Research Square

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Examining the Relationship Between Multiscreen Addiction and Anxiety in Adolescents

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Abstract

Background

Excessive screen exposure among adolescents has become a growing public health concern, with potential associations with behavioral and psychological outcomes. This study aimed to evaluate screen use patterns, multi-screen addiction levels, and their relationship with anxiety in adolescents.

Methods

A cross-sectional study was conducted between April 1 and July 1, 2025, at Health Sciences University Prof. Dr. Cemil Taşcıoğlu Hospital among 340 adolescents aged 10–18 years (mean age 14.74 ± 1.71; 60.3% girls). Data were collected using a descriptive questionnaire, the Multi-Screen Addiction Scale, and the Beck Anxiety Inventory.

Results

Participants reported an average daily screen time of 6.07 ± 1.80 hours, with smartphones being the most frequently used devices (60.9%). The mean total score of the Multi-Screen Addiction Scale was 47.01 ± 7.31, showing high internal consistency ($\alpha = 0.832$). Daily screen time was positively correlated with all subscales of the Multi-Screen Addiction Scale and with the total score ($r = 0.359$; $p < 0.01$). The mean Beck Anxiety Inventory score was 16.90 ± 12.82, with strong reliability ($\alpha = 0.925$). Anxiety scores were significantly higher in girls, older adolescents, those with less educated parents, and those from lower socioeconomic backgrounds ($p < 0.05$). Total screen time and computer use were positively correlated with anxiety levels ($r = 0.311$ and $r = 0.136$, respectively; $p < 0.05$).

Conclusion

Excessive screen exposure among adolescents is associated with higher levels of multi-screen addiction and increased anxiety symptoms. Socioeconomic and parental educational factors appear to influence these outcomes. Interventions targeting healthy screen use habits and mental health support are essential for adolescents.

Introduction

The integration of digital technologies into every aspect of life has significantly increased screen time among children and adolescents. Excessive screen exposure can negatively impact their cognitive, social, and emotional development, particularly during critical developmental periods. In this context, the concept of screen addiction is gaining increasing attention.[1,2]

Screen addiction is characterized by an inability to control the amount of time an individual spends in front of a screen, unsuccessful attempts to reduce this time, and the negative impact of screen use on daily life. Furthermore, several studies have shown significant correlations between screen addiction and psychological problems. Screen and internet addiction are quite common among adolescents and trigger psychological

disorders such as depression in this population. Anxiety disorders are considered both a cause and a consequence of screen addiction.[3,4]

The COVID-19 pandemic has particularly exacerbated screen addiction and anxiety-related disorders among adolescents. A meta-analysis conducted in China showed a moderate positive relationship between adolescents' Internet addiction and suicidal attempts.[5,6]

High levels of depressive and anxiety symptoms in adolescents before COVID-19 led to severe internet addiction during the pandemic. Studies have shown a significant bidirectional relationship between internet addiction and depressive symptoms. Evidence indicates that psychological problems and internet addiction significantly influence each other before and during the COVID-19 pandemic. Studies among Chinese adolescents found that they spend considerable time in front of screens, particularly with video games. Playing video games for more than six hours was positively and significantly associated with anxiety symptoms.[7,8]

A systematic review conducted by Santos et al. in 2023, examining 50 articles from the literature, found a relationship between screen exposure and mental health in adolescents. They noted that smartphones were the most frequently used devices by adolescents, and weekday use was associated with negative mental health outcomes. Social media use was negatively associated with mental health, with a higher risk of depression in girls.[9]

Unlike general “screen time,” which refers to the total duration spent on screen-based activities, multiscreen addiction refers to a behavioral addiction pattern characterized by compulsive, repetitive, and uncontrolled use of multiple screen-based devices (e.g., smartphones, tablets, computers, televisions), often simultaneously or in rapid succession. This behavioral pattern is associated with impaired self-control, functional disruption in daily life, and psychological distress.[7–9]

Although not yet recognized as a formal psychiatric diagnosis, multiscreen addiction is conceptually aligned with behavioral addiction models such as Internet Gaming Disorder (DSM-5) and Problematic Smartphone Use. It includes core features of addiction, including tolerance, withdrawal, compulsive engagement, and loss of control.[7–9]

The Multi-Screen Addiction Scale, developed and validated by Sarıtepeci (2021), operationalizes this concept across three domains: excessive use, compulsive behavior, and loss of control, offering a reliable framework for empirical investigation.[9]

This study aims to statistically examine the relationship between multiscreen addiction and anxiety levels in children and adolescents and to evaluate the demographic variables that influence this relationship.

Material and Method

The study was conducted at Health Sciences University Prof. Dr. Cemil Taşcıoğlu City Hospital between April 1, 2025, and July 1, 2025. Ethics committee approval was obtained from the ethics committee for non-interventional studies dated March 26, 2025, and numbered 111. The study was conducted in accordance with the Declaration of Helsinki. Written informed parental/guardian consent and adolescent assent were obtained from all participants prior to their inclusion in the study. Participation was voluntary and anonymous.

Clinical trial number

not applicable.

Participants

The study was conducted at Health Sciences University Prof. Dr. Cemil Taşcıoğlu Hospital between April 1, 2025, and July 1, 2025, with a total of 340 participants, 60.3% (n = 205) female and 39.7% (n = 135) male. The ages of the participants ranged from 10 to 18, with a mean of 14.74 ± 1.71. Data were collected through voluntary face-to-face surveys administered to participants. The survey was offered to all patients within this age range who attended the clinic for non-emergency reasons, regardless of diagnosis, provided they met the inclusion criteria. Participation was voluntary and anonymous. Adolescents who had a diagnosed psychiatric disorder, cognitive disability, or were currently receiving psychological treatment were excluded from the study to avoid confounding effects on anxiety measures. Parental consent and adolescent assent were obtained before participation.

Data Collection Tools

● **Personal information form**

Participants were asked about their sociodemographic characteristics and screen usage patterns.

