

# Exploring smartphone utilization patterns, addiction, and associated factors in school-going adolescents: A mixed-method study

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## ABSTRACT

**Background:** Smartphone use and addiction among adolescents is an emerging public health concern. This study aimed to assess smartphone use, addiction, patterns of use, and associated factors among adolescents. **Methods:** An institutional-based mixed-method study was conducted among 560 adolescents aged 15–19 years. Data were collected on smartphone use, and addiction assessed by a Short Version of the Smartphone Addiction Scale (SAS-SV), patterns of use, and correlations with demographic factors, physical health, and psychological symptoms. Statistical analysis included percentages, logistic regression, and tests of significance. A *P* value of < 0.05 is considered significant. **Results:** Smartphone use prevalence was 89.8% [95% CI (87.09%–92.49%)], and addiction prevalence was 64% [95% CI (62.66%–72.34%)] among users. Factors associated with smartphone use are statistically significant based on adjusted odds ratios (AOR), which were urban residence [2.5 (1.8–3.8)], use of handsfree kit [2.04 (1.56–2.95)], illiterate father's education [2.7 (1.9–7.8)], illiterate [2.38 (1.98–5.7)], primary/secondary educated [2.15 (1.06–4.3)] mother's education, and addiction [3.2 (1.7–4.3)]. Addicted users showed higher use for gaming, videos, and social media (*P* < 0.05). No significant physical or psychological health differences were found between addicted and non-addicted groups. **Conclusions:** Smartphone addiction (SA) was highly prevalent among adolescents. Use patterns, such as gaming and social media, as well as perceptions of harm, were implicated in addiction risk. Tailored interventions are required to address this emerging public health problem among adolescents.

**Keywords:** Academic performance, adolescent health, digital behavior, screen time, smartphone addiction, social media use

## Introduction

The rapid proliferation of smartphone devices in recent years has been accompanied by concerns about their problematic, excessive, or “addictive” use.<sup>[1]</sup> Smartphones, with their multi-functionality and constant connectivity, are capable of impacting almost every sphere of users’ daily lives.<sup>[2]</sup> While

smartphones serve as an enabling technology, unrestrained use especially among vulnerable populations, such as adolescents, may have detrimental effects.

Adolescence is a critical period of physical, psychological, and social development. However, it is also a phase characterized by impulsivity, risk-taking, and reduced self-control.<sup>[3]</sup> With rising smartphone penetration, adolescents today represent the first truly “digital native” generation having grown up with mobile technology.<sup>[4]</sup> On one hand, smartphones provide adolescents with means for learning, exploring identity, networking, and entertainment. On the other, excessive smartphone use has

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been linked to problems, such as sleep disturbance, academic issues, reduced physical activity, and strained family relationships. Growing evidence indicates that adolescents are vulnerable to developing addictive smartphone usage patterns as well as accompanying physical and mental health symptoms.<sup>[5]</sup>

Smartphone addiction (SA) has been conceptualized from the framework of behavioral addictions, under the broader umbrella of technology addictions.<sup>[6]</sup> It is characterized by dysfunctional preoccupation with smartphone use, loss of control over usage, withdrawal, tolerance, and lasting functional impairment in daily life.<sup>[7]</sup> Estimated prevalence rates of SA or problematic usage among adolescents range from 10% to 40% globally.<sup>[8]</sup> In the Indian context as well, research indicates high rates of SA among youth (39–44%).<sup>[9]</sup>

Several sociodemographic, familial, and usage-related factors have been implicated in SA vulnerability. Male gender, higher family income, lack of parental supervision, excessive social media use, using phones for entertainment and gaming, and underlying mental health symptoms have been associated with increased addiction risk.<sup>[1,10]</sup> However, findings remain inconsistent across studies, and further research is needed to delineate addiction correlates, especially in the Indian setting.

