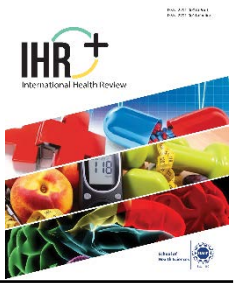
International Health Review (IHR)
Volume 2 Issue 1, 2022
ISSN (P): 2791-0008, ISSN (E): 2791-0016
Homepage: https://journals.umt.edu.pk/index.php/ihr

Article QR



Title:	**Association of Screen time with Depression or anxiety in Adolescence: In Pakistan**
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DOI:	http://doi.org/10.32350/ihr.21.02
History:	Received: February 10, 2022, Revised: April 20, 2022, Accepted: April 24, 2022, Published: June 15, 2022
Citation:	Niazi MK, Hassan F, Jalal K, Riaz K, Imran S, Rizwan B. Association of screen time with depression or anxiety in adolescence: In Pakistan. *Int Health Rev.* 2022;2(1):15–31. http://doi.org/10.32350/ihr.21.02
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Conflict of Interest:	Author(s) declared no conflict of interest

A publication of
The School of Health Science
University of Management and Technology, Lahore, Pakistan

Association of Screen Time with Depression or Anxiety in Adolescence: In Pakistan

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Abstract

Depression is a serious medical illness and impacted on everything that a person feels or perceive which causes persistent feeling of sadness, loneliness, anger, anxiety and depressive disorders. There is a close association exist between depression and over screening of smartphones, computer screens or various electric appliances thus increasing the risk of depressive disorders or negatively impacted psychological well-being. The incidence of depressive disorder was seen more frequently in females than in males due to increased screening time or social networking. This study aims to determine the link of screen time and depression or anxiety in the general population. To find out the association that whether increased screening time is associated with depressive symptoms in general population or not. Cross sectional study design was selected for study and 50 individuals was selected. Convenience sampling technique was used to collect samples. Their demographic information, screen time, anxiety and depression were assessed through pre-planned questionnaire. Data was recorded and analyzed through SPSS version 23. The results shown that the 70.37% female suffered from depression due to increased screen time and 29.63% male suffered. Increased monitoring time leads to an increased risk of depression and anxiety, though causality cannot be determined.

Keywords: Depression, Screen, loneliness, leisure time, Smartphones, Media, anxiety

Introduction

Depression is considered to be a tempered disordered which gives rise to implacable sensation of desolation and shows lack of concern in any action. It is a leading root cause of psychiatric sickness that gives rise to the

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growing chances of increase in the mortality rates with increased financial distress to a nation. Depression is a significant health related disability which adversely affects the mental health of an individual [1].

Depression related Common Manifestation are:

- Regrets and desolation related perceptions
- Lack of interests in majority of the usual routine events and individualized leisure-time activities
- Nervousness, quick-tempered and distress
- Difficult focusing, realization and even making preferences [1] One of the most conventional intellectual disability is considered as depression which is a mixture of biological, temperamental and communal components [2] and acknowledged as utmost promoter of about 14% to the worldwide burden of sickness [3]. It is approximated that 350 million individuals of general public experience depressive symptoms internationally [4]. Certainly, the World Health Organization (WHO) categorize major depressive symptoms as utmost troublesome ailments in the globe. Depression and their associated illnesses are estimated as the 2nd most frequent cause of disease incidence universally by the year of 2030 and the primary root in affluent countries [3].

Advancement in the utilization of electric gadgets has been expanded from the previous five eras [5]. Cellular phones and also Extension phones, work as internet browsing, communal intercommunication evaluator, cameras and intermedia performers [6, 7]. In accordance to young generations, teenagers are in particular more prone to Tech addictiveness. Teenagers usually suffer with depressive symptoms more and have low cope with mechanisms. Whenever they are stressful, they usually showed preference of what gives comfort to oneself, probably anything more accessible to concentrate on as online broadcasting or social networking site. Additionally, in teenagers growing years, self-conception is undetermined. Majority of the teenagers try hard to realized that in which way they need to present their own-self and for the time being Electrical media assist them by engaging them on it. Furthermore, the overzealously using of electric appliances majorly impacted on the living standard of the individuals. The current trends of electric devices delivered to you all the particular details

of each and everything of the globe as well as recreation by just a few clicks of fingers [5].