● **Multi-Screen Addiction Scale**: The scale consists of three sections: excessive screen time (1–4), compulsive behavior (5–12), and loss of control (13–15), totaling 15 questions. Its validity and reliability in Turkish were examined by Sarıtepeci et al. in 2021. The questions are rated on a 5-point Likert scale, ranging from 1(never) to 5 (always).[9]

● **Beck Anxiety Inventory**

The Turkish validity and reliability study was conducted by Ulusoy et al. in 1998. It consists of 21 questions and is scored from 0 (not at all) to 3 (severely).[10]

Inclusion criteria:

- Aged 10–18 years
- Ability to read and understand the questionnaire
- Consent from parent/guardian and assent from adolescent

Exclusion criteria:

- Diagnosed psychiatric disorder
- Intellectual disability
- Current psychiatric or psychological treatment
- Incomplete questionnaires

Statistical Analyses

The NCSS (Number Cruncher Statistical System) 2020 Statistical Software (NCSS LLC, Kaysville, Utah, USA) program was used for statistical analyses. Quantitative variables were presented using mean, standard deviation, median, minimum, and maximum values, while qualitative variables were presented using descriptive statistical methods such as frequency and percentage. Skewness and kurtosis values and box plots were used to assess normality of data distribution. For quantitative two-group comparisons with normal distribution, the Student t-test was used for comparisons of three or more groups, the One-Way ANOVA test was used for comparisons of three or more groups, and the Bonferroni test was used to identify the group causing the difference. For comparisons of three or more groups with non-normal distribution, the Kruskal-Wallis test was used, and the Dunn test was used to identify the group causing the difference. Pearson or Spearman's correlation analysis was used to assess the relationships between variables, depending on the distribution. The results were evaluated at a 95% confidence interval, and significance was assessed at $p < 0.05$.

Results

Sociodemographic characteristics of the participants

The study was conducted between April 1 and July 1, 2025, at Health Sciences University Prof. Dr. Cemil Taşcıoğlu Hospital with 340 participants, 60.3% (n = 205) girls and 39.7% (n = 135) boys. Participants were aged 10–18 years (mean 14.74 ± 1.71). When educational levels were examined, 89.7% (n = 305) of the participants were primary school graduates and 10.3% (n = 35) were high school graduates. The descriptive characteristics of the participants are presented in Table 1.

Table 1
Distribution of Descriptive Characteristics

		n (%)
Gender	**Girl**	205 (60,3)
	Boy	135 (39,7)
Age	*Mean ± SD*	14,74 ± 1,71
	Median (Min-Max)	15 (10–18)
Education Status	**Primary School**	305 (89,7)
	High School	35 (10,3)
Mother's Education Status	**Illiterate**	3 (0,9)
	Primary School	127 (37,4)
	High School	180 (52,9)
	University	30 (8,8)
Father's Education Status	**Illiterate**	0(0)
	Primary School	121 (35,6)
	High School	189 (55,6)
	University	30 (8,8)
Family Economic Status	**Low**	57 (16,8)
	Low-Medium	9 (2,6)
	Medium	190 (55,9)
	Medium-High	30 (8,8)
	High	54 (15,9)

Participants' Screen usage levels

Participants' total daily screen device usage averaged 6.07 ± 1.80 hours (ranging from 1–10 hours). Of the participants, 60.9% (n = 207) used smartphones most frequently during the day, 16.8% (n = 57) used computers, 16.2% (n = 55) used televisions, and 6.2% (n = 21) used tablets. Daily mobile phone use averaged 3.17 ± 1.75 hours (ranging from 0–9 hours). Daily computer use averaged 1.37 ± 1.56 hours (ranging from 0–6 hours). For individuals using tablets, daily tablet use averaged 0.32 ± 1.06 hours (ranging from 0–5 hours). Television watching time averaged 1.47 ± 1.45 hours (ranging from 0–7 hours) (Table 2).

Table 2
Distribution of Features Related to Display Devices

		n (%)
Daily most use screen device	**Smartphone**	207 (60,9)
	Computer	57 (16,8)
	Tablet	21 (6,2)
	Television	55 (16,2)
Total daily screen time (hours)	*Mean ± SD*	6,07 ± 1,80
	Median (Min-Max)	6 (1–10)
Daily smartphone use duration (hours)	*Mean ± SD*	3,17 ± 1,75
	Median (Min-Max)	3 (0–9)
Daily computer use duration (hours)	*Mean ± SD*	1,37 ± 1,56
	Median (Min-Max)	1 (0–6)
Daily tablet use duration (hours)	*Mean ± SD*	0,32 ± 1,06
	Median (Min-Max)	0 (0–5)
Daily television use duration (hours)	*Mean ± SD*	1,47 ± 1,45
	Median (Min-Max)	1 (0–7)

Evaluation of Multiple Screen Addiction Scale Scores

When the subscale scores of the Multi-Screen Addiction Scale were examined; it was seen that the mean score for the “Excessive Screen Time” subscale was 14.33 ± 2.61(range 6–20); the mean score for the “Compulsive Behaviors” subscale was 24.75 ± 4.58(range 12–40); the mean score for the “Loss of Control” subscale was 7.92 ± 1.92(range 3–15); and the total scale mean score was 47.01 ± 7.31(range 24–75)(Fig. 1). Internal consistency analysis revealed α = 0.721 for “Excessive Screen Time,” α = 0.786 for “Compulsive Behavior,” α = 0.628 for “Loss of Control,” and α = 0.832 for the total scale. These values indicate that the scale demonstrates good reliability.

A statistically significant positive correlation was found between daily total screen time and the "Excessive Screen Time" subscale ($r = 0.370$; $p < 0.001$), "Compulsive Behavior" subscale ($r = 0.263$; $p < 0.001$), and "Loss of Control" subscale ($r = 0.235$; $p < 0.001$) of the Multi-Screen Addiction Scale. A statistically significant positive correlation was also found between daily total screen time and the total Multi-Screen Addiction Scale score ($r = 0.359$; $p < 0.001$) (Fig. 2). Mobile phone use time showed statistically significant positive correlations with the "Excessive Screen Time" subscale ($r = 0.132$; $p < 0.05$), the "Compulsive Behavior" subscale ($r = 0.110$; $p < 0.05$), and the total Multi-Screen Addiction Scale score ($r = 0.107$; $p < 0.05$). A statistically significant positive correlation was found between computer use time and the "Loss of Control" subscale of the Multi-Screen Addiction Scale ($r = 0.164$; $p < 0.01$). Tablet use duration showed statistically significant positive correlations with the "Compulsive Behavior" subscale ($r = 0.125$; $p < 0.05$) and the total Multi-Screen Addiction Scale score ($r = 0.110$; $p < 0.05$) (Table 3).

