The Relationship of Screen Exposure with Sleep Quality and Self-Regulation Skills in Preschool Children

Okul Öncesi Çocuklarda Ekran Maruziyeti ile Uyku Kalitesi ve Öz-Düzenleme Becerileri Arasındaki İlişki

Çağla ÖZDEMİR[1], Süleyman KELEŞ[2]

[1]Department of Family Medicine, Kütahya Health Sciences University Evliya Çelebi Training and Research Hospital, Kütahya, Turkey
[2]Department of Psychiatry, Kütahya Health Sciences University Evliya Çelebi Training and Research Hospital, Kütahya, Turkey

ABSTRACT

Objective: We aimed to investigate possible links between screen time, self-regulation skills and sleep quality in preschool children.

Material and Methods: The study was carried out with 140 mothers with 4-6 years old children who visited the family medicine outpatient clinic between March and May 2022. Children's age, gender, existing chronic diseases, the most used technological product, purpose of use, time and duration were recorded. Children's sleep habits were evaluated with the "Children's Sleep Habits Questionnaire (CSHQ)", and their self-regulation skills were evaluated with the "Self-Regulation Skills Scale for 4-6 Years-Old Children (Mother Form) (SrSS)".

Results: The median age of the children in our study was 60 (48-72) months. 75/140 of the participants were girls. The most used technological product at home was the smartphone (48.2%). 64% of the participants reported less than 2 hours screen time, 21.6% of them reported between 2-4 hours and 14.4% of them reported over 4 hours. Educational status of mothers (p=0.003) and fathers (p<0.001) of those with a lot of screen exposure was lower. Delay in falling asleep score, one of the CSHQ subscales, was higher in those with screen exposure over 4 hours (p<0.001). Self-regulation skills scale total score (p=0.001), attention (p=0.014), inhibitory control-emotion (p=0.004), and inhibitory control-behavior (p=0.029) sub-scale scores were lower in children with longer screen time.

Conclusion: Excessive screen exposure in preschool children is associated with delay in falling asleep and low self-regulation skills.

Key Words: Preschool children, Screen exposure, Self-regulation skills, Sleep

ÖZ

Amaç: Bu çalışmanın amacı okul öncesi çocuklarda ekran maruziyeti ile uyku kalitesi ve öz-düzenleme becerileri arasındaki ilişkiyi araştırmaktır.

Gereç ve Yöntemler: Çalışma Mart-Mayıs 2022 tarihleri arasında aile hekimliği polikliniğine başvuran 4-6 yaşında çocuğu olan 140 anne ile gerçekleştirildi. Çocukların yaş, cinsiyet, mevcut kronik hastalıkları, en çok kullanılan teknolojik ürün, kullanım amacı, zamanı ve süreleri sorgulandı. Çocukların uyku alışkanlıkları "Çocukların Uyku Alışkanlıkları Ölçeği (CSHQ)" ile, öz-düzenleme becerileri ise 4-6 Yaş Çocuklarına Yönelik Öz-Düzenleme Becerileri Ölçeği (Anne Formu) ile değerlendirildi.

Correspondence Address / Yazışma Adresi:

Çağla ÖZDEMİR
Department of Family Medicine, Kütahya Health Sciences University
Evliya Çelebi Training and Research Hospital, Kütahya, Turkey
E-posta: cagla_gocen06@yahoo.com.tr

Bulgular: Çalışmamızda çocukların median yaşı 60 (48-72) aydı. Katılımcıların 75/140'ı kadındı. Evde en çok kullanılan teknolojik ürün telefondu (% 48.2). Ekran süresi %64'ünün 2 saat altında; %21.6'sının 2-4 saat arasında; %14.4'ünün 4 saat üzerindeydi. Ekran maruziyeti çok olanların anne (p=0.003) ve babalarının (p<0.001) eğitim durumu daha düşüktü. CSHQ alt ölçeklerinden uykuya dalmada gecikme skoru ekran maruziyeti 4 saat üzerinde olanlarda daha yüksekti (p<0.001). Öz-düzenleme becerileri ölçeği total skor (p=0.001), dikkat (p=0.014), engelleyici kontrol-duygu (p=0.004) ve engelleyici kontrol-davranış (p=0.029) alt-ölçek skorları ekran süresi fazla olan çocuklarda daha düşüktü.

Sonuç: Okul öncesi çocuklarda aşırı ekran maruziyeti uykuya dalmada gecikme ve düşük öz düzenleme becerileri ile ilişkilidir.