An increasing coherence of youth and teenagers' free time as well as usual time is seen to be consumed with screening which includes mobile phones, tablet-computers, gaming panels and home entertainment sites [8, 9, 3].

The adolescent populace has tremendously been observed using smartphones at a higher rate. Majorly because this appliance receive much higher relevancy in adolescence than formerly in any other growing phases [5]. Earlier researches has recognized mass media disclosure which include play-stations, small screens, films and the web, seen to be linked with the occurrence of depressive symptoms amid teens, PSMU a term which is associated and configured with extravagant concerned about social networking sites usage being impelled through a potent motive to utilize social networking, and devoted a huge time span and endeavor to mobile phone usage which incapacitated many communal activity, Education/Career Social interactions or out-gatherings, or psychically fitness and ecstasy [10].

Modern world is marked by the increased usage of various electric appliances through electric gadgets which inadvertently seem to be the part of our living world. Increased utilization of PCs/Small screens has become conventional globally after entering the 21st Era [11]. With further progress in technologies, hours spent on screening (ST) which include the viewing of home entertainment centers utilizing computers and taking part in electronic games, is becoming a pivotal constituent of our everyday life [3]. The occurrence of depressive symptoms majorly at its peak in earlier stages of adultness, which set the youngsters at higher possibility of problematical social out-gatherings or relations, jobs and intellectual undertakings [2].

Over utilization of cellular phones or devices compel the viewer to awaken too late till midnight, contributing towards sleeplessness and their associated disorders further aggravating anxiety, depressive symptoms and stressfulness [12]. Further studies suggest that over-utilization of electric devices may also prone their users with inauspicious drawbacks which impacted their daily routine activities including anxiety, Isolation, aggressiveness, animosity and poor well-being additionally, leading to issues in their social relationships, working in capabilities which negatively effect their physical and psychological well-being [6, 7]. Various studies

suggest that emission of electromagnetic radiations from smart phones detain production of melatonin which further result in insomnia and depressive symptoms [12]. A systematic survey has figured out that sternness of depressive symptoms and nervousness is closely associated with smartphone dependency [12]. Additional findings support the fact that anxiety or depressive symptoms is a triggered of smart phone dependence, as depressed persons over-utilize cellular appliances to get rid of their depressive symptoms due to lower coping processes [13].

Numerous studies suggested that majority of the women are more prone to experience depression or anxiety when compared to men. Females have been seen to be more prone to social networking sites, seem to be more concerned with social media sites and probably reported a lengthen duration of phone calls. This is based on the increased usage of smartphones more due to social gatherings as compared to men [12]. In young generations of especially college going students are also more prone to technology addiction and therefore seem to be more depressive or aggressive. [6, 7]. Individuals who usually spent 4 hours or more than four hours of screening as viewing small screens and using computer screens, are more prone of being depressed or shows anxiety. Long term viewing of small screens and technology usage are considered to be the most conventional sedentary behaviors [4].

Many researches onscreen time-based sedentary behavior (ST-SB) and well-being risks suggested that over-involving in sedentary activities of long times watching screens or increased usage of electronic gadgets is linked with depressive symptoms and various other long-term complications such as type 2 diabetes and heart related complications [4]. Increased body weight, and brain deterioration leading to irregular sleeping patterns, nervousness and depressed symptoms [3]. As one study suggest that depression set heart sufferer at increased chances of attacks by sixty-seven percent further broadening the range of metastatic tumor to fifty percent [14]. Utilization of Smart phones may worsen individual well-being and psychically unhealthiness when tend to be overused leading to depressive disorders and diminished mentality [7]. Madhav et al. [4] conducted a study to assess the relation of screen time and depression in US individuals who spent more hours in screening and their associated depressive symptoms. Individuals who participated were 3201 in National Health and Nutrition Examination Survey. A univariate study was

conducted in these people to find a relation between screen time and depression who spend more than 4 hours of screening. The analysis showed that people who spend more than 4 hours screening in a day on television and computers are more likely to have depressive symptoms and diagnosed with medium and dreadful symptoms than those who spend less than 4 hours a day watching screens or computers. It was seemed that the odds ratio was about 1.798 in people who spend more than 4 to 6 hours of screening, watching TV and using computer usually having moderate and extreme depression as compared to those who spent less than 4 to 6 hours of screening having their odd ratio as 250. From the univariate analyses, it was also seen that those people who were above 65 years of the age were at moderate risk of developing extreme depression compared to those who are aged between 20 to 35 years old. In the same way, Non- Hispanics Asians residents suffers more with depressive symptoms than those who are Hispanics white. The results showed that depressive symptoms are particularly more pronounced with increase in screening time and less in those having less screen time.