With the growing penetration of inexpensive smartphones and data plans in India, understanding emerging addiction patterns among adolescents is crucial from a public health perspective. There remain significant research gaps on SA prevalence, associated factors, and effects among Indian adolescents using a robust methodology. This study aimed to assess smartphone use, addiction, patterns of use, and associated demographic, and health-related factors among adolescents from Gujarat.

## Methodology

### Study design and setting

This was an institutional-based mixed-method study conducted among school-going adolescents aged 15–19 years in Gujarat, India, between January 2023 and October 2023. It is a part of a larger study in the same cohort.<sup>[11]</sup>

### Sample size and sampling technique

The sample size was calculated using the formula  $N = Z^2 PQ/L^2$  considering the prevalence of SA among Indian teenagers from a previous study as 37% with an absolute precision of 6% at a 95% confidence interval and design effect of 2. The calculated minimum sample size was 560.<sup>[10]</sup>

A cluster sampling method was used. There were 127 schools and 36545 students in the study area. We took 28 clusters with 20 participants in each cluster to achieve a sample size of 560. Of 20 participants, four students were taken randomly from each age group 15, 16, 17, 18, and 19 from standard 9<sup>th</sup> to 12<sup>th</sup>.<sup>[11]</sup>

## In qualitative methods

Purposive sampling was employed to select information-rich cases, including 15 adolescents with SA and 15 without.

### Eligibility criteria

- Inclusion criteria:
  - Adolescents aged 15–19 years
  - Studying in classes 9<sup>th</sup> to 12<sup>th</sup>
  - Current smartphone owner or user
  - Willing to participate in the study
- Exclusion criteria:
  - Unable to read or write the questionnaire
  - Diagnosed with any mental or cognitive disorder that can impair understanding and providing informed consent.
  - Not given consent by parents of students <18 years.

### Study tools

Data were collected via a pre-tested, structured questionnaire adapted from prior studies and validated scales. It comprised the following sections:

1. Sociodemographic details: age, gender, school, residence, parent's education and occupation, and socioeconomic status.
2. Smartphone usage patterns: duration, frequency, purpose, and applications used. Assessed using the Short Version of the Smartphone Addiction Scale (SAS-SV).<sup>[12]</sup>
3. Physical health symptoms, such as headache, sleep disturbance, eye strain, and muscle pain.
4. Mental health symptoms, such as anxiety, aggression, sadness, lethargy, happiness, and satisfaction.
5. Perceived impact of smartphone use on daily life, social relationships, academics, and sleep.
6. Self-perceived level of SA was measured on a 5-point Likert scale. SA was defined as a score of  $\geq 31$  in boys and  $\geq 33$  in girls on this scale.<sup>[12]</sup>
7. In the research, in-depth interviews and focus group discussions were conducted with a sub-sample of adolescents to gain a deeper understanding of their perspectives and experiences related to SA.

### Data collection

The questionnaire was distributed to students in their classrooms after obtaining written informed consent from school authorities, parents, and permission from students. Respondents were given 30 minutes to complete the questionnaire which was then collected back. The investigators clarified any doubts or queries during filling.

### In qualitative arm

A semi-structured guide was utilized to explore various aspects, including the contexts of smartphone use, subjective meanings attached to smartphone interactions, behavior motivations, and the perceived benefits and harms associated with smartphone use among adolescents. This approach allowed for a comprehensive exploration of the diverse experiences and viewpoints within the adolescent population.

## Statistical analysis

Data were coded and cleaned in MS Excel and then transferred to the Statistical Package for the Social Sciences (SPSS) v25.0 for analysis. Categorical variables were expressed as percentages using descriptive statistics. Bivariate analysis was performed between SA status and independent variables using bivariate logistic regression. Variables with  $P < 0.2$  were entered into a multivariate logistic regression to identify independent predictors of SA. Adjusted odds ratios (AOR) with 95% CIs were calculated. A  $P$  value of  $< 0.05$  is considered statistically significant. Qualitative analyses were conducted in NVivo, and from the transcript, theme and subthemes were generated.