Table 3
Relationship Between Multiple Screen Addiction Scale Scores and Age and Screen Time

		Excessive Screen Time	Compulsive behavior	Loss of control	Multiscreen Addicted Scale Total Point
Age	**R**	0,083	-0,067	-0,065	-0,030
	p	*0,128*	*0,215*	*0,235*	*0,585*
	95% CI	[-0.023, 0.188]	[-0.172, 0.040]	[-0.170, 0.042]	[-0.136, 0.076]
Total daily screen time	**R**	0,370	0,263	0,235	0,359
	p	**< 0,001****	**< 0,001****	**< 0,001****	**< 0,001****
	95%CI	**[0.276, 0.457]**	**[0.162, 0.358]**	**[0.133, 0.333]**	**[0.264, 0.448]**
Daily smartphone use duration	**R**	0,132	0,110	-0,034	0,107
	p	**0,015***	**0,042***	**0,527**	**0,048***
	95%CI	**[0.026, 0.235]**	**[0.004, 0.214]**	**[-0.140, 0.072]**	**[0.001, 0.211]**
Daily computer use duration	**r**	0,014	0,045	0,164	0,064
	p	**0,801**	**0,411**	**0,002****	**0,237**
	95%CI	**[-0.092, 0.120]**	**[-0.061, 0.150]**	**[0.059, 0.265]**	**[-0.042, 0.169]**
Daily tablet use duration	**r**	0,075	0,125	0,081	0,110
	p	**0,168**	**0,021***	**0,136**	**0,042***
	95%CI	**[-0.031, 0.180]**	**[0.019, 0.228]**	**[-0.025, 0.186]**	**[0.004, 0.214]**
Daily television use duration	**r**	0,070	0,129	0,131	0,141
	p	**0,195**	**0,017***	**0,016***	**0,009****
	95%CI	**[-0.036, 0.175]**	**[0.023, 0.232]**	**[0.025, 0.234]**	**[0.035, 0.244]**
r: Pearson's Correlation coefficient					
r: Spearman's Correlation coefficient					
***p < 0,01 *p < 0,05*					

The relationship between sociodemographic characteristics and multiscreen addiction

Gender

The "Excessive Screen Time," "Compulsive Behavior," and "Loss of Control" subscale scores of the Multi-Screen Addiction Scale, as well as the total Multi-Screen Addiction Scale scores, showed no statistically significant

difference between genders ($p > 0.05$) (Table 4).

Table 4
Comparison of Descriptive Characteristics of Multiple Screen Addiction Scale Scores

		Excessive Screen Time		Compulsive behavior		Loss of control		Multiscreen Addicted Scale Total Point	
		Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)
Gender	**Girl**	14,22 ± 2,62	15 (6–20)	24,41 ± 4,73	24 (12–40)	7,82 ± 1,81	8 (3–12)	46,46 ± 7,29	47 (24–61)
	Boy	14,50 ± 2,61	15 (6–20)	25,27 ± 4,31	24 (12–40)	8,07 ± 2,09	8 (3–15)	47,84 ± 7,29	47 (24–75)
	[a]p	**0,327**		**0,093**		**0,257**		**0,089**	
Education Status	**Primary School**	14,36 ± 2,63	15 (6–20)	25,01 ± 4,63	24 (12–40)	7,99 ± 1,93	8 (3–15)	47,35 ± 7,41	47 (24–75)
	High School	14,11 ± 2,51	15 (9–18)	22,54 ± 3,37	23 (17–28)	7,34 ± 1,81	7 (5–11)	44,00 ± 5,64	44 (32–52)
	[a]p	**0,603**		**0,002****		**0,061**		**0,010***	
Mother's Education Status	**Primary School**	14,87 ± 2,08	15 (10–19)	24,55 ± 3,57	24 (17–32)	7,78 ± 1,64	8 (3–12)	47,21 ± 5,17	47 (36–59)
	High School	14,27 ± 2,50	15 (7–20)	24,99 ± 4,62	24 (16–40)	8,06 ± 1,89	8 (3–14)	47,31 ± 7,03	47 (29–61)
	University	12,40 ± 4,12	13 (6–20)	24,20 ± 7,49	24,5 (12–40)	7,70 ± 3,02	6,5 (5–15)	44,30 ± 13,86	44,5 (24–75)
	[b]p	**0,002****		**0,602**		**0,381**		**0,513**	
Father's Education Status	**Primary School**	15,18 ± 2,17	15 (10–19)	24,92 ± 3,54	25 (17–32)	7,69 ± 1,71	8 (3–12)	47,79 ± 5,16	49 (36–59)
	High School	14,14 ± 2,35	14 (7–20)	24,64 ± 4,5	24 (16–40)	8,08 ± 1,81	8 (3–14)	46,87 ± 6,88	47 (29–61)
	University	12,10 ± 4,03	11,5 (6–20)	24,80 ± 7,85	25,5 (12–40)	7,80 ± 3,11	6,5 (5–15)	44,70 ± 14,11	44,5 (24–75)
	[b]p	**0,001****		**0,835**		**0,165**		**0,248**	

[a]Student t Test [b]One Way ANOVA test & Bonferroni test [c]Kruskal-Wallis & Dunn-Bonferroni Test ***p < 0,01 *p < 0,05*

		Excessive Screen Time		Compulsive behavior		Loss of control		Multiscreen Addicted Scale Total Point	
		Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)
Family Economic Status	**Low**	15,32 ± 1,61	15 (12–19)	25,11 ± 3,98	23 (20–34)	8,37 ± 1,19	8 (6–11)	48,79 ± 4,42	49 (43–59)
	Low-Medium	14,67 ± 4,44	16 (9–19)	26,00 ± 6,87	29 (17–32)	6,33 ± 2,50	8 (3–8)	47,00 ± 13,75	53 (29–59)
	Medium	14,22 ± 2,46	14,5 (7–20)	24,79 ± 4,42	24 (16–40)	7,89 ± 1,95	8 (3–14)	46,90 ± 6,81	47 (30–61)
	Medium-High	12,40 ± 2,77	13,5 (6–15)	22,60 ± 4,92	22,5 (12–32)	7,10 ± 1,73	6,5 (5–11)	42,10 ± 7,84	43 (24–55)
	High	14,72 ± 2,97	15 (8–20)	25,22 ± 4,89	25 (16–40)	8,28 ± 2,20	8 (5–15)	48,22 ± 8,66	48,5 (32–75)
	[c]p	**0,001****		**0,130**		**0,001****		**0,001****	
Daily most use screen device	**Smartphone**	14,13 ± 2,66	15 (7–20)	24,62 ± 4,75	24 (16–40)	7,75 ± 1,98	8 (3–14)	46,50 ± 7,44	46 (29–61)
	Computer	14,56 ± 1,76	15 (11–18)	24,70 ± 2,54	25 (20–30)	8,49 ± 1,35	8 (6–11)	47,75 ± 3,05	49 (43–56)
	Tablet	15,00 ± 1,73	16 (12–17)	25,57 ± 3,83	25 (20–32)	8,00 ± 1,73	8 (6–11)	48,57 ± 4,86	49 (39–55)
	Television	14,62 ± 3,32	16 (6–20)	24,98 ± 5,75	25 (12–40)	7,93 ± 2,2	8 (6–15)	47,53 ± 10,15	46 (24–75)
	[b]p	**0,158**		**0,753**		**0,085**		**0,187**	

