



The effects of heavy screen viewing on the health of secondary school-aged children in Duhok city

Jwan Hikmat Hussein* Haitham Issa Albanna**

Abstract

Background and objectives: Although there has been a remarkable increase in screen time among children over recent years, the literature includes contradictory reports on its effects of the individuals' health. In this regard, the present study was an attempt to figure out the effects of heavy screen time on the health of secondary school-aged children in Duhok city, Kurdistan-Iraq.

Methods: A cross-sectional study was conducted on 850 secondary school students aged 14-18 years, from September 2022 to September 2023 in Duhok secondary schools. Data about screen viewing were gathered through a questionnaire. then data were analyzed via SPSS (version 25.0). Chi-square were used and 0.05 was set a level of significant.

Results: The students aged 14-18 years, with the largest group being 18 years of age (38.4%). Most of the students (59.4%) were females. Grade 12 students were the largest group (57.3%). Most of them (76.2%) were from middle-income families and (65.4%) had healthy body mass index. Significant associations were found between the students' screen time and their age (P -value<0.001), gender (p -value<0.001), parents' education (P -value<0.001), parents' occupation (P -value<0.05), and socioeconomic status (p -value=0.014). Moreover, significant associations were found between their screen time duration and their medical problems (P -value<0.001), previous surgical operation (p -value=0.008), mood during the day (P -value<0.001), relationship with parents (p -value=0.003), sleep difficulties (p -value=0.002), and eating during screen viewing (p -value<0.001).

Conclusions: Most adolescence in Duhok city have excessive screen time (more than two hours) in which affects their health and quality of life adversely. Health practitioners and families should consider these factors while designing and implementing adolescent health promoting programs.

Keywords: Health, Secondary school students, Screen time, Screen viewing.

*M.B.CH.B. residence doctor at Directorate of Preventive Health Affairs at Duhok government, Kurdistan Region-Iraq. Email: jojhikmat1989@yahoo.com ,

**F.I.B.M.S. Assist. Prof. in Community medicine at Hawler medical university, Erbil, Kurdistan Region-Iraq. Email: drhaithambahoo@yahoo.com.

Corresponding author: Jwan Hikmat Hussein

Introduction

Electronic media is an essential part of life in the current young generation, such that different types of media devices are used by children and adolescents for leisure.¹ Children and adolescents spend more time on screen-based activities than ever before.² One of the symbols of our modern age is the screen of televisions, tablets, mobiles, or computers. Moreover, a major part of current children's lives is 'digital natives' who have grown up while being surrounded by digital entertainment and information on screens.³ There is an increasing number of methods to have access to digital information anywhere and anytime via their mobile devices, resulting in a remarkable increase in the screen time particularly among the adolescent and young.⁴ There has been a sharp increase in youth's digital media use, in 2000 The average screen time of 8-18 year-old children increased from 6.21 hours per day to 7:38 hours in 2009. It is also reported that mobile devices were available to 52% of 1 to 8-year-old children in 2011, while this figure soared to 75% in 2013.⁵ Concerns over the adverse effects of screen time have increased over recent years. Several authoritative organizations have published guidelines for professionals and families to manage screen time for children and adolescents.⁶ The well-known recommendation is to have no more than 2 hours of recreational screen time per day. Research has shown that there is an association between screen time and obesity. This association is justified through this mechanism that screen time increases inactivity, decreases physical activity, and reduces metabolic rate.⁷ Research has also revealed association between high screen time and deleterious impacts on irritability, low mood, and cognitive and socioemotional development, resulting in poor educational performance.⁸ These guidelines have been criticized for not being evidenced-based because there is inconsistency regarding the effect of screen time on health.⁹ This discrepancy might be related to the fact that

screen time cannot be from non-screen sedentary behaviors characterized by low physical movement and energy expenditure. It has been demonstrated that an increase in screen viewing time can lead to adult-onset diseases associated with a sedentary lifestyle in high-income countries.¹⁰ Moreover, poor school performance, dry eyes, and decreased physical activity are the result of using smartphones and tablets and watching TV.¹¹ In addition, unfavorable sleep outcomes can be the result of increased screen viewing time. Furthermore, neck pain and headache are among other adverse consequences of sitting for long periods of time in a fixed posture in front of any electronic device.¹² The aim of this study is to determine the outcomes that heavy screen viewing impact on the health of adolescents and to identify the prevalence of health problems that could be attributed to heavy screen viewing.