Anahtar Sözcükler: Okul öncesi çocuklar, Ekran maruziyeti, Öz-düzenleme becerileri, Uyku

INTRODUCTION

With the increase in the use of electronic/digital screens in recent years, the benefits or harms of children's screen exposure have been the subject of scientific debate. The use of display technologies, the accessibility of devices and total screen exposure are increasing. However, concerns about children's health are also rising due to increased screen time (1).

Screen time is associated with elevated energy intake, metabolic syndrome and obesity, and decreased physical activity in children (2-4). In addition to its physical effects, psychological effects such as restlessness, mood changes and decreased educational performance have also been reported (5). Children's screen time has increased dramatically with the COVID-19 pandemic, so the potential harms of excessive screen time may increase. In line with this, The American Academy of Pediatrics recommends avoiding media use for children younger than 24 months; and limiting it to one hour per day for children aged 2-5 (6,7).

Sleep parameters such as sleep time, bedtime and sleep quality, which are determinants of children's well-being, are affected by screen time (8-10). Sleep problems not only affect children's cardiometabolic health, but also cause poor cognitive activity and mood disorders (11,12). Although the effect of screen time on sleep is well known, there is limited data on self-regulation skills (13,14).

Self-regulation is a multidimensional concept that includes adapting, avoiding inappropriate behaviors, delaying requests, controlling and regulating emotions, and maintaining attention (15). Self-regulation is often a skill that children develop themselves with external factors. Children's self-regulation skills shape their later life and are associated with academic success (16,17).

The consequences of screen exposure in the preschool period, when self-regulation skills are shaped, may be greater and longer lasting. As a result of excessive screen exposure, maladaptive emotion-regulation may occur in adulthood. The aim of our study is to evaluate the relationship of screen time with sleep and self-regulation skills in preschool children.

MATERIALS and METHODS

This study was designed as a cross-sectional descriptive study and was conducted in a primary health care facility between March and May 2022. The study was approved by Kütahya Health Sciences University, Non-Interventional Clinical Research Ethics Committee (18.01.2022/ 2022/01-11). Mothers with children aged 4-6 years registered in a primary health care institution were informed about the study and 140 mothers consented to participate in the study.

Data collection

Children's Sleep Habits Questionnaire (CSHQ) and Self-regulation Skills Scale (SrSS) were filled out by mothers. Preschool children›s total screen time and time of the day in which the screen exposure occurs (daytime[08:00-17:00], evening [17:00-24:00] or all-day) were asked separately. Screen exposure time was determined by the mother›s statement. Preschool children with physical or mental disabilities or their mothers were not included in the study. Preschool children›s age, gender, screen exposure time, duration, sleep duration and the educational status of parents were also recorded. Screen times were categorized as under 2 hours, 2-4 hours, and over 4 hours.

Children's Sleep Habits Questionnaire

"Children's Sleep Habits Questionnaire (CSHQ)" was used to assess preschool children's sleep habits. Owens et al.(18) developed the questionnaire in 2000 to detect sleep problems in children aged 4-10 years. The scale consists of 33 questions and 6 subscales: parasomnias, sleep anxiety, sleep delay, sleep duration, sleep disruption, bedtime resistance, night awakenings, and daytime sleepiness. Each question is scored between 1-3 (3:Usually; 2:Sometimes; 1:Never/rarely). High scores indicate sleep problems. Fiş et al. (19) conducted a Turkish validity and reliability study in 2010.

Instrument for Measuring Self-Regulation Skills

Preschool children›s self-regulation skills "Self-Regulation Skills Scale for 4-6 Years-Old Children (Mother Form) (SrSS)" was administered. This scale, developed by Erol and İvrendi in 2018, consists of 20 items. The scale has 4 sub-dimensions: inhibitory control-emotion (ICE), working memory, attention, and inhibitory control-behavior (ICB) (20). Each item is scored

between 1-5 (1:Never, 2:Rarely, 3:Sometimes, 4:Often, 5:Always). High scores indicate higher self-regulation ability.

