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Investigation of Nomophobia, Anxiety, and Depression Levels and Their Relationships in Children Diagnosed with Attention Deficit Hyperactivity Disorder

Dikkat Eksikliği ve Hiperaktivite Bozukluğu Tanılı Çocuklarda Nomofobi, Anksiyete, Depresyon Düzeyleri ve İlişkisinin İncelenmesi

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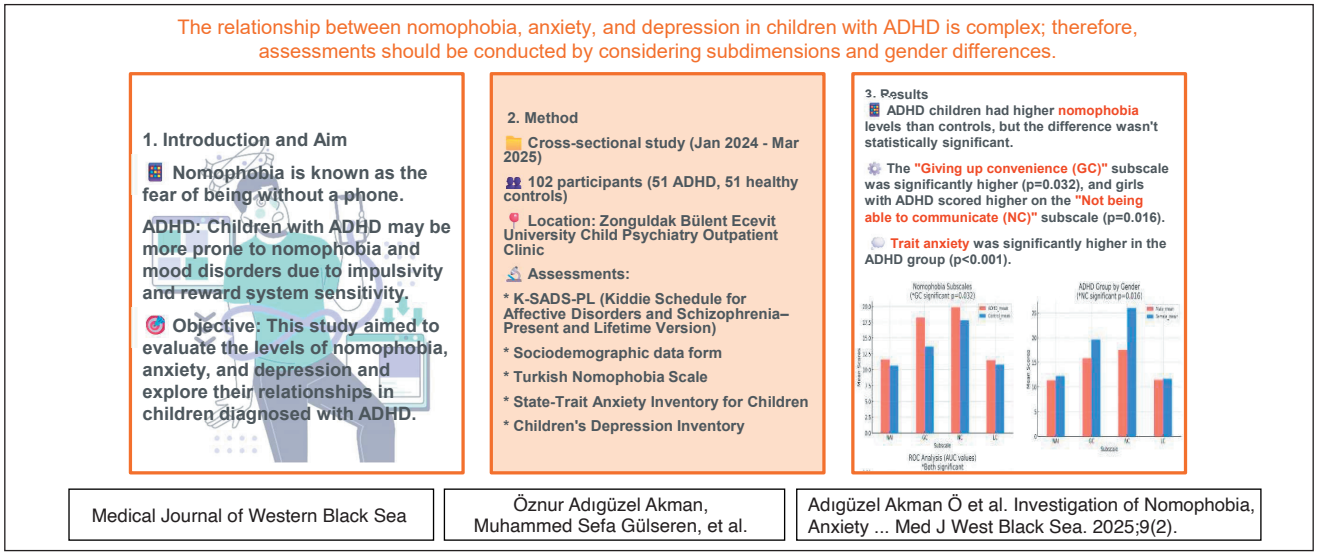
GRAPHICAL ABSTRACT



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ABSTRACT

Aim: Nomophobia, known as the "fear of being without a phone," is considered one of the effects of technology on mental health. Individuals with Attention Deficit Hyperactivity Disorder (ADHD) may be prone to nomophobia and mood disorders due to impulsivity and sensitivity in the reward system. This study aimed to evaluate the levels of nomophobia, anxiety, and depression and their relationships in children diagnosed with ADHD.