There is limited and conflicting evidence for associations between use of screen-based technology and anxiety and depression in young people. Khouja et al. [15] conducted a study to evaluate a linkage between screen time at age 16 years and stress and depression at age 18. A cohort study of UK region enrolled (n = 14,665; complete cases n = 1869) subjects from the ALSPC setting and find the linkage between screen time usually in the form of watching television, using computer, messaging (which is calculated by the use of questionnaire at age 16 years) and that of anxiety and depression (which is calculated in a at 18 years through clinical interview setting) after adjusting sex, maternal education, family status, family disputes, blackjacking and maternal depressive symptoms) on week days and normal days. Results showed strong indication that increased screening time on weekdays was linked with a small increased chances of having depressive symptoms (OR for 1–2 h = 1.17 OR for 3+ hours = 1.30) People who tended to use computer on weekends (for 1–2 h = 1.17 OR for 3+ hours = 1.28). Our results recommended that young people who passed their more time on screen-dependent activities may more prone to have small greater chances of having depressive symptoms but not anxiety. But by lowering the time of youth screening may reduce the chances of having depression or depressive symptoms. Time which is spent alone was also linked with

attenuating some contraindications between depression, and further research should explore this.

Kim et al. [13] conducted a study to measure the extent of linkage between active and passive forms of screening and their effect associated with adolescence depression like disorders and anxiety distress. Data was collected from Ontario child health study center having year 2014, an indicative sample of Twenty-three hundred and twenty adolescents with having major proportion of males (50%) with standard age of 14 who self-explained the time they spend on screening or screen dependent tasks. Data of previous six months showed anxiety related disorder pronouncing depression, phobic attacks which were quantified by MINI introductory session for children and adolescence .Those adolescents who spend four or more than four hours of screening usually of passive type compared to those who spend two hours or less than two hours of passive screening in a whole day were three times more prone to meet the *DSM-IV-TR* criteria leading to main symptomatic depressive episodes [OR=3.28(95% CI=1.71–6.28)], social phobia [OR=3.15 (95% CI=1.57–6.30)] and generalized anxiety disorder [OR=2.92 (95% CI=1.64–5.20)]. It was seemed that passive type screening was majorly related with increased chances of having disorder after normalizing for the age, socioeconomic status, active type of screening and physical activity. From the results it was concluded that active type of using screens was not positively associated with depression as compared to passive type which is highly related with mood and anxiety related issues.

Kandola et al. [16] conducted a study to analyze whether periodic usage of of screening or devices probably used for screening could be a modifiable high risk component for depressive symptoms associated with adults. We further conclude by changing screen time activities with exercise and measure its influencing capabilities on emotional depression. Total of forty-five hundred ninety nine adolescents with fifty percent ratio of females were participated in this prospective cohort study to quantify or to assess screening time (T.V, Computer) and physical activity (Sports and exercises) It was seen that emotional distress was reduced when replace screening time of 60 minutes with exercise with p value of 0.05 were obtained. Further improved results were obtained when screening in the form of T.V and social media usage were replaced with sport exercises showed reduced emotionalism or distress with the scores reduction from 0.17 and 0.15. So results concluded that Screen time with increased duration

may cause mental distress and depression related symptoms in adolescence but on the other side if screen time (Computer, T.V) were replaced with physical activity or sports it might draw positive influencing while regulating mental distress.

Growing use of smart phones and tablets or other screening apps have become an important part of our daily life as it is more common among youngsters and adolescence age group. Kleppang et al. [17] conducted a study to find out the relationship between screening and psychological sufferings among youngsters. A self-reported cross-sectional survey was conducted in the year 2018 in which total of Six thousand seven hundred and seventy-seven youngsters were allocated from the school of city Norway. Psychological distress and anxiety issues were measured. Introductory results were shown that increased psychological distress and anxiety attacks was seen in majority of those who used screens for more than two to three hours right after schooling in a whole day when compared with those who used screens for relatively shorter duration of two hours or less than two hours per day or none at all. It was further concluded that increased psychological distress was seen in school girls than in boys, especially in higher secondary school level than the lower ones. Two hours or more usage of screens was associated with increased risk of having psychological sufferings. So, Health policies along with different implementation plans should provide attention to lower down the worse outcomes of increased screening in youngsters and adolescence age groups.