Materials and methods

This is a cross-sectional study which was carried out in secondary schools in Duhok city, Iraq over a period of one year from September 2022 to September 2023. The study sample consisted of 850 adolescents who were chosen using cluster random sampling method. All adolescents aged between 14-18 years were included, while those with mental disorder and those who did not watch any types of screens were excluded. Required data were collected through a self-administered quantitative questionnaire which were distributed among and completed by the chosen students. The quantitative questionnaire was designed after doing review of literature with the help of my supervisor. The questionnaire consisted of two parts: first part (sociodemographic data), second part (health related effects of heavy screen viewing), then the data were analyzed through Statistical Package for Social Sciences (SPSS, version 25.0). For this purpose, frequencies and percentages

were calculated for the categorical variables, and mean and standard deviation (SD) were computed for the numerical variables. A P-value of ≤ 0.05 was considered statistically significant. Ethical approval was obtained from the research ethics committee of Ministry of Health under the confirmation number 07122022-9-8. Moreover, informed consent was obtained from the participants.

Results

In terms of fathers' education, most of the fathers were educated 94.6%(finished college and schools) and 6.4% were illiterate. Regarding mothers' education, most of the mothers were educated

(86.2%finished schools and college),14.8% were illiterate. With regard to their parents' occupation, 34.9% of the fathers worked in high level education, 7.8% were retired, and 4.5% were unemployed. Most of the mothers (62.6%) were unemployed (house wife), 25.6% were working, and 1.6% were retired. Most of the students (76.2%) belonged to middle-income families, 18.1% to high-income families, and 5.6% to low-income families. In terms of their weight, most of the students (65.4%) had healthy weight with a BMI between 18.5 to 24.9, 15.5% were overweight, 15.2% were underweight, and 3.9% were obese, See Table (1).

Table (1): The students' socioeconomics

Characteristic	Categories	Frequency (N)	Percentage (%)
Father education	Illiterate	54	6.4
	Read, write and primary	149	17.5
	Intermediate	117	13.8
	Secondary	120	14.1
	College and above	410	48.2
Mother Education	Illiterate	126	14.8
	Read, write and primary	171	20.1
	Intermediate	132	15.5
	Secondary	117	13.8
	College and above	304	35.8
Father Occupation	Unemployment	38	4.5
	High level occupation	297	34.9
	Manual worker	172	20.2
	Retired	66	7.8
	Other	277	32.6
Mother Occupation	Unemployment	532	62.6
	High level occupation	133	15.6
	Manual worker	85	10.0
	Retired	14	1.6
	Other	86	10.1
Socioeconomic status	Low income	48	5.6
	Middle income	648	76.2
	High income	154	18.1
BMI	< 18.5 Underweight	129	15.2
	18.5 - 24.9 Healthy weight	556	65.4
	25 - 29.9 Overweight	132	15.5
	> 30.0 Obesity	33	3.9

The results revealed a significant association between the students' screen viewing duration and their parents' educational level (p -value <0.001), such that students whose parents had higher educational level viewed screens more than those with parents with lower educational level. The results also showed a significant association between the parents' occupation and the students' screen viewing duration (p -value <0.05). It was seen that students

whose fathers worked in high level education and those whose mothers were unemployed viewed screens more than other groups. The students' socioeconomic status was also found to be significantly associated with their screen viewing duration (p -value $=0.014$), such that students from middle-income families viewed screens more than students from low- and high-income families ,See Table (2).

Table (2): Association between screen viewing duration per day and the students' demographics