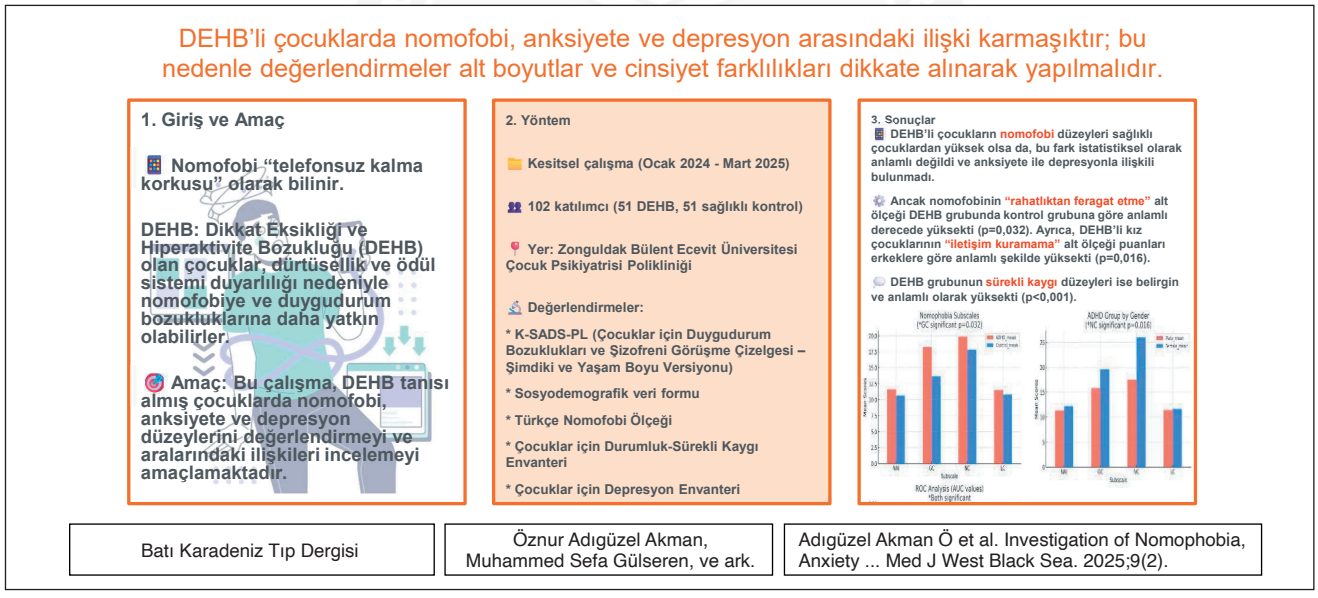
Material and Methods: The study included 51 children aged 6 to 16 years diagnosed with ADHD and 51 healthy controls who were referred to the Child Psychiatry Outpatient Clinic of Zonguldak Bulent Ecevit University between January 2024 and March 2025. Participants were assessed using the Kiddie Schedule for Affective Disorders and Schizophrenia–Present and Lifetime Version (K-SADS-PL), a socio-demographic data form, the Turkish Nomophobia Scale, the State-Trait Anxiety Inventory for Children, and the Children's Depression Inventory.

Results: Of the participants, 39.2% were female (n=40) and 60.8% were male (n=62), with a mean age of 11.53 ± 3.02 years. Although children with ADHD had higher nomophobia levels than healthy controls, this difference was not statistically significant and was not associated with anxiety or depression levels. However, the “Giving up convenience (GC)” subscale of nmophobia was significantly higher in the ADHD group compared to controls (p=0.032). Additionally, female children with ADHD scored significantly higher than males on the “Not being able to communicate (NC)” subscale (p=0.016). The trait anxiety levels in the ADHD group were notably and significantly higher (p<0.001).

Conclusion: The relationship between nomophobia, anxiety, and depression in children with ADHD appears to be more complex than previously thought. Nomophobia assessments should be conducted based on subdimensions and clinical groups rather than total scores. Particular attention should be given to the "giving up comfort" dimension and the sensitivity in digital communication observed in girls with ADHD. To the best of our knowledge, our study is among the first in the literature to examine the relationship between nomophobia subscales and anxiety and depression in children with ADHD.

Keywords: Attention deficit and hyperactivity disorder, anxiety, depression, digital addiction, nomophobia