Methodology

The design of the study was cross sectional. Respondents from the department of nutrition at university of Lahore selected. Undergraduate students were selected randomly. A sample of 165 individuals, both males and females with a healthy weight between ages 18 to 35 years were selected using a 5% level of significance and a 7% margin of error. It was calculated by using the following formula. It was calculated by using the following formula: N = 1000 (population size) Margin of Error= 7% n= 16.

Inclusion and Exclusion Criteria

Young individuals within the age group of 18-35 years were considered with both genders (males and females) who were healthy. Overweight and underweight individuals (infants, children, pregnant and lactating women) with any disease or infirmity were excluded.

Data Collection

A self-designed questionnaire was designed to fulfill the objectives of the study. Closed-ended questions were asked and noted down accordingly. The questionnaire included the following parts:

Demographic profile

Individuals were asked about their age, marital and employment status

Screen time

In a self-designed questionnaire respondents were asked about leisure time, hours per day spend looking a phone, TV, total duration

Depression/anxiety

In self-designed questionnaire respondents were asked about total sleeping hours, family time and relation with family members, attitudes and behaviors and mood swings

Procedure

Purpose of the research was briefly explained to the participants before filling out the questionnaires. All the queries and concerns of the participants were addressed till they were satisfied. The questionnaire was then filled by the participants. The questionnaire firstly obtained their demographic information. It contained questions regarding depression.

Statistical Analysis

Data was entered and analyzed using SPSS version 24. Quantitative variable was presented in form of mean standard deviation or median of the data. Qualitative or categorical variable were presented in form of frequencies and percentages. Bar chart and pie chart were constructed for categorical variables. Histogram with normal were constructed for continuous normal data. Pearson correlation were used to see the association.

Results

Demographic Profile of Respondent

Table 1. Gender of the Respondent Along with Frequency and Percentage

Gender	Frequency	Percent
Male	21	42
Female	29	58
Total	50	100

Table 2. Representing the Age of the Respondent

Age	Frequency	Percent
13-20	6	12
20-25	19	38
25-35	24	48
35-45	1	2
Total	50	100

Table 3. Employment Status of the Respondent

Employment status	Frequency	Percent
Students	33	66
Full time	6	12
part time	3	6
Unemployed	8	16
Total	50	100

Table 4. Marital Status of the Respondent

Marital status	Frequency	Percent
Single	39	78
Married	10	20
Widowed	1	2
Total	50	100

Table 5. Impact of Screen

	Yes		No	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Do You Think You Are a Screen Addict?	26	52%	24	48%
Do you think screening impact on your quality of life?	35	70%	15	30%
Do you think screen time causes you lazy & inactive?	31	62%	19	38%
Do you think spending a lot of time watching screens effect your social interaction?	34	68%	16	32%
Do You Think Increased Screening Time Affect Your Intellectual Abilities?	24	48%	26	52%
Do you think increased screen time causes family & relationship issues?	29	58%	21	42%

Table 5 shows that 52 % thought they had screen addicted and 48% responded to this question in no,70 % thought screening impacted on quality of life and30% thought that screening had no impact on quality of life, while 62% respondents thought that screen time causes lazy and inactive, 58%agreed that thought increased screen time causes family & relationship issues.

Figure 1 shows that depression is more common in 25-35 age group and in female, 11.11٪ in male and female of age groups of 20-25, 7.41 ٪ in 13-20 age group and 3.70 ٪ in 35-45 age group and 3.70٪ male and female of age groups of 13-20.