Characteristics	Categories	Hours of screen viewing per day					Total	p-value
		0-1	2-3	4-6	7-10	>11		
Father education	Illiterate	14(12.5)	26(8.7)	11(3.6)	3(3.0)	0(0.0)	54(6.4)	<0.001
	Read, write and primary	31(27.7)	49(16.4)	48(15.6)	15(15.0)	6(18.2)	149(17.5)	
	Intermediate	18(16.1)	53(17.8)	32(10.4)	12(12.0)	2(6.1)	117(13.8)	
	Secondary	14(12.5)	42(14.1)	44(14.3)	14(14.0)	6(18.2)	120(14.1)	
	College and above	35(31.3)	128(43.0)	172(56.0)	56(56.0)	19(57.6)	410(48.2)	
Mother Education	Illiterate	25(22.3)	52(17.4)	38(12.4)	8(8.0)	3(9.1)	126(14.8)	<0.001
	Read, write and primary	33(29.5)	62(20.8)	50(16.3)	15(15.0)	11(33.3)	171(20.1)	
	Intermediate	20(17.9)	52(17.4)	38(12.4)	20(20.0)	2(6.1)	132(15.5)	
	Secondary	10(8.9)	42(14.1)	48(15.6)	12(12.0)	5(15.2)	117(13.8)	
	College and above	24(21.4)	90(30.2)	133(43.3)	45(45.0)	12(36.4)	304(35.8)	
Father Occupation	Unemployment	8(7.1)	13(4.4)	13(4.2)	2(2.0)	2(6.1)	38(4.5)	<0.001
	High level occupation	24(21.4)	86(28.9)	130(42.3)	45(45.0)	12(36.4)	297(34.9)	
	Manual worker	35(31.3)	51(17.1)	58(18.9)	24(24.0)	4(12.1)	172(20.2)	
	Retired	11(9.8)	28(9.4)	22(7.2)	3(3.0)	2(6.1)	66(7.8)	
	Other	34(30.4)	120(40.3)	84(27.4)	26(26.0)	13(39.4)	277(32.6)	
Mother Occupation	Unemployment	83(74.1)	203(68.1)	169(55.0)	54(54.0)	23(69.7)	532(62.6)	0.016
	High level occupation	9(8.0)	38(12.8)	63(20.5)	20(20.0)	3(9.1)	133(15.6)	
	Manual worker	10(8.9)	22(7.4)	36(11.7)	13(13.0)	4(12.1)	85(10.0)	
	Retired	2(1.8)	6(2.0)	3(1.0)	2(2.0)	1(3.0)	14(1.6)	
	Other	8(7.1)	29(9.7)	36(11.7)	11(11.0)	2(6.1)	86(10.1)	
Socioeconomic status	Low income	10(8.9)	15(5.0)	19(6.2)	1(1.0)	3(9.1)	48(5.6)	0.014
	Middle income	86(76.8)	236(79.2)	233(75.9)	75(75.0)	18(54.5)	648(76.2)	
	High income	16(14.3)	47(15.8)	55(17.9)	24(24.0)	12(36.4)	154(18.1)	

Their relationship with their parents had a significant association with their screen viewing duration (p -value=0.003), those with better relationships with their parents had longer durations of screen viewing. Also, the association between sleep duration per day and screen viewing

duration was significant (p -value<0.001), such that those who slept for 5 to 8 hours had a longer duration of screen viewing. Sleeping difficulties were found to have a significant association with screen viewing duration (p -value=0.002). See Table (3).

Table (3): Association between hours of screen viewing per day and the students' other characteristics.