[a]Student t Test [b]One Way ANOVA test & Bonferroni test [c]Kruskal-Wallis & Dunn-Bonferroni Test ***p < 0,01 *p < 0,05*

Education

The "Excessive Screen Time" and "Loss of Control" subscale scores of the Multi-Screen Addiction Scale did not show statistically significant differences between educational backgrounds (p > 0.05). Primary school graduates had statistically significantly higher "Compulsive Behavior" subscale scores and total Multi-Screen Addiction Scale scores than high school graduates (p = 0.002 and p = 0.010; respectively) (Table 4).

Mother’s Education

The "Excessive Screen Time" subscale scores of the Multi- Screen Addiction Scale showed statistically significant differences according to mothers' educational status ($p = 0.002$; $p < 0.01$). Participants whose mothers had primary school education or less had statistically significantly higher "Excessive Screen Time" subscale scores than participants whose mothers were university graduates ($p = 0.009$; $p < 0.01$) (Table 4).

Father's Education

The "Excessive Screen Time" subscale scores of the Multi- Addiction Scale showed statistically significant differences according to fathers' educational status ($p = 0.001$; $p < 0.01$). Participants whose fathers had primary school education had statistically significantly higher "Excessive Screen Time" subscale scores than participants whose fathers were high school or university graduates ($p = 0.001$ for both comparisons; $p < 0.01$). Additionally, participants whose fathers were high school graduates had higher "Excessive Screen Time" subscale scores than those whose fathers were university graduates ($p = 0.028$; $p < 0.05$) (Table 4).

Family Economic Status

There were statistically significant differences in the "Excessive Screen Time" subscale scores of the Multi-Screen Addiction Scale based on family economic status ($p = 0.001$). Participants with moderate-high family economic status had statistically significantly lower "Excessive Screen Time" subscale scores than those with low, low-moderate, moderate, and high family economic status ($p = 0.001$; $p = 0.006$; $p = 0.009$; and $p = 0.001$; respectively) (Table 4).

The "Loss of Control" subscale scores of the Multi-Screen Addiction Scale were statistically significantly different based on family economic status ($p = 0.001$). Participants with moderate-high family economic status had statistically significantly lower "Loss of Control" subscale scores than those with low and high family economic status ($p = 0.001$ and $p = 0.043$, respectively; $p < 0.05$) (Table 5). Total scores of the Multi-Screen Addiction Scale showed statistically significant differences according to family economic status ($p = 0.001$; $p < 0.01$). Participants with moderate-high family economic status were found to be statistically significantly lower than those with low, moderate, and high family economic status ($p = 0.001$; $p = 0.011$; $p = 0.002$) (Table 4).

Table 5
Comparison of Beck Anxiety Inventory Scores and Descriptive Characteristics

		Beck Anxiety Inventory Total Score		P
		Mean ± SD	Median (Min-Max)	
Gender	**Girl**	18,51 ± 13,55	14 (0–51)	**[a]0,003****
	Boy	14,45 ± 11,26	12 (0–47)	
Education Status	**Primary School**	17,01 ± 13,00	13 (0–51)	**[a]0,633**
	High School	15,91 ± 11,31	17 (0–37)	
Mother's Education Status	**Primary School**	20,27 ± 13,13	20 (3–51)	**[b]0,001****
	High School	15,96 ± 12,00	13 (0–47)	
	University	7,90 ± 11,24	3,5 (0–37)	
Father's Education Status	**Primary School**	17,91 ± 13,02	13 (2–51)	**[b]0,001****
	High School	18,15 ± 12,60	16 (0–47)	
	University	4,90 ± 5,43	3,5 (0–15)	
Family Economic Status	**Low**	22,95 ± 14,44	24 (2–47)	**[c]0,004****
	Low-Medium	18,33 ± 6,26	22 (10–23)	
	Medium	16,26 ± 12,33	13 (0–49)	
	Medium-High	15,70 ± 15,51	11 (0–51)	
	High	13,17 ± 9,79	13 (0–36)	
Daily most use screen device	**Smartphone**	15,51 ± 11,38	13 (0–51)	**[b]0,094**
	Computer	19,58 ± 13,08	15 (0–46)	
	Tablet	22,29 ± 19,28	13 (1–49)	
	Television	17,29 ± 14,04	13 (0–45)	

[a]Student t Test

[b]One Way ANOVA Test&Bonferroni Test

[c]Kruskal Wallis Test&Dunn Bonferroni Test

***p < 0,01*

Relationship between the results of the Multiscreen Addiction Scale and the Beck Anxiety Inventory

Total Beck Anxiety Inventory scores ranged from 0 to 51, with a mean of 16.90 ± 12.82 points. The internal consistency coefficient was α = 0.925, indicating that the scale has high internal consistency.

A statistically significant positive correlation was found between age and total Beck Anxiety Inventory scores ($r = 0.126$; $p = 0.020$). A statistically significant positive correlation was found between daily total screen time and Beck Anxiety Inventory scores ($r = 0.311$; $p < 0.001$). A statistically significant positive correlation was also found between daily computer use duration and total Beck Anxiety Inventory scores ($r = 0.136$; $p = 0.012$; $p < 0.05$).

Girls' total Beck Anxiety Inventory scores were statistically significantly higher than boys' ($p = 0.003$; $p < 0.01$). Beck Anxiety Inventory scores differed statistically significantly according to mothers' educational background ($p = 0.001$; $p < 0.01$). Participants whose mothers had primary school education or less had statistically significantly higher Beck Anxiety Inventory scores than those whose mothers had high school or university education ($p = 0.010$; $p = 0.001$; $p < 0.05$); and those whose mothers had high school education had statistically significantly higher scores than those whose mothers had university education ($p = 0.002$; $p < 0.01$) (Table 5).