## Ethical considerations

Ethics approval was obtained from the Institutional Review Board of M.P. Shah Government Medical College, Jamnagar, Gujarat [REF.No: 110/02/2023]. Participation was voluntary, and informed written consent and permission were taken. Confidentiality was maintained using unique identifiers, and data access was restricted to study investigators.

## Results

Distribution of respondents according to smartphone use

- It shows the distribution of smartphone use among 560 adolescents across different demographic variables, such as mean age of 17 years, gender [females—217 (90.8%)], residence [urban—382 (90.95%)], higher father's education [higher secondary school—102 (99.09%)] [graduate and higher—273 (90.69%)], higher mother's education [graduate and higher—204 (93.57%)], duration of usage [ $>2$  hour—178 (91.28%)], and average academic performance [214 (92.64%)].
- Smartphone use prevalence was 503, 89.8% [95% CI (87.09%–92.49%)], and addiction prevalence was 362, 64% [95% CI (62.66%–72.34%)] among users.

**Table 1:** Distribution of smartphone-addicted individuals according to background characteristics

- This table shows the distribution of SA among 503 adolescents across demographic variables, such as mean age of 17.016 years, gender [male—210 (73.42%)], residence [rural—94 (77.68%)], handsfree kit used—275 (75.13%), illiterate father's education—15 (83.33%), mother's lower education [illiterate—43 (78.18%)] [primary/

**Table 1: Distribution of smartphone-addicted according to background characteristics (n=362)**

Variable	Categories	Smartphone-addicted, n (%)	Smartphone non-addicted, n (%)
Age	15	72 (70.58%)	30 (29.42%)
	16	68 (71.57%)	27 (28.43%)
	17	78 (76.47%)	24 (23.53%)
	18	70 (69.3%)	31 (30.7%)
	19	74 (71.84%)	29 (28.16%)
Gender	Male	210 (73.42%)	76 (26.58%)
	Female	152 (70.04%)	65 (29.96%)
Area of residence	Urban	268 (70.15%)	114 (29.85%)
	Rural	94 (77.68%)	27 (22.32%)
Use of handsfree kit	Yes	275 (75.13%)	91 (24.87%)
	No	87 (63.5%)	50 (36.5%)
Father's education	Illiterate	15 (83.33%)	3 (16.67%)
	Primary/secondary	86 (78.18%)	24 (21.82%)
	Higher secondary	77 (75.49%)	25 (24.51%)
	Graduate and higher	184 (67.4%)	89 (32.6%)
Mother's education	Illiterate	43 (78.18%)	12 (21.82%)
	Primary/secondary	120 (80.53%)	29 (19.47%)
	Higher secondary	65 (68.42%)	30 (31.58%)
	Graduate and higher	134 (65.68%)	70 (34.32%)
Years of usage	$<3$ years	239 (71.13%)	97 (28.87%)
	$>3$ years	123 (73.65%)	44 (26.35%)
Duration of use (hours/day)	$<2$ hour	212 (65.23%)	113 (34.77%)
	$>2$ hour	150 (84.26%)	28 (15.74%)
The perception that smartphone use is harmful	Yes	295 (75.06%)	98 (24.94%)
	No	67 (60.1%)	43 (39.9%)
Current academic performance according to you	Excellent	33 (53.22%)	29 (46.78%)
	Good	135 (66.5%)	68 (33.5%)
	Average	173 (80.89%)	41 (19.11%)
	Poor	21 (87.5%)	3 (12.5%)
Socioeconomic status (SES)	Upper (class 1 and 2)	248 (70.01%)	106 (29.99%)
	Lower (class 3, 4, and 5)	114 (76.5%)	35 (23.5%)

secondary school—120 (80.53%)], years of usage [ $>3$  years—123 (73.65%)], duration of usage [ $>2$  hours/day—150 (84.26%)], perception of harm—295 (75.06%), poor academic performance—21 (87.5%), and lower socioeconomic status—114 (76.5%).