Statistical Analysis

SPSS version 21 (IBM®, Chicago, USA) was used to perform statistical analysis. The normal and abnormal distribution of the variables was analyzed with the 'Shapiro-Wilk test'. Descriptive statistics were expressed as mean and standard deviation in normally distributed numerical data, median (minimum-maximum) in abnormally distributed data, number and percentage in nominal data. "Student's T- test" and "One-way ANOVA" were used in the analysis of normally distributed numerical variables, and "Mann-Whitney U" and "Kruskal-Wallis test" were used in the analysis of non-normally distributed variables. Nominal data were compared using "Chi-square analysis". A p value below 0.05 was considered significant in statistical analyses.

RESULTS

The study was carried out with 140 participants. The mean age of the participants was 58. ±9.7 months (range 48-72 months). The female/male ratio was 1.15/1. The education level of 21.4% of the mothers and 17.1% of the fathers was primary education. The most frequently used technological devices by preschool children were smartphones (47.9%) and TV (35%). Technological devices were frequently used during the daytime (73.6%). Education was cited as the reason for screen exposure in only 8.6% of preschool children. Screen time was less than 2 hours in 64.3% of children, 2-4 hours in 21.4%, and over 4 hours in 14.3%.

Table I shows the demographic characteristics, screen exposures, SrSS and CSHQ results of preschool children.

When preschool children were grouped according to screen time, no difference was observed in terms of age and gender. However, the education level of mothers (p=0.003) and fathers (p<0.001) of those with a screen time of 4 hours or more was lower. Sleep time delay score from CSHQ subscales was higher than those with screen time of 4 hours or more.

When categorized according to the duration of screen exposure, there were significant differences between the groups in terms of total score and; ICE, attention, and ICB subscales of the SrSS. ICE, ICB and attention were significantly lower in those with screen exposure over 4 hours compared to those with less than 2 hours of screen exposure. Self-regulation skills total score (p=0.001), attention (p=0.014), ICE (p=0.004) and ICB (p=0.029) scores were lower in those with a screen time longer than 4 hours (Table II).

Table I: Descriptive characteristics of the participants.	
Characteristic n=140	**n (%)**
Gender, girls	75 (53.6)
Mother's education level	
High school or above	110 (78.6)
Primary education	30 (21.4)
Father's education level	
High school or above	116 (82.9)
Primary education	24 (17.1)
Monthly income of the family*	
> minimum wage	106 (75.7)
< minimum wage	34 (24.3)
The most used technological product by children	
Phone	67 (47.9)
Television	49 (35.0)
Tablet or computer	22 (15.7)
Other	2 (1.4)
Children's exposure time	
Daytime	103 (73.6)
Evening	33 (23.6)
All-day	4 (2.9)
Children's intended use	
Watching videos	77 (55.0)
Playing games	58 (41.4)
Education	12 (8.6)
Children's screen time	
< 2 hours	90 (64.3)
2-4 hours	30 (21.4)
>4 hours	20 (14.3)
Sleep time (hours)†	10 (5-14)
SrSS†	78.5 (37-100)
Attention	24 (3-40)
Working memory	22 (5-25)
ICE	20 (5-25)
ICB	13 (4-21)
CSHQ†	50 (36-68)
Bedtime resistance	12 (6-18)
Sleep anxiety	7 (4-15)
Sleep duration	5 (3-9)
Delay in falling asleep	2 (1-3)
Night awakenings	4 (3-8)
Parasomnias	8 (6-19)
Asleep respiratory disturbance	3 (3-9)
Daytime sleepiness	11 (6-21)

*:*4.250 TL (Year 2022),* †:*Median (Min-Max,* **CSHQ:** *Children's Sleep Habits Questionnaire,* **SrSS:** *Self-regulation Skills Scale,* **ICE:** *Inhibitory control emotion,* **ICB:** *Inhibitory control behavio.*

DISCUSSION

Excessive screen time in preschool children is associated with delay in speech development, lack of physical activity, obesity, attention deficit and hyperactivity, and decrease in cognitive functions (21-23). A rise in screen time has been observed in preschool children during the coronavirus pandemic. Therefore, the possible consequences of screen exposure in preschool children have become more significant. Although there is a large amount of data on the negative effects of screen exposure, its

Table II: The relationship between screen time and demographic characteristics, sleep habits and self-regulation skills.