Beck Anxiety Inventory scores differed statistically significantly according to fathers' educational background ($p = 0.001$). Participants whose fathers had university education had statistically significantly lower Beck Anxiety Inventory scores than those whose fathers had primary or high school education ($p = 0.001$). Beck Anxiety Inventory scores showed statistically significant differences according to family economic status ($p = 0.004$). Participants with low family economic status had statistically significantly higher Beck Anxiety Inventory scores than those with moderate or high family economic status ($p = 0.019$; $p = 0.006$) (Table 5).

A statistically significant positive correlation was determined between the Beck Anxiety Inventory total score and the Multi-Screen Addiction Scale total score ($r = 0.157$, $p = 0.004$, 95% CI = [0.051, 0.259]), as well as its subscales of excessive screen time ($r = 0.169$, $p = 0.002$) and compulsive behavior ($r = 0.116$, $p = 0.033$). However, no statistically significant relationship was found with the loss of control subscale ($r = 0.092$, $p = 0.089$, 95% CI = [-0.014, 0.196]). Notably, all observed significant correlations reflected small effect sizes ($r < 0.20$), with confidence intervals close to zero (Table 6).

Table 6

Relationship Between Multiple Screen Addiction Scale and Beck Anxiety Inventory Scores

			Beck Anxiety Inventory Total Score
Multiple Screen Addiction Scale	**Excessive screen time**	**r**	0,169
		CI	[0.064, 0.271]
		p	**0,002****
	Compulsive behavior	**r**	0,116
		CI	[0.010, 0.219]
		p	**0,033***
	Loss of Control	**R**	0,092
		CI	[-0.014, 0.196]
		p	**0,089**
	Multiscreen Addiction Scale Total Score	**r**	0,157
		CI	[0.051, 0.259]
		p	**0,004****

r: Pearson's correlation coefficient; CI: Confidence Interval.

*p < 0.01, *p < 0.05*

Multivariate Predictive Models for Multi-Screen Addiction and Anxiety

The regression analysis conducted to determine the relationships between descriptive characteristics, Beck Anxiety scores, and the Multi-Screen Addiction score was found to be statistically significant (F = 3.453; p = 0.001; p < 0.01). It is observed that there is a relationship between Multi-Screen Addiction scores and education level, mother's education level, father's education level, and Beck Anxiety scores. These variables account for 9.5% of the variance in Multi-Screen Addiction scores (R^2 = 0.095). When primary education is taken as the reference category, having a high school education level decreases Multi-Screen Addiction scores ($\beta = -0.142; p = 0.024; p < 0.05). Having a high school-educated mother increases Multi-Screen Addiction scores (β = 0.159; p = 0.039; p < 0.05). Having a high school-educated father decreases Multi-Screen Addiction scores (β = -0.168; p = 0.034; p < 0.05). A one-unit increase in Beck Anxiety scores increases Multi-Screen Addiction scores by 0.179 units (β = 0.179; p = 0.002; p < 0.01). No statistically significant relationship was found between age, gender, income levels, and Multi-Screen Addiction scores ($p > 0.05) (Table 7).

Table 7
Effects of Descriptive Characteristics and Beck Anxiety Scores on Multi-Screen Addiction Scores

Dependent Variable	Independent Variable	ß	t	p	F	Model (p)	R^2
Multi-Screen Addiction Score	Constant		10,819	**0,001****	3,453	**0,001****	0,095
	Age	0,018	0,268	**0,789**			
	Gender *(female)*	-0,097	-1,771	**0,077**			
	Education Level *(high school)*	-0,142	-2,273	**0,024***			
	Income Level *(middle)*	-0,055	-0,791	**0,429**			
	Income Level *(high)*	0,081	1,173	**0,242**			
	Mother's Education Level *(high school)*	0,159	2,068	**0,039***			
	Mother's Education Level *(university)*	-0,149	-1,233	**0,218**			
	Father's Education Level *(high school)*	-0,168	-2,131	**0,034***			
	Father's Education Level *(university)*	0,029	0,240	**0,810**			
	Beck Anxiety Score	0,179	3,051	**0,002****			

Discussion

This study contributes to existing literature by examining not only the relationship between screen use and anxiety, but also the specific construct of multiscreen addiction in relation to sociodemographic vulnerability. Unlike many previous studies that evaluate only total screen time, our findings emphasize that compulsive multiscreen behavior and loss of control are significantly associated with anxiety symptoms, suggesting that the problematic nature of screen use is as important as its duration.

A novel contribution of this study is the identification of parental education and socioeconomic status as protective or risk-modifying factors. Adolescents whose parents had higher educational levels and moderate-to-high socioeconomic status demonstrated significantly lower multiscreen addiction and anxiety scores. This suggests that family environment, access to structured activities, and parental monitoring may play protective roles. These findings are especially important for public health planners and school-based intervention programs, as they identify vulnerable populations that may benefit most from digital well-being and mental health initiatives.

The findings of this study indicate that screen addiction is high among adolescents and is significantly associated with anxiety. Participants' average daily screen time was found to be 6 hours, which is above the literature's estimates of 3–4 hours. The fact that smartphones are the most used device (60.9%) suggests that screen addiction is particularly shaped by mobile devices. Multi-Screen Addiction Scale results indicated high scores in the subscales of "excessive screen use," "compulsive behaviors," and "loss of control" in adolescents, and significant positive correlations were found between total screen time and addiction levels.

One of the striking findings of our study is that parental education level and family economic status play a decisive role in screen addiction. Adolescents whose mothers or fathers have a low education level had higher "excessive screen use" scores. Similarly, children from families with medium- to high-income families had lower screen addiction scores. This suggests that family environment and socioeconomic conditions have a significant impact on screen use habits.

Furthermore, findings obtained with the Beck Anxiety Inventory in our study indicate that anxiety levels in adolescents are closely related to screen addiction. The average anxiety score was 16.9, and female adolescents experienced significantly higher anxiety than males. Anxiety levels were observed to increase as total daily screen time and computer use increased. Significant positive correlations were found between the "excessive screen use" and "compulsive behaviors" subscales of the screen addiction scale and anxiety. These results demonstrate that screen addiction is not only a behavioral but also a psychological risk factor.