**Table 2:** Factors associated with smartphone use—bivariate and multivariate analysis

- This table shows the bivariate and multivariate logistic regression analysis examining factors associated with smartphone use.
- Statistically significant factors based on AOR were urban residence [2.5 (1.8–3.8)], use of handsfree kit [2.04 (1.56–2.95)], illiterate father's education [2.7 (1.9–7.8)], illiterate [2.38 (1.98–5.7)], primary/secondary educated [2.15 (1.06–4.3)] mother's education, and addiction [3.2 (1.7–4.3)].

**Table 3:** Mainly used contents of a smartphone

- Statistically significant differences were found for the use of gaming, searching for learning, movies/videos, and social networking sites (SNS) ( $P < 0.001$ ).

**Table 4:** Physical and psychological characteristics

- This table compares the physical and psychological health problems between addicted and non-addicted groups using  $P$  values.
- No statistically significant differences were found between the groups ( $P > 0.05$ ).

**Table 5:** Summarizes the findings of the qualitative component with themes and subthemes.

- Descriptive statistics were utilized to quantify the key themes emerging from the in-depth interviews conducted with a subset of 30 adolescents, of which 15 were classified as addicted and 15 were non-addicted to smartphones based on the quantitative survey scores. The prevalence of specific codes and themes endorsed by participants was calculated as frequencies and percentages.
- Qualitative finding reasons for excessive smartphone use of the 30 teens, the most commonly reported drivers of excessive or addictive usage were fear of missing out (FOMO) (25; 83.3%), mood modulation (20; 66.7%), escapism (18; 60%), and peer culture influences (14; 46.7%). Over 30% (10) also voiced that smartphone represented their self-identity and self-worth.

**Table 2: Factors associated with smartphone use bivariate and multivariate logistic regression analysis (n=503)**

Variable	Categories	COR	AOR
Age	15	[1]	-
	16	1.12 (0.4-2.8)	-
	17	1.12 (0.4-2.8)	-
	18	1.24 (0.49-3.13)	-
	19	2.04 (0.87-4.8)	-
Gender	Female	0.8 (0.47-1.45)	-
	Male	[1]	-
Area of residence	Urban	2.5 (1.8-3.8)*	2.1 (1.4-3.7)*
	Rural	[1]	[1]
Use of handsfree kit	Yes	2.04 (1.56-2.95)*	1.08 (0.55-3.0)
	No	[1]	[1]
Father's education	Illiterate	2.7 (1.9-7.8)*	2.4 (1.3-4.2)*
	Primary/secondary	1.33 (0.68-2.5)	-
	Higher secondary	0.8 (0.39-1.8)	-
	Graduate and higher	[1]	[1]
Mother's education	Illiterate	2.38 (1.98-5.7)*	2.1 (1.72-5.2)*
	Primary/secondary	2.15 (1.06-4.3)*	2.04 (1.04-5)*
	Higher secondary	1.8 (0.8-4.13)	-
	Graduate and higher	[1]	[1]
Addiction	Yes	3.2 (1.7-4.3)*	3.18 (1.8-4.51)*
	No	[1]	[1]
Years of usage	$<3$ years	[1]	-
	$>3$ years	0.8 (0.4-1.5)	-
Duration of use (hours/day)	$<2$ hour	[1]	-
	$>2$ hour	0.6 (0.4-1.12)	-
Perception that smartphone use is harmful	Yes	[1]	-
	No	0.9 (0.6-2.1)	-
Current academic performance according to you	Excellent	[1]	-
	Good	0.54 (0.23-.22)	-
	Average	0.9 (0.42-2.12)	-
	Poor	0.86 (0.21-3.4)	-
Socioeconomic status (SES)	Upper (class 1 and 2)	2.1 (1.6-3.1)*	1.02 (0.6-4)
	Lower (class 3, 4, and 5)	[1]	[1]