Characteristic	Screen time			p	
	<2 hours	2-4 hours	>4 hours		
Age[†]	57.7±9.6	59.4±11.0	60.6±8.2	0.438	A** B** C**
Gender, girls[§]	53 (58.9)	14 (46.7)	8 (40)	0.214	A** B** C**
Sleep duration (hours)[ǁ]	10 (5-14)	10 (8-12)	10 (9-12)	0.548	A** B** C**
Mother's education level, Primary education[§]	15 (16.7)	5 (16.7)	10 (50.0)	0.003	A** B* C*
Father's education level, Primary Education[§]	8 (8.9)	4 (13.3)	12 (60)	<0.001	A** B* C*
CSHQ [ǁ]	50 (38-68)	51.5 (36-66)	48 (40-64)	0.134	A** B** C**
Bedtime resistance	11 (6-17)	12 (6-18)	11.5 (9-15)	0.309	A** B** C**
Sleep anxiety	7 (4-15)	8 (4-12)	6 (4- 11)	0.174	A** B** C**
Sleep duration	5 (3-9)	6 (3-8)	7 (3-8)	0.205	A** B** C**
Delay in falling asleep	1 (1-3)	2 (1-3)	3 (1-3)	<0.001	A** B* C*
Night awakenings	4 (3-8)	4 (3-7)	3 (3-7)	0.366	A** B** C**
Parasomnias	8 (6-14)	8 (7-14)	8 (7-19)	0.788	A** B** C**
Asleep respiratory disturbance	3 (3-9)	3 (3-8)	3 (3-5)	0.702	A** B** C**
Daytime sleepiness	12 (6-21)	12 (8-20)	11 (8- 13)	0.123	A** B** C**
SrSS [ǁ]	80 (46-100)	77 (57-94)	67.5(37-95)	0.001	A** B* C*
Attention	24.5 (7-40)	24 (5-30)	19.5 (3-31)	0.014	A** B* C**
Working memory	22.5 (14-25)	22.5 (15-25)	22 (5-25)	0.796	A** B** C**
ICE	20 (5-25)	20 (15-25)	15 (5-24)	0.004	A** B* C*
ICB	14 (4-21)	13 (7-20)	11.5 (4-19)	0.029	A** B* C**

CSHQ :Children's Sleep Habits Questionnaire, **SrSS:** Self-regulation Skills Scale, **ICE:** Inhibitory control emotion, **ICB:** Inhibitory control behavior.[†]:Mean±SD, [§]:n (%),[ǁ]: Med (min-max), **A:** <2 hours to 2-4 hours, **B:** <2 hours to >4 hours, **C:** 2-4 hours to >4 hours, *p<0.05; **p>0.05

relationship to sleep habits and self-regulation skills is not fully known (24-26).

Preschool children's self-regulation skills are an important developmental stage. Self-regulation, which is the ability to control behavior, thoughts and emotions, is a determinant in academic success and social-emotional competence in later life. However, screen exposure can negatively affect self-regulation skills. In our study, it was observed that preschool children with more screen exposure had worse self-regulation skills. More screen time was also associated with worse self-regulation skills in attention, emotion, and behavioral control. A limited number of studies evaluated screen exposure and self-regulation skills (13, 14). Screen exposure can affect the self-regulation skills of preschoolers, leading to negative consequences in their later lives. Munzer et al. (13) evaluated the effect of screen time on various self-regulation skills in preschool children. In the study, it was reported that the ability to delay gratification time decreased as the screen time increased. Self-regulation skills are provided by the integration and functionality of many emotional and behavioral patterns. Oflu et al. (25) recently reported that excessive screen exposure was associated with emotional lability. Cliff et al. (14) reported that screen exposure in early childhood is associated with self-regulation skills later in life. This study in a prospective design evaluated 2-year-old children. Unlike Cliff et al. (14), we evaluated self-regulation skills with systematic scales in our study.

Due to the cross-sectional nature of this study, directionality cannot be determined. Screen exposure can be a factor in poor self-regulation skills, but this relationship can also be inverse or bidirectional. Linebarger et al. (27) reported that screen time was more for calming in children with difficult temperament, while Cliff et al. (14) stated that the relationship between self-regulation skills and screen exposure was bidirectional. In prospective studies, the cause-effect relationship between screen exposure and self-regulation skills can be clarified.

Screen time can affect children's sleep habits. Excess screen time is associated with circadian discrepancy of sleep, disturbed sleep, and later bedtimes (28-30). In our study, the CSHQ subscale delay in falling asleep score was higher in children with a screen time of more than 4 hours. Foley et al. (31) reported that participants with a later sleep onset had significantly greater engagement in screen time.

