	0.70	1.01	0.70	1.252	0.26
	No	1.50	1.00	1.50	1.00		
Reading books[a]	Yes	1.26	0.81	1.13	0.75	1.832	0.17
	No	0.87	0.58	0.89	0.67		
Regular physical activities[a,b]	Yes	1.25	0.79	1.13	0.77	0.503	0.48
	No	0.87	0.69	0.85	0.58		
Outdoor activities[a]	Yes	1.20	0.79	1.09	0.75	0.009	0.92
	No	0.87	0.61	0.81	0.56		
Social interaction[a,c]	Yes	1.02	0.72	1.02	0.72	0.616	0.43
	No	1.48	0.82	1.48	0.82		
Family games[a]	Yes	1.19	0.74	1.06	0.69	1.036	0.31
	No	0.94	0.92	1.02	0.96		
Parental negative emotional changes[a]	Yes	1.20	0.75	1.16	0.54	0.085	0.77
	No	1.03	0.82	1.29	0.56		

[a]Adjusted for methylphenidate use, [b]Adjusted for gender, [c]Adjusted for socioeconomic status

New onset internalizing problems, such as unhappiness and anxiety, were reported in 22.9% (n=24) of cases, while new onset externalizing problems, such as anger, were reported in 23.8% (n=24) of cases. Cases with regular online education had significantly fewer externalizing problems compared to those without. However, there was no significant relationship between other daily routines and internalizing or externalizing problems. Children whose parents had new onset negative emotional changes showed a significantly higher rate of internalizing problems. Cases where the father worked from home had significantly fewer internalizing problems compared to children with fathers working in an office or unemployed. Parental emotional and work status did not significantly relate to externalizing problems (Table 3).

Table 3. Presence of new internalizing and externalizing problems according to status of activity, parental mood and work during quarantine

		Internalizing			Externalizing		
		Yes N (%)	No N (%)	*p*	Yes N (%)	No N (%)	*p*
Regular online education[a]	Yes	21 (22.1)	74 (77.9)	0.421	20 (21.1)	75 (78.9)	0.035*
	No	3 (33.3)	6 (66.7)		5 (55.5)	4 (44.5)	
Reading books[a]	Yes	20 (27.8)	52 (72.7)	0.088	16 (22.2)	56 (77.8)	0.516
	No	4 (12.5)	28 (87.5)		9 (28.1)	23 (71.9)	
Regular physical activities[a,b]	Yes	19 (24.7)	58 (75.3)	0.514	16 (20.8)	61 (69.2)	0.189
	No	5 (18.5)	22 (81.5)		8 (33.3)	19 (66.7)	
Outdoor activities[a]	Yes	21(23.6)	68 (76.4)	0.76	22 (24.7)	67 (75.3)	0.692
	No	3 (20)	12 (80)		3 (20)	12 (80)	
Social interaction[a,c]	Yes	24(25)	72 (75)	0.193	22 (22.9)	74 (77.1)	0.395
	No	0 (0)	8 (100)		3 (37.5)	5 (62.5)	
Parental negative emotional changes[a]	Yes	21 (29.2)	51 (70.8)	0.023*	21 (29.2)	51 (70.8)	0.057
	No	3 (9.1)	30 (90.9)		4 (12.1)	29 (87.9)	
Paternal work status	Unemployed	3 (33.3)	6 (66.7)	0.007**	3 (33.3)	6 (66.7)	0.559
	At home	3 (7.5)	37 (92.5)		11 (27.5)	29 (72.5)	
	At office	18 (32.8)	37 (67.2)		11 (20)	44 (80)	
Maternal work status	Unemployed	9 (19.6)	37 (80.4)	0.417	11 (23.9)	35 (76.1)	0.271
	At home	4 (18.2)	18 (81.8)		4 (18.2)	18 (81.8)	
	At office	11 (30.6)	25 (69.4)		13 (26.9)	23 (73.1)	

[a]Adjusted for methylphenidate use, [b]Adjusted for gender, [c]Adjusted for socioeconomic status

DISCUSSION

Our study focused on assessing the impact of the COVID-19 pandemic and associated quarantine measures on children and adolescents diagnosed with ADHD. Our primary investigation centered around potential changes in ADHD symptom levels before and during quarantine, as well as the influence of new daily routines and parental emotional changes on these symptoms. The secondary aim was to explore the occurrence of new onset internalizing and externalizing symptoms during quarantine, and their correlation with daily routines and parental emotional and work status.