We acknowledge that both the Multi-Screen Addiction Scale (MSAS) and the Beck Anxiety Inventory (BAI) were initially validated in older or university samples. However, their utilization in this adolescent cohort was methodologically essential, as there are currently no alternative psychometric instruments specifically validated for Turkish adolescents that capture the multi-screen multi-tasking dimension or match the clinical precision of the BAI. To compensate for this structural limitation, we rigorously examined the psychometric integrity of both tools within our specific sample, confirming excellent internal consistency (alpha = 0.832 for MSAS and strong reliability for BAI), which justifies their cross-sectional deployment while indicating that future pediatric validation studies are warranted.

When assessing the direct link between multi-screen addiction and anxiety, our bivariate correlation analyses revealed statistically significant, yet notably weak relationships. According to Cohen’s effect size conventions, correlation values below 0.20 indicate small practical or clinical significance. This crucial finding suggests that although a baseline association exists, multi-screen addiction alone explains only a minimal fraction of the variance in adolescent anxiety. The statistical significance is heavily driven by our sample size rather than a robust clinical impact. Therefore, screen addiction should not be viewed as a standalone primary cause of adolescent anxiety, but rather as one of many interconnected digital lifestyle risk factors that warrants caution in clinical interpretations

Our multivariate approach provides critical insights into the distinct and overlapping roots of both digital addiction and psychological distress in adolescents. Interestingly, while gender played a significant role in predicting anxiety (with females showing higher vulnerability), it had no independent impact on multi-screen addiction. Conversely, lower family socioeconomic status emerged as a robust, shared risk factor that significantly predicts both higher multi-screen addiction and elevated anxiety levels. This suggests that financial constraints or lack of alternative recreational resources in lower-income households may inadvertently drive adolescents toward excessive, uncontrolled media multitasking across multiple screens, which subsequently compounds their psychological anxiety. Crucially, the persistence of the multi-screen addiction effect on anxiety even when fully adjusted for all socioeconomic and parental background factors confirms that digital dependence operates as an independent risk factor for adolescent mental health, rather than being a mere reflection of socio-demographic disadvantages.

Furthermore, the small to moderate effect sizes observed in our parallel regression models underscore a critical theoretical nuance that adolescent digital behaviors and mental health are inherently multifactorial. This indicates that neither screen dependency nor anxiety serves as a singular, overwhelming cause of the other. Instead, they operate within a broader, complex ecosystem of intersecting risk factors such as socioeconomic status, parental

dynamics, and underlying emotional vulnerabilities suggesting a mutually reinforcing cyclical relationship rather than a direct, linear causal pathway.

Sarıtepeci and colleagues examined multiple screen addiction and mobile social online gaming addiction among university students. They found that students exhibited high levels of multiple screen addiction, with significant differences found across subscales (excessive behavior, compulsive behavior, and loss of control) among some student profiles.[11] Similarly, our study revealed that the adolescent group exhibited high multiple screen addiction and subscale scores. Total screen time, and specifically mobile phone use, was found to influence multiple screen addiction scale and subscale scores.

A study by Cioffredi et al. found that average screen time was 3 to 4 hours per day, and 29% of adolescents reported mental health problems or high risk of comorbid depression and anxiety, along with risky substance use. The findings indicated that the risk of depression, severe anxiety, and substance use was significantly increased in relation to screen time.[12] Our study found that adolescents averaged 6 hours of screen time and found significant correlations between multiple screen addiction scales and subscales and the Beck Anxiety Inventory. We did not use a scale for depression and substance abuse, so we were unable to assess these domains.

Gökalp et al.'s study of 390 adolescents from various high schools in Türkiye showed that self-control was negatively associated with multiple screen addiction and procrastination. Furthermore, the findings indicated that multiple screen addiction mediated the relationship between self-control and procrastination.[13] Our study also found significant correlations between total screen time and loss of control.

In a study conducted by Shuaishuai on adolescents, it was found that physical activity affects adolescent Psychological Sub-Health (PSH), and Multi-Screen addiction is directly related to PSH.[14] We could not evaluate the physical activity of adolescents with multi-screen addiction because we did not use a scale or questionnaire in this area.

In a study conducted by Nahidi et al. among medical students in Iran, mild and severe mobile phone addiction were reported in 83.7% and 2.5% of students, respectively. Furthermore, the study findings revealed significantly higher sleep quality impairment, depression, and anxiety scores in students with severe mobile phone addiction compared to other participants.[15] In our study, 60.9% (n = 207) of the participants mostly used smartphones during the day, 16.8% (n = 57) computers, 16.2% (n = 55) televisions, and 6.2% (n = 21) tablets. There was a statistically significant correlation between multiscreen addiction and anxiety.

In a study conducted by Panneerselvam et al. in India with 400 medical students, it was observed that students' internet addiction was associated with quality of life and anxiety and stress problems, and that addiction was found at high prevalence rates among university students.[16] Similarly, our study found that screen addiction was prevalent among adolescents and was associated with anxiety.

In a study conducted by Figueredo et al. in Paraguay, mean smartphone use was 8.06 ± 3.81 hours in boys and 9.46 ± 4.4 hours in girls. Twenty-seven percent of participants reported moderate anxiety, and 36% reported severe anxiety, and smartphone misuse was reported to be closely associated with anxiety symptoms in the Paraguayan pediatric population.[17] In our study, the average daily screen device usage was 6 hours, with 60% of adolescents using smartphones, and this was associated with anxiety in adolescents.

In a study by Güner et al., it was determined that students' smartphone addiction was above the moderate level, the adolescent group was the highest risk group in terms of addiction, and smartphone addiction had an impact on nomophobia, self-control, and anxiety.[18] Our study also found that screen addiction was high in the adolescent group and was associated with compulsive behavior, loss of control, and anxiety.

In a study by Buctot et al. conducted in the Philippines, 99.5% of participants reported nomophobia (fear of being away from their mobile phones) and 62.6% reported smartphone addiction. They found that nomophobia and smartphone addiction were associated with stress in adolescents.[19] Similarly, we observed that 60% of adolescents were addicted to their phones, and that this was associated with anxiety and stress.

In a study by, 25.9% of participants were addicted to their smartphones, and a high positive correlation was found between smartphone usage time and smartphone addiction scores. The smartphone addiction scale was positively correlated with anxiety and social appearance anxiety scores, but not with depression.[20] Our study also observed that multiple screen use, particularly computer use, was positively correlated with Beck Anxiety Inventory scores.