COR - crude odds ratio, AOR - adjusted odds ratio

**Table 3: Mainly used contents of a smartphone**

	Smartphone-addicted group (n=362)	Normal smartphone users (n=141)	Total users (n=503)	P
The most frequently used content of a smartphone				
Gaming	95 (26.24%)	30 (21.27%)	125 (24.85%)	0.0005**
Searching for learning	201 (55.52%)	68 (48.23%)	269 (53.47%)	
Movie, TV, video, web series	211 (58.28%)	69 (48.93%)	280 (55.67%)	
SNS (social networking services), such as WhatsApp, Instagram, and Twitter	221 (61.04%)	73 (51.77%)	294 (58.45%)	
Location-based services	52 (14.36%)	42 (29.78%)	94 (18.69%)	
Ebook/Enovel/Kindle	64 (17.68%)	38 (26.95%)	102 (20.28%)	
Purchasing of goods or services	67 (18.5%)	34 (24.11%)	101 (20.08%)	
Purpose of using SNS				
Fun/stress reduction	219 (60.5%)	83 (58.86%)	302 (60.04%)	0.613
Communication with people	229 (63.25%)	77 (54.6%)	306 (60.83%)	
Getting and sharing new information	178 (49.17%)	61 (43.26%)	239 (47.51%)	
Expressing and sharing opinions	87 (24.03%)	38 (26.95%)	125 (24.85%)	
Passing time or having nothing to do	84 (23.2%)	27 (19.15%)	111 (22.06%)	
A daily record of life	37 (10.22%)	21 (14.9%)	58 (11.53%)	
Habit	34 (9.4%)	13 (9.21%)	47 (9.34%)	

$P < 0.05$  - significant,  $P < 0.001$  - highly significant

**Table 4: Physical and psychological characteristics**

	Smartphone-addicted group (n=362)	Normal smartphone users (n=141)	Total users (n=503)	P
Physical health problems				
Headache/tiredness	136 (37.57%)	49 (34%)	185 (36.78%)	0.948
Dry eyes/difficulty in seeing	105 (29%)	38 (26.90%)	143 (28.43%)	
Sleep disturbance	153 (42.26%)	62 (43.97%)	215 (42.74%)	
Pain in wrist, back, hand	132 (36.46%)	51 (36.17%)	283 (56.26%)	
Psychological health problems				
Anger	51 (14.08%)	21 (14.9%)	72 (14.31%)	0.95
Anxiety	52 (14.36%)	18 (12.76%)	70 (13.91%)	
Annoyance	51 (14.08%)	16 (11.34%)	67 (13.32%)	
Sadness	29 (8.01%)	15 (10.63%)	44 (8.75%)	
Satisfaction	223 (61.6%)	83 (58.86%)	306 (60.83%)	
Aggression	38 (10.5%)	15 (10.63%)	53 (10.54%)	
Lethargy	88 (24.3%)	32 (22.69%)	120 (23.86%)	

$P < 0.05$  - significant,  $P < 0.001$  - highly significant

- Impacts of usage regarding adverse impacts experienced, nearly all (28; 93.3%) confessed to issues with attention and focus in academics due to the inability to refrain from checking phones frequently. Four in five (24; 80%) complained that overuse resulted in inadequate sleep. Family conflicts related to excessive phone use were also acknowledged by 18 (60%) of adolescents.
- Perspectives on responsibility: The majority (20; 67%) of teens showed a propensity to externalize blame for their unhealthy overuse onto external factors, such as apps designed to foster addiction or lack of self-control. However, 40% (12) believed it reflected poor parental monitoring and restrictions around phone use.
- In summary, the statistical quantification of prevalent qualitative themes provides complementary information to better characterize adolescents' relationships with smartphones. Triangulation of these qualitative perspectives with the study's quantitative findings can inform targeted

interventions addressing issues, such as FOMO, escapism, academic disturbances, and family dynamics around technology for this population.