Characteristics	Categories	Hours of screen viewing per day					Total	p-value
		0-1	2-3	4-6	7-10	>11		
Do you have any medical problem	No	87(77.7)	194(65.1)	172(56.0)	40(40.0)	13(39.4)	506(59.5)	<0.001
	Neck pain	3(2.7)	17(5.7)	43(14.0)	13(13.0)	7(21.2)	83(9.8)	
	Back pain	8(7.1)	19(6.4)	25(8.1)	16(16.0)	2(6.1)	70(8.2)	
	Headache	4(3.6)	37(12.4)	43(14.0)	21(21.0)	7(21.2)	112(13.2)	
	Eye problem	10(8.9)	31(10.4)	24(7.8)	10(10.0)	4(12.1)	79(9.3)	
Do you have done any operation	Yes	23(20.5)	58(19.5)	50(16.3)	17(17.0)	14(42.4)	162(19.1)	0.008
	No	89(79.5)	240(80.5)	257(83.7)	83(83.0)	19(57.6)	688(80.9)	
How is your mood during the day	Sad	29(25.9)	56(18.8)	48(15.6)	28(28.0)	9(27.3)	170(20.0)	<0.001
	Unhappy	5(4.5)	39(13.1)	49(16.0)	15(15.0)	1(3.0)	109(12.8)	
	Fair	18(16.1)	83(27.9)	95(30.9)	20(20.0)	4(12.1)	220(25.9)	
	Happy	20(17.9)	62(20.8)	61(19.9)	16(16.0)	4(12.1)	163(19.2)	
	Very happy	40(35.7)	58(19.5)	54(17.6)	21(21.0)	15(45.5)	188(22.1)	
How is your mood after heavy screen viewing	Sad	44(39.3)	69(23.2)	42(13.7)	18(18.0)	11(33.3)	184(21.6)	<0.001
	Unhappy	16(14.3)	57(19.1)	61(19.9)	9(9.0)	3(9.1)	146(17.2)	
	Fair	15(13.4)	72(24.2)	94(30.6)	21(21.0)	4(12.1)	206(24.2)	
	Happy	8(7.1)	48(16.1)	50(16.3)	17(17.0)	2(6.1)	125(14.7)	
	Very happy	29(25.9)	52(17.4)	60(19.5)	35(35.0)	13(39.4)	189(22.2)	
How is our relationship with your parents	Very bad	3(2.7)	1(0.3)	3(1.0)	4(4.0)	0(0.0)	11(1.3)	0.003
	Bad	3(2.7)	6(2.0)	18(5.9)	7(7.0)	1(3.0)	35(4.1)	
	Normal	13(11.6)	36(12.1)	35(11.4)	10(10.0)	3(9.1)	97(11.4)	
	Good	9(8.0)	74(24.8)	65(21.2)	20(20.0)	6(18.2)	174(20.5)	
	Very good	84(75.0)	181(60.7)	186(60.6)	59(59.0)	23(69.7)	533(62.7)	
How many hours you sleep/day	5-6	32(28.6)	100(33.6)	108(35.2)	33(33.0)	9(27.3)	282(33.2)	<0.001
	7-8	58(51.8)	136(45.6)	123(40.1)	31(31.0)	8(24.2)	356(41.9)	
	9-10	13(11.6)	49(16.4)	55(17.9)	19(19.0)	4(12.1)	140(16.5)	
	11-12	3(2.7)	9(3.0)	16(5.2)	11(11.0)	6(18.2)	45(5.3)	
	>13	6(5.4)	4(1.3)	5(1.6)	6(6.0)	6(18.2)	27(3.2)	
Do you have any difficulties in sleeping	No	89(79.5)	211(70.8)	188(61.2)	58(58.0)	16(48.5)	562(66.1)	0.002
	Some how	12(10.7)	46(15.4)	62(20.2)	28(28.0)	8(24.2)	156(18.4)	
	Some time	11(9.8)	38(12.8)	54(17.6)	12(12.0)	8(24.2)	123(14.5)	
	Most of the time	0(0.0)	3(1.0)	3(1.0)	2(2.0)	1(3.0)	9(1.1)	
How often you see a psychiatrist	Never	101(90.2)	277(93.0)	282(91.9)	88(88.0)	26(78.8)	774(91.1)	0.116
	Once	9(8.0)	16(5.4)	22(7.2)	8(8.0)	6(18.2)	61(7.2)	
	Twice	2(1.8)	5(1.7)	3(1.0)	4(4.0)	1(3.0)	15(1.8)	
	Some how	34(30.4)	110(36.9)	113(36.8)	33(33.0)	16(48.5)	306(36.0)	
	Some time	49(43.8)	141(47.3)	135(44.0)	49(49.0)	9(27.3)	383(45.1)	

Discussion

According to the related literature, excessive screen viewing time is defined in quite different manners. In a study by Kerai et al, it was recommended that children and young people aged 5-17 years should not be allowed more than 2 hours of sedentary recreational screen time per day (not including schoolwork).¹³ Our results demonstrated that more than two-third of the children's mothers were educated, However, nearly 15% of them were illiterate. Our results also revealed that the parents' educational level had a significant relationship with the students' screen viewing duration, such that students with parents of higher educational level viewed screens more than those with parents with lower educational level, Lin et al pointed out that screen time among preschoolers decreased and their sleep quality improved as parental education rose.¹⁴ parents can positively influence children's language, adaptive social skills, sleep patterns, and behaviors by limiting family screen time.¹⁵ The results of this study showed a significant association ($p\text{-value} < 0.001$) between the students' screen viewing duration and the parents' occupation, such that screen time was longer among students whose mothers were unemployed and those whose fathers worked in high level of education. It was also observed that the students' screen time was associated with their socioeconomic status, screen time was shorter among students from low-income families than those from middle-income families at $p\text{-value} 0.014$. In a similar study, oh et al reported that as the wage rate of the mother increases, the household's demand for children's screen time is decreasing.¹⁶ Another study by Lampard et al, reported screen time of children in low-income families might be limited as a result of family contextual factors.¹⁷ nearly 20% of the students were overweight and obese. In a similar study by Bakour et al, it was reported that watching TV or playing video games for ≥ 1 hour per day is associated with obesity in adolescents who did not