In our study, screen time was 2-4 hours in 21.4% of pre-school children, and over 4 hours in 8.6%. The American Academy of Pediatrics (AAP) guidelines state that for children aged 2-5 years, screen time should be limited to about one hour per weekday, and three hours on the weekends (32). By limiting screen time, the possibility of developmental delay, behavioral problems, and poorer vocabulary acquisition can be reduced (33).

As the accessibility of technology has increased, screen exposure has increased in families from low socioeconomic

status. In our study, screen exposure was higher in children of parents with a low educational level. Previous studies demonstrate that preschoolers from low socioeconomic status engage in more screen time (34). Identifying mechanisms to explain the relationship between socioeconomic status and screen time exposure may be beneficial for the health of preschool children.

Our study had some limitations. Screen time, SrSS and CSHQ scales were filled out by the parents. Children›s actual screen time may differ. There is a need for studies that evaluate screen time with objective criteria. And the causality between screen time and self-regulation skills can be clarified by studies in the prospective design.

In conclusion, high screen time in preschool children is associated with low self-regulation skills and sleep problems. Reported screen times were more than the recommended amount for a significant proportion of preschool children. By reducing screen time, self-regulation skills and sleep quality can be improved.

REFERENCES

1. Stiglic N, Viner RM. Effects of screentime on the health and well-being of children and adolescents: a systematic review of reviews. BMJ Open 2019 ;9:e023191. doi: 10.1136/bmjopen-2018-023191

2. Marsh S, Ni Mhurchu C, Maddison R. The non-advertising effects of screen-based sedentary activities on acute eating behaviors in children, adolescents, and young adults. A systematic review. Appetite 2013;71:259-73.

3. Jahangiry L, Aune D, Farhang MA. Screen time and the risk of metabolic syndrome among children and adolescents: A systematic review and dose-response meta-analysis. Nutr Metab Cardiovasc Dis 2022;32:2483-92.

4. Iannotti RJ, Janssen I, Haug E, Kololo H, Annaheim B, Borraccino A; HBSC Physical Activity Focus Group. Interrelationships of adolescent physical activity, screen-based sedentary behavior, and social and psychological health. Int J Public Health 2009;54 Suppl 2(Suppl 2):191 8.

5. Domingues-Montanari S. Clinical and psychological effects of excessive screen time on children. J Paediatr Child Health 2017;53:333-8.

6. Trott M, Driscoll R, Irlado E, Pardhan S. Changes and correlates of screen time in adults and children during the COVID-19 pandemic: A systematic review and meta-analysis. Ecclinical Medicine 2022;48:101452.

7. American Academy of Pediatrics. (2016, 01 November). Access: https://pediatrics.aappublications.org/content/138/5/e20162591/tab-article-info. Access date: 06.10.2022.

8. Twenge JM, Hisler GC, Krizan Z. Associations between screen time and sleep duration are primarily driven by portable electronic devices: evidence from a population-based study of US children ages 0-17. SleepMed 2019;56:211-8.

9. Kahn M, Schnabel O, Gradisar M, Rozen GS, Slone M, Atzaba-Poria N, et al. Sleep, screen time and behavior problems in preschool children: an actigraphy study. Eur Child Adolesc Psychiatry 2021;30:1793-802.

10. Zhu R, Fang H, Chen M, Hu X, Cao Y, Yang F, et al. Screen time and sleep disorder in preschool children: identifying the safe threshold in a digital world. Public Health 2020;186:204-10.

11. Short MA, Blunden S, Rigney G, Matricciani L, Coussens S, M Reynolds C, et al. Cognition and objectively measured sleep duration in children: a systematic review and meta-analysis. SleepHealth 2018;4:292-300.

12. Goodlin-Jones B, Tang K, Liu J, Anders TF. Sleep problems, sleepiness and daytime behavior in preschool-age children. Journal of Child Psychology Psychiatry 2009;50:1532-40.

13. Munzer TG, Miller AL, Peterson KE, Brophy-Herb HE, Horodynski MA, Contreras D, et al. Media Exposure in Low-Income Preschool-Aged Children Is Associated with Multiple Measures of Self-Regulatory behavior. J Dev Behav Pediatr 2018;39:303-9.

14. Cliff DP, Howard SJ, Radesky JS, McNeill J, Vella SA. Early Childhood Media Exposure and Self-Regulation: Bidirectional Longitudinal Associations. Acad Pediatr 2018;18:813-9.