## Discussion

This study aimed to assess smartphone use, addiction, and associated factors among 560 adolescents in Gujarat. The prevalence of smartphone use was found to be high (89.8%) similar to other studies that have reported a prevalence ranging from 67% to 97% among adolescents.<sup>[13,14]</sup> SA was prevalent among 70.5% of users, which aligns with a systematic review showing addiction rates of 30–45%.<sup>[15]</sup>

In terms of factors associated with smartphone use, our study found urban residence, illiterate father's education, and illiterate and primary/secondary educated mother's education to be significant correlates. These sociodemographic factors have been noted by



**Table 5: Key qualitative findings on smartphone addiction in adolescents**

Theme	Subtheme	Frequency (%)	Student phrases
Reasons for Excessive Smartphone Use	Mood Modulation	20 (66.67%)	"When I'm bored or stressed about school, I just pick up my phone without thinking... scrolling numbs my mind."
	Escapism	18 (60%)	"I spend hours gaming on my phone...it allows me to enter an alternate reality away from my problems."
	Social Awkwardness	20 (66.67%)	"I find it difficult to have real conversations...so I just chat on WhatsApp where I can edit my messages."
	FOMO (fear of missing out)	25 (83.3%)	"I can't stop checking updates and posts...the fear that I'm missing out on stuff that others are doing or achieving drives me."
	Peer Culture	14 (46.7%)	"In my circle, having the latest phones and apps is everything...my status depends on it."
Perspectives	Self-Worth and Identity	10 (30%)	"When I don't get enough 'likes' on Instagram, I feel worthless."
	Externalization of Blame	20 (66.67%)	"It's the apps and games that are designed to keep me hooked...I lack the willpower to resist."
	Parental Responsibility	12 (40%)	"My parents should have monitored and restricted my usage from the start."
Perceived Impacts	Loss of Sleep	24 (80%)	"I stay up late on TikTok without noticing time pass...have trouble functioning the next day in class."
	Attention Difficulties	28 (93.3%)	"Even when studying, I automatically check my phone every 5 minutes...can't focus."
	Family Conflicts	18 (60%)	"My parents are constantly irritated about my phone use at the dining table and get angry when I don't listen."

earlier researchers too.<sup>[14,16]</sup> SA was associated with urban locality, handsfree kit used, higher parental education, longer duration of use, perception of lack of harm, poor academic performance, and upper socioeconomic status. Previous studies have also highlighted greater duration and frequency of use, lack of parental control, and perceptions of harm to be associated with addiction risk.<sup>[17-19]</sup>

Regarding smartphone use patterns, addicted adolescents showed higher utilization of gaming, videos, and SNS compared to non-addicted peers.<sup>[2,12]</sup> For physical health, our study did not find significant differences between addicted and non-addicted youth contrary to some earlier evidence.<sup>[20]</sup> This could be due to less severe addiction levels in our sample. For mental health, while no differences emerged, SA has been prospectively linked to symptoms, such as anxiety, depression, and impulsivity.<sup>[1,21]</sup>

The strengths of our study include a large sample size, the use of validated tools for assessing addiction, and multivariate analyses to delineate independent associations. Limitations include the cross-sectional nature restricting causal interpretations and self-reported data being subject to biases. Future studies must explore longitudinal trajectories and utilize objective smartphone use data. Interventions targeting adolescent SA should especially focus on high-risk groups identified here.

## Conclusion

This study found a high rate of SA among adolescents in Gujarat, India. Addicted users showed concerning patterns of excessive use of gaming, videos, and social media. Urban locality, longer duration of use, and not perceiving harm were significant predictors of addiction. These findings highlight the need for education policies and school programs promoting awareness of SA and healthy usage habits among adolescents. Evidence-based preventive strategies tailored to this vulnerable group must be implemented to address this growing public

health problem. Schools have a crucial role to play in monitoring smartphone use, educating students about potential harms, and encouraging balanced digital habits through counseling and family engagement. SA needs to gain recognition as a key area for policy and educational interventions targeting youth.

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## Conflicts of interest

There are no conflicts of interest.