meet the guidelines for physical activity.¹⁸ The results of another study by Wu et al find that screen time was 0.313 hour higher for children and adolescents with obesity vs. children and adolescents without obesity. However, in a similar study (Tandon et al), reported that more physical activity and less screen time were associated with better mental health for children, accounting for pandemic stressors.¹⁹ also playing electronic games had a positive association with snacking at night and a negative association with self-esteem, sleep duration, and health problems. Moreover, screen time in adolescents is associated with unhealthy behaviors and undesirable psychological states that can contribute to poor quality of life.²⁰ Moreover, there was significant association between students' screen time duration and their mood, such that students with better mood viewed screens less than other groups. Similar to this finding, Tang et al, reported positive associations between screen time and mental health problems, including depressive symptoms and suicidality, having been reported.²¹ In a similar study by Khan et al, it is stated that an increase in screen time duration results in limited physical activity, which in turn leads to a decrease in spending time outdoors in contact with nature, which finally affects the individuals' mood negatively.²² The results revealed a significant association between screen time duration and sleep difficulties, such that those who had longer screen time had more sleep difficulties 33.9% and at $p\text{-value} 0.002$, Maurya et al, indicated that adolescents and young adults with longer screen time had higher probability of sleep difficulties, and greater probability was seen among adolescents than young adults.²³ Similarly, adolescents who engaged in excessive screen time behaviors had higher probability to have insufficient sleep compared to those who did not engage in such behaviors.²⁴

Conclusion

Excessive screen time has been reported as an independent factor in children's behavioral problems and their health-related quality of life. Different types of health problems like poor quality of life, depression, unhealthy diet, and adiposity among children and young people are caused by high levels of screen time. Potential risk factors for excessive screen time include disinterest in reading books, the presence of a TV in the bedroom, and mobile phone use early in the morning and before bedtime. A higher likelihood of reporting sleep difficulties among adolescents has a relationship with their increased screen time. The current findings have important implications for health practitioners and families with adolescents, and mental health programs at this age.

Conflict of interest

The author reports no conflicts of interest.

References

1. Bohnert M, Gracia P. Emerging digital generations? Impacts of child digital use on mental and socioemotional well-being across two cohorts in Ireland, 2007–2018. *Child Indic Res*. 2021;14:629–59. <https://doi.org/10.1007/s12187-020-09767-z/>
2. Kontostoli E, Jones AP, Pearson N, Foley L, Biddle SJ, Atkin AJ. Age-related change in sedentary behavior during childhood and adolescence: a systematic review and meta-analysis. *Obes Rev*. 2021;22(9): e13263. <https://doi.org/10.1111/obr.13263/>
3. Stiglic N, Viner RM. Effects of screen time on the health and well-being of children and adolescents: a systematic review of reviews. *BMJ open*. 2019;9(1): e023191. <https://doi.org/10.1136/bmjopen-2018-023191/>
4. Henderson M, Benedetti A, Barnett TA, Mathieu ME, Deladoëy J, Gray-Donald K. Influence of adiposity, physical activity, fitness, and screen time on insulin dynamics over 2 years in children. *JAMA pediatrics*. 2016;170(3):227–35. <https://doi.org/10.1001/jamapediatrics.2015.3909/>
5. Lissak G. Adverse physiological and psychological effects of screen time on children and adolescents: Literature review and case study. *Env. Res*. 2018; 164:149–57. <https://doi.org/10.1016/j.envres.2018.01.015/>
6. Tremblay MS, Carson V, Chaput JP, Connor Gorber S, Dinh T, Duggan M, et al. Canadian 24-hour movement guidelines for children and youth: an integration of physical activity, sedentary behavior, and sleep. *Appl Physiol Nutr Metab*. 2016;41(6): S311–27. <https://doi.org/10.1139/apnm-2016-0151/>
7. Reid Chassiakos YL, Radesky J, Christakis D, Moreno MA, Cross C, Hill D, et al. Children and Adolescents and Digital Media. *Ped*. 2016;138(5). <https://doi.org/10.1542/peds.2016-2593/>
8. Ferguson CJ, Beresin E. Social science's curious war with pop culture and how it was lost: The media violence debate and the risks it holds for social science. *Prev. med*. 2017; 99:69–76. <https://doi.org/10.1016/j.ypmed.2017.02.009/>
9. van Ekris E, Altenburg TM, Singh AS, Proper KI, Heymans MW, Chinapaw MJ. An evidence-update on the prospective relationship between childhood sedentary behavior and biomedical health indicators: meta-analysis. *Obes. rev*. 2016 (9):833–49. <https://doi.org/10.1111/obr.12426/>
10. Makin S. Searching for digital technology's effects on well-being. *Nature*. 2018;563(7733): S138–40. <https://doi.org/10.1038/d41586-018-07503/>
11. Hale L, Guan S. Screen time and sleep among school-aged children and adolescents: S. med. rev. 2015; 21:50–8. <https://doi.org/10.1016/j.smr.2014.07.007/>
12. Çaksen H. Electronic screen exposure and headache in children. *Ann Indian Acad Neurol*. 2021;24(1):8.