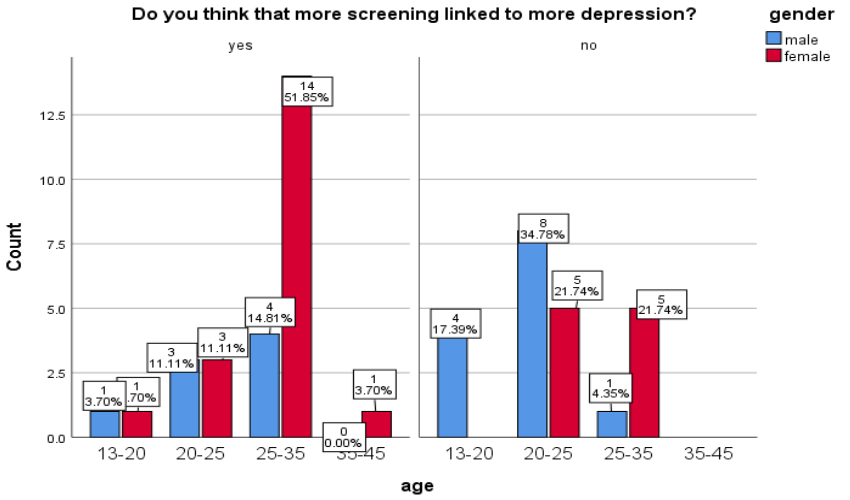

Figure 1. Age and Depression

Table 6a. Analysis of Screen Time with Depression

Male	p value
Do you think screening impacted on your thinking?	0.02
After how many hours do you feel tiredness?	0.01
How do you believe increased screen time impacts your attitude?	0.01
Do you think that more screening linked to more depression?	0.03

This shows that p value is < 0.05 that shows the significant relationship of between screen time and depression

Table 6b. Analysis of Screen Time with Depression

Female	p value
Do you think screening impacted on your thinking?	0.02
After how many hours do you feel tiredness?	0.04
How do you believe increased screen time impacts your attitude?	0.01
Do you think that more screening linked to more depression?	0.05

This shows that p value is < 0.05 which shows the significant relationship of between screen time and depression.

Discussion

According to our results Table 1 Gender of the Respondent shows that females are more effective than male. Table 2 Age of the Respondent shows that the age between 25-35 are more effective than others. Table 3 Employment Status of the Respondent shows that the students are 66% more effective than others. Table 4 Marital Status of the Respondent shows that single person 78% effective than others. Table 5 shows that 52 % thought they had screen addicted and 48% responded to this question in no,70 % thought screening impacted on quality of life and30% thought that screening had no impact on quality of life, while 62% respondents thought that screen time causes lazy and inactive, 58%agreed that thought increased screen time causes family & relationship issues. Table 6 shows that 52 % thought they had screen addicted and 48% responded to this question in no,70 % thought screening impacted on quality of life and30% thought that screening had no impact on quality of life, while 62% respondents thought that screen time causes lazy and inactive, 58% agreed that thought increased screen time causes family & relationship issues.

Figure 1 shows that depression is more common in 25-35 age group and in female, 11.11٪ in male and female of age groups of 20-25, 7.41 ٪ in 13-20 age group and 3.70 ٪ in 35-45 age group and 3.70٪ male and female of age groups of 13-20.

Analysis of screen time with depression it shows that p value is < 0.05 that shows the significant relationship of between screen time and depression.

Liyanarachchi et al. [18] revealed that the majority of individuals with more than 2 h/d ST-SB were more likely to be depressed. The relationships among SB and the incidence of stroke were stronger when ST was treated as a dependent variable. For starters, long-term SB may cause biological pathway disruptions like as alertness or sleep disorders in the brain and nervous system. Secondly, physical activity has been demonstrated to help with depressed symptoms reduction [19]. Boers et al. [20] indicate that when people's usage of social media, tv, and computers increases over the course of a year, their anxiety and depression could become more severe. Such results are noteworthy in light of some other recent study that found within-person connections among depression, social networking sites, and television viewing, but not computer use, amongst Canadian adolescents, that were accounted by lower self-esteem. Laptop usage seems to be