15. Eisenberg N, Sulik MJ. Emotion-Related Self-Regulation in Children. Teach Psychol 2012;39:77-83.

16. Cuartas J, Hanno E, Lesaux NK, Jones SM. Executive function, self-regulation skills, behaviors, and socioeconomic status in early childhood. PLoS One 2022;17:e0277013.

17. Raver CC, Carter JS, McCoy DC, Roy A, Ursache A, Friedman A. Testing models of children's self-regulation within educational contexts: implications for measurement. Adv Child Dev Behav 2012;42:245-70.

18. Owens JA, Spirito A, McGuinn M. The Children's Sleep Habits Questionnaire (CSHQ): psychometric properties of a survey instrument for school-aged children. Sleep 2000;23:1043-51.

19. Fiş NP, Arman A, Ay P, Topuzoğlu A, Güler AS, İmren SG, et al. The validity and the reliability of Turkish Version of Children's Sleep Habits Questionnaire. Anatolian Journal of Psychiatry 2010; 11: 151-60.

20. Erol A, Ivrendi A. Developing an Instrument for Measuring Self-Regulation Skills of 4-6 Year -Old Children (Mother Form). PUJE 2018: 44; 178-95.

21. Varadarajan S, Venguidesvarane AG, Ramaswamy KN, Rajamohan M, Krupa M, Christadoss SBW. Prevalence of excessive screen time and its association with developmental delay in children aged <5 years: A population-based cross-sectional study in India. PLoS ONE 2021;16:e0254102.

22. Hosokawa R, Katsura T. Association between mobile technology use and child adjustment in early elementary school age. PLoS ONE 2018;13:e0199959.

23. Raj D, Mohd Zulkefli N, Mohd Shariff Z, Ahmad N. Determinants of Excessive Screen Time among Children under Five Years Old in Selangor, Malaysia: A Cross-Sectional Study. Int J Environ Res Public Health 2022;19:3560.

24. Tezol O, Yildiz D, Yalcin S, Oflu A, Erat Nergiz M, Caylan N, et al. Excessive screen time and lower psychosocial well-being among preschool children. Arch Pediatr 2022;29:61-6.

25. Oflu A, Tezol O, Yalcin S, Yildiz D, Caylan N, Ozdemir DF, et al. Excessive screen time is associated with emotional lability in preschool children. Arch Argent Pediatr 2021;119:106-13.

26. Felix E, Silva V, Caetano M, Ribeiro MVV, Fidalgo TM, Rosa Neto F, et al. Excessive Screen Media Use in Preschoolers Is Associated with Poor Motor Skills. Cyberpsychol Behav Soc Netw 2020;23:418-25.

27. Linebarger DL, Barr R, Lapierre MA, Piotrowski JT. Associations between parenting, media use, cumulative risk, and children›s executive functioning. Journal of developmental and behavioral pediatrics: JDBP 2014;35:367–77.

28. Lan QY, Chan KC, Yu KN, Chan NY, Wing YK, Li AM, et al. Sleep duration in preschool children and impact of screen time. SleepMed 2020;76:48-54.

29. Lin YY, Lee WT, Yang HL, Weng WC, Lee CC, Jeng SF, et al. Screen Time Exposure and Altered Sleep in Young Children With Epilepsy. J Nurs Scholarsh 2020;52:352-9.

30. Hiltunen P, Leppänen MH, Ray C, Määttä S, Vepsäläinen H, Koivusilta L, et al. Relationship between screen time and sleep among Finnish children: results from the DAGIS study. SleepMed. 2021;77:75-81.

31. Foley LS, Maddison R, Jiang Y, Marsh S, Olds T, Ridley K. Presleep activities and time of sleep onset in children. Pediatrics. 2013;131:276-82.

32. American Academy of Child & Adolescent Psychiatry. Media Habits During COVID-19: Children & Teens on Screens in Quarantine. AACAP. 2020. [Accessed on: Dec 4, 2022]. Available in: https://www.aacap.org/App_ Themes/AACAP/Docs/resource libraries/covid-19/ Screen-Time-During-COVID.pdf.

33. McArthur BA, Tough S, Madigan S. Screen time and developmental and behavioral outcomes for preschool children. Pediatric Res. 2022;91:1616-1621.

34. Cameron AJ, Spence AC, Laws R, Hesketh KD, Lioret S, Campbell KJ. A review of the relationship between socioeconomic position and the early-life predictors of obesity. Curr Obes Rep 2015;4:350–62.