Our findings indicate that there were no significant differences in inattentiveness and hyperactivity scores before and during quarantine. We observed significantly lower symptom scores in children who were using MPH. Neither the new daily routines nor parental negative emotional changes influenced the change in ADHD symptoms after adjusting for MPH treatment use. This contrasts with a study from China that reported significant worsening in children's behavioral symptoms during the COVID-19 outbreak compared to their pre-pandemic state (12). In agreement with Bobo et al., we found inattention and hyperactivity levels to be similar to the pre-pandemic period (13).

The NIMH Multimodal Treatment Study of ADHD demonstrated that the combination of behavioral intervention and stimulant medication, as well as stimulant medication alone, were clinically and statistically superior to behavioral approaches. However, combination therapy did not have a significant advantage over stimulant therapy on core ADHD symptoms. Consistent with these findings, in our study, new daily routines and parental emotional changes neither enhanced nor reduced core ADHD symptoms (14).

As per the European ADHD Guideline Group, individuals with ADHD should, if clinically indicated, continue their pharmacological treatment during the COVID-19 pandemic (9). In our study, we discovered that approximately 20% of children and adolescents with ADHD developed new onset internalizing symptoms. A remarkably high proportion of parents experienced negative emotional changes due to the pandemic, with many caregivers reporting increased feelings of anxiety

and sadness for their children's emotional state. Interestingly, these parental negative emotional changes correlated with higher rates of internalizing problems in children and adolescents. This aligns with other studies that noted a correlation between children's and parents' negative mood states (12, 15, 16). Moreover, it's documented that the enforced social isolation during the pandemic increased the risk of depression and anxiety in the youth, underscoring the need for preventative support and early interventions catered to each country's needs and resources (17-20).

Contrarily, some studies found that most children and adolescents with ADHD either experienced stability or improvements in their well-being during the pandemic, with some reporting an alleviation in school-related anxiety according to parent reports (13, 21). In our own study, we found a correlation between fathers working from home and lower rates of new onset internalizing problems.

In addition to internalizing symptoms, we discovered new onset externalizing symptoms in approximately 20% of children and adolescents with ADHD. Interestingly, the prevalence of externalizing symptoms was lower in those who maintained regular online education during the pandemic. However, some other studies conducted during the pandemic reported that adolescents with ADHD had a decrease in routine adherence and encountered more difficulties with remote learning compared to those without ADHD (22). It was also found that parents of these children faced more challenges in supporting home learning (23).

Our study did present some limitations, including the reliance on parental reports due to COVID-19 restrictions that hindered direct evaluations of the children. Moreover, we did not use a standardized assessment scale to evaluate the presence of new emotional and behavioral symptoms, instead relying on questions directed to the parents. Despite these limitations, our study contributes some valuable insights into the effects of the COVID-19 pandemic on children and adolescents with ADHD. Importantly, our findings indicate that the pandemic has not significantly impacted the core symptoms of ADHD. However, internalizing and externalizing problems have been observed, suggesting the need for focused attention on these aspects. We highlight the importance of maintaining regular routines, such as online education, which seem to be associated with positive outcomes in terms of behavioral symptoms. Equally significant is the need to address parental well-being and job conditions, given their association with children's internalizing problems. These findings emphasize that maintaining the well-being of children and adolescents with ADHD during such challenging times requires a holistic approach, considering not just the child's routines and treatments, but also the broader family environment. Although the intensity of the COVID-19 pandemic has significantly waned, the learnings from this period remain vital, offering rich insights for future scenarios that might necessitate similar sweeping changes in lifestyle and societal functioning.

Conflict of Interest: The authors have no conflict of interest to declare.

REFERENCES

1. Polanczyk G, De Lima MS, Horta BL, Biederman J, Rohde LA. The worldwide prevalence of ADHD: a systematic review and metaregression analysis. Am J Psychiatry. 2007;164(6):942-48.
2. Kendall T, Taylor E, Perez A, Taylor C. Diagnosis and management of attention-deficit/hyperactivity disorder in children, young people, and adults: summary of NICE guidance. BMJ. 2008;337.
3. Moore DA, Richardson M, Gwernan-Jones R, Thompson-Coon J, Stein K, Rogers M, Garside R, Logan S, Ford TJ. Non-pharmacological interventions for ADHD in school settings: An overarching synthesis of systematic reviews. J Atten Disord. 2019;23(3):220-33.
4. Sayal K, Prasad V, Daley D, Ford T, Coghill D. ADHD in children and young people: prevalence, care pathways, and service provision. Lancet Psychiatry. 2018;5(2):175-86.
5. Kadesjö B, Gillberg C. The comorbidity of ADHD in the general population of Swedish school-age children. J Child Psychol Psychiatry. 2001;42(4):487-92.
6. Hodgkins P, Setyawan J, Mitra D, Davis K, Quintero J, Fridman M, Shaw M, Harpin V. Management of ADHD in children across Europe: patient demographics, physician characteristics and treatment patterns. Eur J Pediatr. 2013;172:895-906.
7. Pliszka S, The AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. J Am Acad Child Adolesc Psychiatry. 2007;46(7):894-921.
8. Barkley RA. Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment. New York: The Guilford Press; 2006.
9. Cortese S, Asherson P, Sonuga-Barke E, Banaschewski T, Brandeis D, Buitelaar J, Coghill D, Daley D, Danckaerts M, Dittmann RW. ADHD management during the COVID-19 pandemic: guidance from the European ADHD Guidelines Group. Lancet Child Adolesc. Health. 2020;4(6):412-14.
10. Masi A, Mendoza Diaz A, Tully L, Azim SI, Woolfenden S, Efron D, Eapen V. Impact of the COVID-19 pandemic on the well-being of children with neurodevelopmental disabilities and their parents. J Paediatr Child Health. 2021;57(5):631-36.