connected with increased anxiety in a special manner, possibly in connection to utilizing the laptop for academic tasks, although more research is needed. Lastly, the results indicate that link among television viewing and anxiety was present at the time of the study and did not persist after the severity of the television viewing was lowered. According to our results 74% thought spending more than 2 hours of screening effect mental health while 26% disagreed with that. Gunnell et al. [21] 2018 indicate that female teenagers spending time on social media and have worse mental health than their male colleagues. The causes for the disparity in screen time are unknown and thus are highly complex. Adolescent girls have such a higher risk of poor mental wellbeing than male adolescents, as well as a number of factors contributing have been found including both physiological (hormone levels) and environmental (sexual misconduct, conformity to cultural self-image norms) aspects. Although there is some indication that harassment, sleep deprivation, and a lack of physical exercise among teenage girls can mitigate the association among social media addiction and mental health, further research is required to better explain such gender disparities [22]. Kawachi et al. [23] indicate that when it comes to depression, males and females have distinct coping techniques. Girls are more prone to absorb her feelings and ponder on them, while boys are much more prone to participate in projecting or diverting tasks .When a result, as screen time grows, women would have less confidence to chat with one another and is becoming more reclusive, while men will focus on some other things. As a result, spending too much time in front of the screen may have a greater impact on female viewers [24]. Furthermore, different reference groups yielded varied outcomes. In studies utilizing 0–1 h/day as that of the comparison group there was a weak point among Screen behavior and depression incidence, but the link increased greater if 2 h/day more than was used as the comparison group.This study contributes to the understanding of the link among Screen time-screen behavior and depression risk implying that ST in balance is not linked to greater symptoms of distress. Liu et al. [25] showed that ST as well as the incidence of stroke had a nonlinear dosages relationship. The general positive relationship among ST-SB and mortality hazard was stressed in certain guidelines. ST-SB is related with a reduced risk of depression if ST is confined to 0–2 hours per day according to research, and the lowest risk is identified at 1 hour per day. Results show that screen time and depression relation is significant in our research.

Conclusion

In summary, our results show that depression is more common in 25-35 age group and in females. It suggests increased screen time usage is associated, though causality cannot be ascertained, with increased risk of depression and more anxiety. There was little evidence of a time-consuming effect on the risk of anxiety and depression, following adjustment to potentially confusing people, indicating that there may be a more complex connection between screen time and mental health outcomes than simply more screentime increases risk. Furthermore, depending on the time of the week the instruments are employed, their size and strength differ, indicating more complexities.

References

1. Rustagi A, Manchanda C, Sharma N, Kaushik I. Depression anatomy using combinational deep neural network. In: Gupta D, Khanna A, Bhattacharyya S, Hassanien AE, Anand S, Jaiswal A. (eds.). *International Conference on Innovative Computing and Communications*. Singapore: Springer; 2021:19–33. https://doi.org/10.1007/978-981-15-5148-2_3
2. Shensa A, Escobar-Viera CG, Sidani JE, Bowman ND, Marshal MP, Primack BA. Problematic social media use and depressive symptoms among US young adults: A nationally-representative study. *Soc Sci Med*. 2017;182:150–157. https://doi.org/10.1016/j.socscimed.2017.03.061
3. Kim S, Favotto L, Halladay J, Wang L, Boyle MH, Georgiades K. Differential associations between passive and active forms of screen time and adolescent mood and anxiety disorders. *Soc Psychiatry Psychiatr Epidemiol*. 2020;55:1469–1478. https://doi.org/10.1007/s00127-020-01833-9
4. Madhav KC, Sherchand SP, Sherchan S. Association between screen time and depression among US adults. *Prev Med Rep*. 2017;8:67–71. https://doi.org/10.1016/j.pmedr.2017.08.005
5. Hegde AM, Suman P, Unais M, Jeyakumar C. Effect of electronic gadgets on the behaviour, academic performance and overall health of school going children-a descriptive study. *J Adv Med Dent Sci Res*. 2019;7(1):100–103. https://doi.org/10.21276/jamdsr
6. Tamura H, Nishida T, Tsuji A, Sakakibara H. Association between excessive use of mobile phone and insomnia and depression among