In a study by Prashanthi et al. conducted in India, it was reported that 41.5% of medical students had decreased sleep quality, with Beck Anxiety Inventory scores indicating mild anxiety in 29%, moderate anxiety in 17%, and severe anxiety in 8%. A significant positive correlation was found between sleep quality and anxiety scores.[21] In our study, we also found significant correlations between screen addiction and Beck Anxiety Inventory scores.

The COMPASS study by Mougharbel et al., which examined Canadian high school students, found significant associations between time spent on each type of screen and subsequent symptoms of anxiety and depression. In adolescents, greater screen time was longitudinally associated with higher symptoms of anxiety and depression at a one-year follow-up.[22] Similarly, increased screen time has been shown to be associated with anxiety.

In the Li et al study of preschool children and their parents, and it was determined that parental screen addiction can directly and indirectly affect children's screen addiction through parental anxiety and the parent-child relationship.[23] In a meta-analysis covering the past five years, Mougharbel et al. examined higher levels of screen time as being associated with more severe depressive symptoms. The associations between screen time and anxiety were inconsistent and gender-specific. They noted that social media use was associated with poorer mental health, and that higher screen time was generally associated with worse mental health outcomes, although these associations were influenced by factors such as screen type, gender, and age.[24] In our study, we observed that anxiety scores were higher in girls. We observed that anxiety levels were related to the education level of the mother and father, and the family's economic status.

Conclusion

This study revealed that screen addiction is significantly associated with anxiety in children and adolescents. Gender and age, however, do not significantly affect screen addiction. The findings demonstrate the importance of considering psychological factors, particularly anxiety levels, in interventions aimed at reducing screen addiction. Multivariate and longitudinal studies are recommended to examine the factors associated with screen addiction from a broader perspective.

Implications and Contribution Summary

This study demonstrates that excessive screen exposure is significantly associated with multiscreen addiction and elevated anxiety symptoms among adolescents. Findings highlight the influence of parental education and socioeconomic status on these outcomes. The results emphasize the need for targeted interventions to promote healthy screen use and protect adolescent mental health.

Limitations of the Study

This study has several limitations that should be considered when interpreting the results. First, the study was conducted at a single center, which may limit the generalizability of the findings to other populations or regions. Second, the data were collected through self-reported questionnaires, which may be subject to reporting bias, social desirability bias, or inaccurate recall, particularly in estimating screen time and anxiety levels. Third, the cross-sectional design of the study prevents the establishment of causal relationships between screen addiction and anxiety. Additionally, other potential confounding factors such as sleep patterns, physical activity, peer relationships, and parental monitoring were not assessed, which may have influenced the results. Lastly, although the sample size was adequate, the imbalance in the educational levels and socioeconomic status of participants' families may have introduced additional bias into the findings.

Furthermore, although the newly introduced parallel multiple linear regression models successfully controlled for key sociodemographic confounders including adolescent age, gender, maternal and paternal education levels, and family socioeconomic status (SES) the retrospective and cross-sectional nature of this study prevented the inclusion of other critical behavioral and environmental variables. Specifically, proximal lifestyle and systemic factors such as sleep duration, objective sleep quality, daily physical activity levels, peer relationship dynamics, family conflict, and parental digital monitoring were not measured. Because these unmeasured variables could actively confound or partially mediate the observed relationship between multi-screen addiction and adolescent anxiety, their omission restricts our capacity to isolate pure independent effects. Future prospective and longitudinal studies should systematically incorporate these behavioral and familial covariates to map a more comprehensive and ecologically valid predictive model of adolescent digital mental health.

Additionally, because both the predictor and outcome variables were evaluated using self-report measures, the study is vulnerable to common-method bias, as well as participants' recall and social desirability biases; to mitigate this limitation, future prospective research should complement psychometric scales with objective, device-logged tracking data such as iOS Screen Time or Android Digital Wellbeing.

Abbreviations

BAI
Beck Anxiety Inventory
MSAS
Multi-Screen Addiction Scale
SD
Standard Deviation
SES
Socioeconomic Status.

Declarations

Ethics approval and consent to participate: Ethics committee approval was granted by the Clinical Research Ethics Committee of University of Health Sciences, Prof. Dr. Cemil Taşcıoğlu City Hospital (Approval date: March 26, 2025; Approval number: 111). Written informed parental/guardian consent and adolescent assent were obtained from all participants prior to their inclusion in the study.

Consent for publication: Not applicable.

Availability of data and materials: The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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Authors' contributions:Concept: E.G., B.A.; **Design:** E.G., B.A.; **Supervision:** H.D., V.A.; **Materials:** E.G., B.A., E.G.Ö.Y., F.A.Ö., D.M.I., N.S., S.K., M.Ö., H.Y.Ö., M.O.; **Data collection:** E.G., B.A., E.G.Ö.Y., F.A.Ö., D.M.I., N.S., S.K., M.Ö., H.Y.Ö., M.O.; **Analysis:** E.G.; **Literature search:** E.G.; **Writing:** E.G.; **Critical review:** H.D., V.A.