11. Sciberras E, Patel P, Stokes MA, Coghill D, Middeldorp CM, Bellgrove MA, Becker SP, Efron D, Stringaris A, Faraone SV. Physical health, media use, and mental health in children and adolescents with ADHD during the COVID-19 pandemic in Australia. J Atten Disord. 2022;26(4):549-62.
12. Zhang J, Shuai L, Yu H, Wang Z, Qiu M, Lu L, Cao X, Xia W, Wang Y, Chen R. Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak. Asian J Psychiatr. 2020;51:102077.
13. Bobo E, Lin L, Acquaviva E, Caci H, Franc N, Gamon L, Picot M, Pupier F, Speranza M, Falissard B. How do children and adolescents with Attention Deficit Hyperactivity Disorder (ADHD) experience lockdown during the COVID-19 outbreak? Encephale. 2020:46(3S):85-92.
14. Jensen PS, Hinshaw SP, Swanson JM, Greenhill LL, Conners CK, Arnold LE, Abikoff HB, Elliott G, Hechtman L, Hoza B. Findings from the NIMH Multimodal Treatment Study of ADHD (MTA): implications and applications for primary care providers. J Dev Behav Pediatr. 2001;22(1):60-73.
15. Samji H, Wu J, Ladak A, Vossen C, Stewart E, Dove N, Long D, Snell G. Mental health impacts of the COVID-19 pandemic on children and youth–a systematic review. Child Adolesc Ment Health. 2022;27(2):173-89.
16. de Miranda DM, da Silva Athanasio B, Oliveira ACS, Simoes-e-Silva AC. How is COVID-19 pandemic impacting mental health of children and adolescents? Int. J. Disaster Risk Reduct. 2020;51:101845.
17. Loades ME, Chatburn E, Higson-Sweeney N, Reynolds S, Shafran R, Brigden A, Linney C, McManus MN, Borwick C, Crawley E. Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. J Am Acad Child Adolesc Psychiatry. 2020;59(11):1218-39.
18. Viner R, Russell S, Saulle R, Croker H, Stansfield C, Packer J, Nicholls D, Goddings A-L, Bonell C, Hudson L. School closures during social lockdown and mental health, health behaviors, and well-being among children and adolescents during the first COVID-19 wave: a systematic review. JAMA pediatrics. 2022;176(4):400–409.
19. Li Y, Wang A, Wu Y, Han N, Huang H. Impact of the COVID-19 pandemic on the mental health of college students: a systematic review and meta-analysis. Front Psychol. 2021;12:669119.
20. Hawes MT, Szenczy AK, Klein DN, Hajcak G, Nelson BD. Increases in depression and anxiety symptoms in adolescents and young adults during the COVID-19 pandemic. Psychol Med. 2022;52(14):3222-30.
21. Panchal U, Salazar de Pablo G, Franco M, Moreno C, Parellada M, Arango C, Fusar-Poli P. The impact of COVID-19 lockdown on child and adolescent mental health: systematic review. Eur Child Adolesc Psychiatry. 2023;32(7):1151-77.
22. Breaux R, Dvorsky MR, Marsh NP, Green CD, Cash AR, Shroff DM, Buchen N, Langberg JM, Becker SP. Prospective impact of COVID-19 on mental health functioning in adolescents with and without ADHD: Protective role of emotion regulation abilities. J Child Psychol Psychiatry. 2021;62(9):1132-39.
23. Becker SP, Breaux R, Cusick CN, Dvorsky MR, Marsh NP, Sciberras E, Langberg JM. Remote learning during COVID-19: Examining school practices, service continuation, and difficulties for adolescents with and without attention-deficit/hyperactivity disorder. J Adolesc Health. 2020;67(6):769-77.