https://doi.org/10.4103/aian.AIAN_972_20/

13. Kerai S, Almas A, Guhn M, Forer B, Oberle E. Screen time and developmental health: results from an early childhood study in Canada. *BMC public health*.2022; (1):1-9.<https://doi.org/10.1186/s12889-022-12701-3/>
14. Lin YM, Kuo SY, Chang YK, Lin PC, Lin YK, Lee PH, et al. Effects of parental education on screen time, sleep disturbances, and psychosocial adaptation among Asian preschoolers: *J Pediatr Nurs*.2021;56: e27-34.<https://doi.org/10.1016/j.pedn.2020.07.003/>
15. Marsh J, Lahmar J, Plowman L, Yamada-Rice D, Bishop J, Scott F. Under threes' play with tablets. *J Early Child Res*.2021 (3):283-97.<https://doi.org/10.1177/1476718x20966688/>
16. Oh SE, Vukina T. Estimating Parental Demand for Children's Screen Time in a Model of Family Labor Supply. *Int Adv Econ Res*.2022 (3-4):69-89.<https://doi.org/10.1007/s11294-022-09854-7/>
17. Lampard AM, Jurkowski JM, Davison KK. The family context of low-income parents who restrict child screen time. *Child Obes*. 2013;9(5):386-92.<https://doi.org/10.1089/chi.2013.0043/>
18. Bakour C, Mansuri F, Johns-Rejano C, Crozier M, Wilson R, Sappenfield W. Association between screen time and obesity in US adolescents: National Survey of Children's Health 2016–2017. *Plos one*.2022 (12): e0278490.<https://doi.org/10.1371/journal.pone.0278490/>
19. Tandon PS, Zhou C, Johnson AM, Gonzalez ES, Kroshus E. Association of children's physical activity and screen time with mental health during the COVID-19 pandemic. *JAMA*.2021(10): e2127892.<https://doi.org/10.1001/jamanetworkopen.2021.27892/>
20. Yan H, Zhang R, Oniffrey TM, Chen G, Wang Y, Wu Y, et al. Associations among screen time and unhealthy behaviors, academic performance, and well-being in Chinese adolescents. *Int J Environ Res Public Health*. 2017 (6):596.<https://doi.org/10.3390/ijerph14060596/>
21. Tang S, Werner-Seidler A, Torok M, Mackinnon AJ, Christensen H. The relationship between screen time and mental health in young people: *Clin Psychol Rev*.2021 86:102021.<https://doi.org/10.1016/j.cpr.2021.102021/>
22. Khan A, Lee EY, Rosenbaum S, Khan SR, Tremblay MS. Dose-dependent and joint associations between screen time, physical activity, and mental wellbeing in adolescents: *Lancet Child Adolesc Health*.2021;5(10):729-38.[https://doi.org/10.1016/S2352-4642\(21\)00200-5/](https://doi.org/10.1016/S2352-4642(21)00200-5/)
23. Maurya C, Muhammad T, Maurya P, Dhillon P. The association of smartphone screen time with sleep problems among adolescents and young adults cross-sectional findings from India. *BMC Public Health*.2022 ;22(1):1686.<https://doi.org/10.1186/s12889-022-14076-x/>
24. Baiden P, Tadeo SK, Peters KE. The association between excessive screen-time behaviors and insufficient sleep among adolescents: *Psychiatry Res*.2019; 281:112586
<https://doi.org/10.1016/j.psychres.2019.112586/>