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Figures

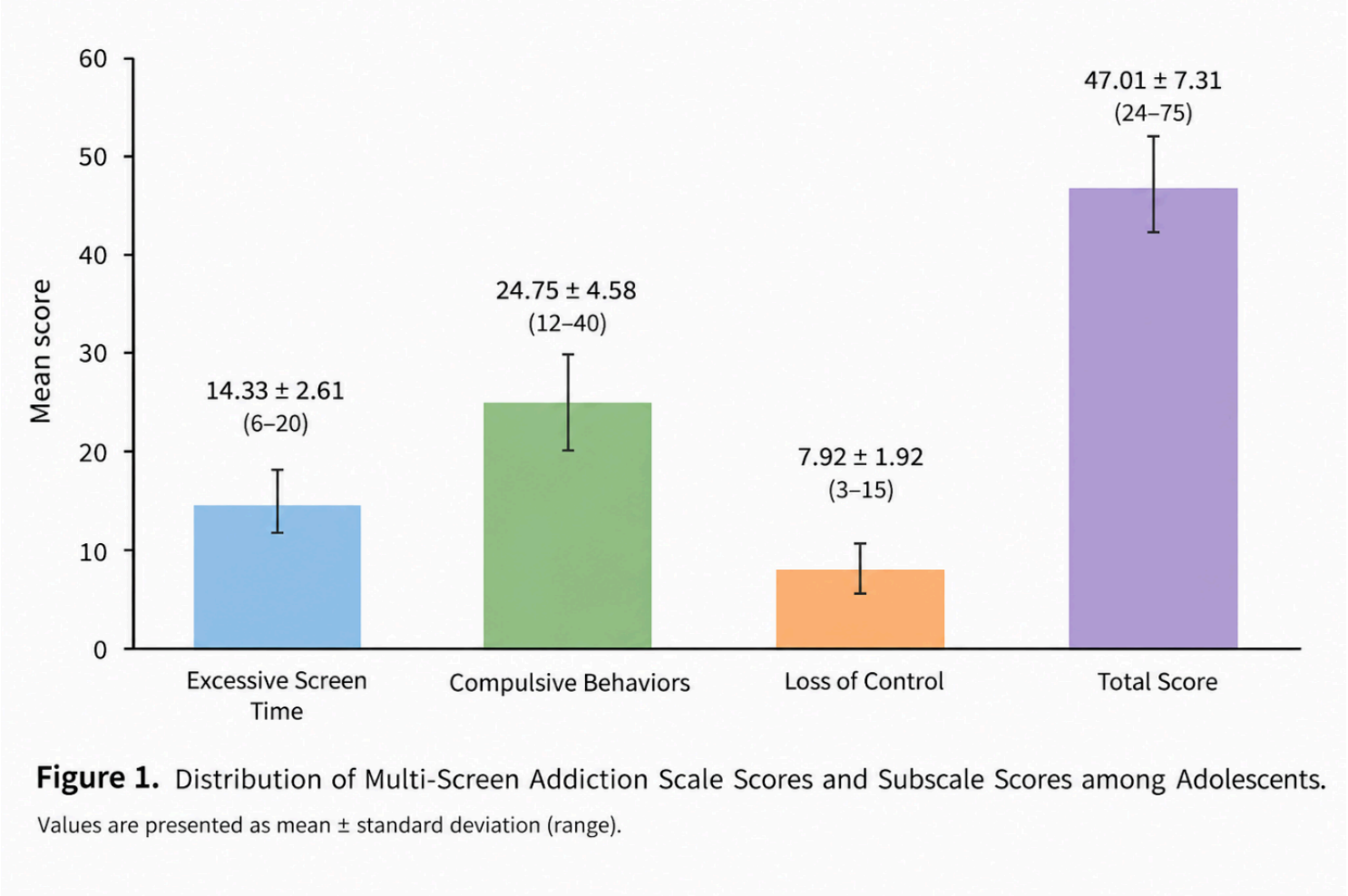


Figure 1. Distribution of Multi-Screen Addiction Scale Scores and Subscale Scores among Adolescents.

Values are presented as mean ± standard deviation (range).

Figure 1

See image above for figure legend.

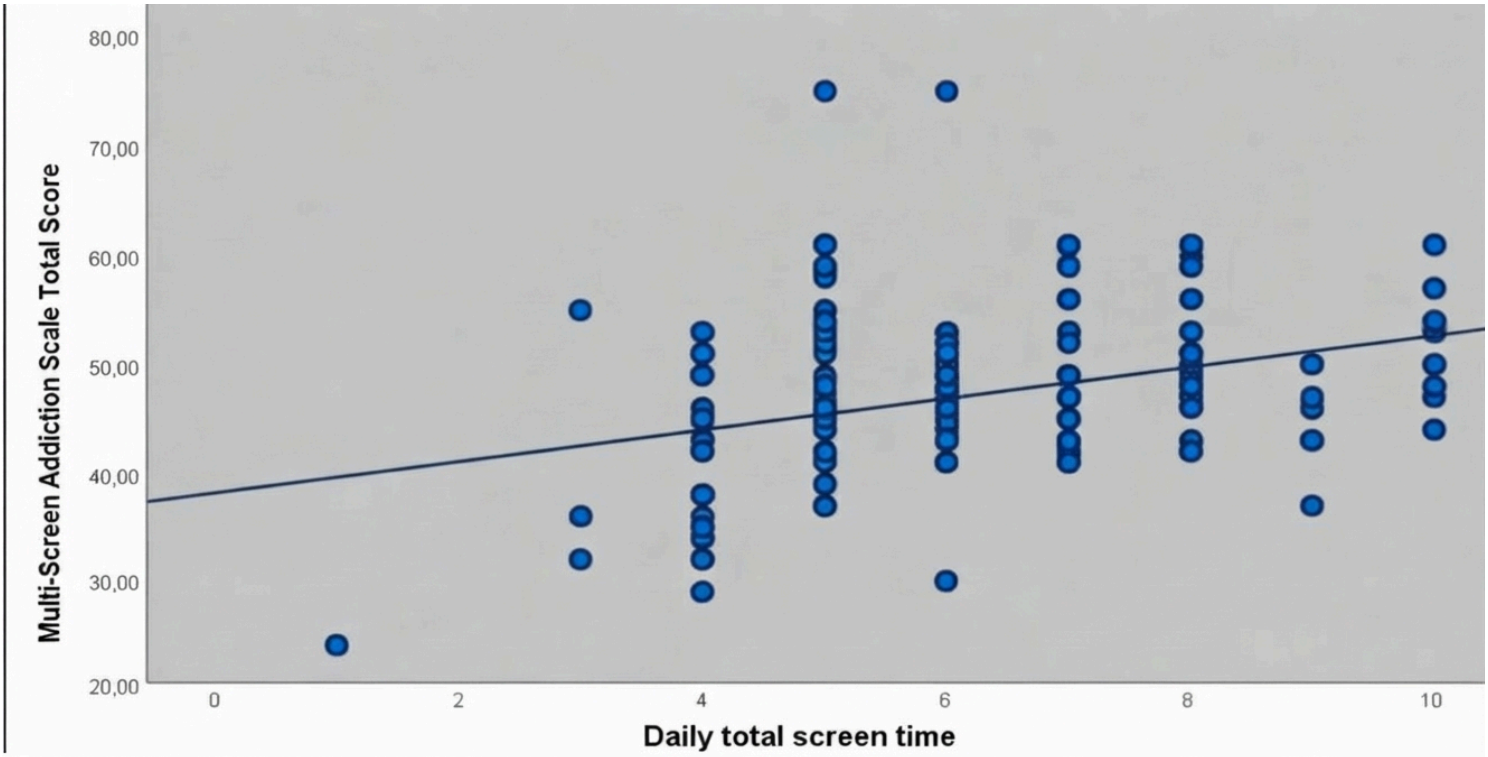


Figure 2. Relationship between total daily screen time and multi screen addiction scale total score

Figure 2

See image above for figure legend.