Japanese adolescents. *Int J Environ Res Public Health*. 2017;14(7):e701. https://doi.org/10.3390/ijerph14070701
7. Desouky DE, Abu-Zaid H. Mobile phone use pattern and addiction in relation to depression and anxiety. *East Mediterr Health J*. 2020;26(6):692–699. https://doi.org/10.26719/emhj.20.043
8. Twenge JM, Martin GN, Spitzberg BH. Trends in US Adolescents' media use, 1976–2016: The rise of digital media, the decline of TV, and the (near) demise of print. Psychology of Popular Media Culture. 2019;8(4):329–345. https://doi.org/10.1037/ppm0000203
9. Kelishadi R, Qorbani M, Motlagh ME, Heshmat R, Ardalan G, Jari M. Relationship between leisure time screen activity and aggressive and violent behaviour in Iranian children and adolescents: The CASPIAN-IV study. *Paediatr Int Child Health*. 2015;35(4):305–311. https://doi.org/10.1080/20469047.2015.1109221
10. Holfeld B, Sukhawathanakul P. Associations between internet attachment, cyber victimization, and internalizing symptoms among adolescents. *Cyberpsychol Behav Soc Netw*. 2017;20(2):91–96. https://doi.org/10.1089/cyber.2016.0194
11. de Araújo LG, Turi BC, Locci B, Mesquita CA, Fonsati NB, Monteiro HL. Patterns of physical activity and screen time among Brazilian children. *J Phy Activity Health*. 2018;15(6):457-461. https://doi.org/10.1123/jpah.2016-0676
12. Elahi JD, Dvorak RD, Levine JC, Hall BJ. Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *J Affect Disord*. 22017;207:251–259. https://doi.org/10.1016/j.jad.2016.08.030
13. Kim R, Lee KJ, Choi YJ. Mobile phone overuse among elementary school students in Korea: Factors associated with mobile phone use as a behavior addiction. *J Addic Nurs*. 2015;26(2):81-85. https://doi.org/10.1097/JAN.0000000000000074
14. Kongsuk T, Supanya S, Kenbubpha K, Phimtra S, Sukhawaha S, Leejongpermpoon J. Services for depression and suicide in Thailand. *WHO South-East Asia J Public Health*. 2017;6(1):34–38. https://doi.org/10.4103/2224-3151.206162
15. Khouja J, Munafò M, Tilling K, et al. Is increased screen time associated with the development of anxiety or depression in young people?. *Eur Psychiatry*. 2017;41(S1):S530–S531. https://doi.org/10.1016/j.eurpsy.2017.01.719

16. Kandola A, Owen N, Dunstan DW, Hallgren M. Prospective relationships of adolescents' screen-based sedentary behaviour with depressive symptoms: The millennium cohort study. *Psychol Med*. 2021;52(15):3531–3539. https://doi.org/10.1017/S0033291721000258
17. Kleppang AL, Steigen AM, Finbråten HS. The association between screen time and psychological distress in Norwegian adolescents. *Eur J Public Health*. 2019;29(Supplement_4):34–35.
18. Liyanarachchi S, Wojcicka A, Li W, et al. Cumulative risk impact of five genetic variants associated with papillary thyroid carcinoma. *Thyroid*. 2013;23(12):1532–1540. https://doi.org/10.1089/thy.2013.0102
19. Teychenne M, Ball K, Salmon J. Physical activity and likelihood of depressionin adults: A review. *Prev Med*. 2008;46(5):397–411. https://doi.org/10.1016/j.ypmed.2008.01.009
20. Boers E, Afzali MH, Newton N, Conrod P. The association of screen time and depression adolescence. *JAMA Pediatr*. 2019;173(9):853–859. https://doi.org/10.1001/jamapediatrics.2019.1759
21. Gunnell D, Kidger J, Elvidge H. Adolescent mental health in crisis. *BMJ*. 2018;361:ek2608. https://doi.org/10.1136/bmj.k2608
22. Viner RM, Gireesh A, Stiglic N, et al. Roles of cyberbullying, sleep, and physical activity in mediating the effects of social media use on mental health and wellbeing among young people in England: A secondary analysis of longitudinal data. *Lancet Child Adolesc Health*. 2019;3(10):685–696. https://doi.org/10.1016/S2352-4642(19)30186-5
23. Kawachi I, Berkman LF. Social ties and mental health. *J Urban Health*. 2001;78:458–467. https://doi.org/10.1093/jurban/78.3.458
24. Tremblay MS, Leblanc AG, Janssen I, et al. Canadian sedentary behaviour guidelines for children and youth. *Appl Physiol Nutr Metab*. 2011;36(1):59–64. https://doi.org/10.1139/H11-012
25. Liu M, Wu L, Yao S. Dose-response association of screen time-based sedentary behaviour in children and adolescents and depression: A meta-analysis of observational studies. *Br J Sports Med*. 2016;50(20):1252–1258. http://dx.doi.org/10.1136/bjsports-2015-095084