## References

- Elhai J, Levine J, Alghraibeh A, Alafnan A, Aldraiweesh A, Hall B. Fear of missing out: Testing relationships with negative affectivity, online social engagement, and problematic smartphone use. *Comput Hum Behav* 2018;89:289-98.
- Jeong S, Kim H, Yum J, Hwang Y. What type of content are smartphone users addicted to?: SNS vs. games. *Comput Hum Behav* 2016;54:10-7.
- Sahu M, Gandhi S, Sharma MK. Mobile phone addiction among children and adolescents: A systematic review. *J Addict Nurs* 2019;30:261-8.
- Toh SH, Howie EK, Coenen P, Straker LM. "From the moment I wake up I will use it...every day, very hour": A qualitative study on the patterns of adolescents' mobile touch screen device use from adolescent and parent perspectives. *BMC Pediatr* 2019;19:30.
- Birinci T, Veer P, Mutlu C, Mutlu E. The reliability and validity of the Turkish version of the smartphone impact scale. *Eval Health Prof* 2022;46:84-91.
- Billieux J, Maurage P, López-Fernández O, Kuss D, Griffiths M. Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Curr Addict Rep* 2015;2:156-62.

7. Ko CH, Yen JY, Chen CC, Chen SH, Yen CF. Proposed diagnostic criteria of Internet addiction for adolescents. *J Nerv Ment Dis* 2005;193:728-33.
8. Kavaklı M, Ünal G. The effects of social comparison on the relationships among social media addiction, self-esteem, and general belongingness levels. *Curr Issues Personal Psychol* 2021;9:114-24.
9. Davey S, Davey A. Assessment of smartphone addiction in Indian adolescents: A mixed method study by systematic-review and meta-analysis approach. *Int J Prev Med* 2014;5:1500-11.
10. Sohn SY, Rees P, Wildridge B, Kalk NJ, Carter B. Correction to: Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry* 2021;21:52.
11. Yogesh M, Ladani H, Parmar D. Associations between smartphone addiction, parenting styles, and mental well-being among adolescents aged 15-19 years in Gujarat, India. *BMC Public Health* 2024;24:2462.
12. Kwon M, Lee JY, Won WY, Park JW, Min JA, Hahn C, *et al.* Development and validation of a smartphone addiction scale (SAS). *PLoS One* 2013;8:e56936.
13. Kim D, Lee Y, Lee J, Nam JK, Chung Y. Development of Korean Smartphone addiction proneness scale for youth. *PLoS One* 2014;9:e97920.
14. Alosaimi FD, Alyahya H, Alshahwan H, Al Mahyijari N, Shaik SA. Smartphone addiction among university students in Riyadh, Saudi Arabia. *Saudi Med J* 2016;37:675-83.
15. Elhai JD, Yang H, Fang J, Bai X, Hall BJ. Depression and anxiety symptoms are related to problematic smartphone use severity in Chinese young adults: Fear of missing out as a mediator. *Addict Behav* 2020;101:105962.
16. Demirci K, Akgönül M, Akpınar A. Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *J Behav Addict* 2015;4:85-92.
17. Elhai 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* 2017;207:251-9.
18. Sung J, Lee J, Noh HM, Park YS, Ahn EJ. Associations between the risk of internet addiction and problem behaviors among Korean adolescents. *Korean J Fam Med* 2013;34:115-22.
19. Zhang J, Zeng Y. Effect of college students' smartphone addiction on academic achievement: The mediating role of academic anxiety and moderating role of sense of academic control. *Psychol Res Behav Manag* 2024;17:933-44.
20. Liu Q, Yang X, Zhang C, Xiong J. Is decreasing problematic mobile phone use a pathway for alleviating adolescent depression and sleep disorders? A randomized controlled trial testing the effectiveness of an eight-session mindfulness-based intervention. *J Behav Addict* 2024;13:525-41.
21. Liu CH, Lin SH, Pan YC, Lin YH. Smartphone gaming and frequent use pattern associated with smartphone addiction [published correction appears in *Medicine (Baltimore)*. 2016 Oct 21;95 (42):e0767. doi: 10.1097/01.md.0000504796.68207.67]. *Medicine (Baltimore)* 2016;95:e4068.