GRAFİKSEL ÖZET



ÖZ

Amaç: Nomofobi “telefonsuz kalma korkusu” olarak bilinir ve teknolojinin ruh sağlığı üzerindeki etkilerinden biri olarak görülmektedir. Dikkat Eksikliği ve Hiperaktivite Bozukluğu (DEHB), dürtüsellik ve ödül sistemindeki hassasiyet nedeniyle nomofobiye ve aynı zamanda duygudurum bozukluklarına yatkın olabilir. Bu çalışmada DEHB tanısı almış çocuklarda nomofobi, anksiyete, depresyon düzeyleri ve birbiriyle olan ilişkisinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntemler: Çalışmaya, Ocak 2024-Mart 2025 tarihleri arasında Zonguldak Bülent Ecevit Üniversitesi çocuk psikiyatri polikliniğine başvuran, 6-16 yaş arası DEHB tanısı almış 51 çocuk ve 51 sağlıklı kontrol grubu dahil edilmiştir. Katılımcılara, duygulanım bozuklukları ve şizofreni görüşme çizelgesi (K-SADS-PL), sosyo-demografik veri formu, Türkçe Nomofobi Ölçeği, Çocuklar için Durumluk Sürekli Kaygı Envanteri ve Çocuklarda Depresyon Ölçeği uygulanmıştır.

Bulgular: Katılımcıların %39,2'si kız (n=40), %60,8'i erkek (n=62) olup, yaş ortalaması 11,53±3,02'dir. DEHB'li çocukların nomofobi düzeyleri sağlıklı çocuklardan yüksek olsa da, bu fark istatistiksel olarak anlamlı değildi ve anksiyete ile depresyonla ilişkili bulunmadı. Ancak nomofobinin "rahatlıktan feragat etme" alt ölçeği DEHB grubunda kontrol grubuna göre anlamlı derecede yüksekti (p=0,032). Ayrıca, DEHB'li kız çocuklarının "iletişim kuramama" alt ölçeği puanları erkeklere göre anlamlı şekilde yüksekti (p=0,016). DEHB grubunun sürekli kaygı düzeyleri ise belirgin ve anlamlı olarak yüksekti (p<0,001).

Sonuç: DEHB'li çocuklarda nomofobi, anksiyete ve depresyon ilişkisi sanıldığından daha karmaşık bir yapıya sahip gibi görünmektedir. Nomofobi değerlendirmeleri toplam skorlarla değil, alt boyutlar ve klinik gruplar bazında yapılmalıdır. Özellikle "rahatlıktan feragat etme" boyutu ve DEHB'li kızlarda dijital iletişimdeki hassasiyet göz önünde bulundurulmalıdır.

Anahtar Sözcükler: Anksiyete, depresyon, dikkat eksikliği ve hiperaktivite bozukluğu, dijital bağımlılık, nomofobi

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders of childhood, characterized by symptoms of inattention, impulsivity, and hyperactivity (1). With a global childhood prevalence ranging between 5% and 7%, ADHD leads to significant difficulties in various areas of life, including academic performance, social relationships, and daily functioning (2,3). Although ADHD begins in childhood, its effects may persist into adolescence and adulthood, often accompanied by various psychiatric comorbidities (4).

The rapid advancement of technology and the widespread use of mobile devices have led to significant changes in the daily habits of children and adolescents. This shift has created a foundation for new behavioral and psychological problems related to digital media and mobile device use. Nomophobia, defined as the "fear of being without a mobile phone," has emerged as a phenomenon of interest in the field of mental health, particularly among individuals who develop a dependency-level attachment to mobile devices (5). The term is derived from the abbreviation of "No Mobile Phobia" (6). It refers to the emotional distress experienced, especially by adolescents, when disconnected from digital devices (7). This condition is characterized by intense anxiety, stress, and functional impairment when separated from mobile devices and is reported to be particularly common among adolescents. Studies have shown that nomophobia is associated with internet addiction, psychiatric symptoms, self-esteem, and parental attitudes (8).

The relationship between nomophobia and ADHD presents a research-worthy area, as both conditions involve similar mechanisms related to attention and impulsivity. It is well known that children with ADHD exhibit deficits in attention, strategic flexibility, planning, working memory, and behavioral regulation. This behavioral disinhibition in individuals with ADHD may lead to problems with self-control (9). Children and adolescents with ADHD may tend to use digital devices more frequently and uncontrollably due to impulsive behaviors and a focus on immediate rewards(10,11). This situation may exacerbate both ADHD symptoms and nomophobia manifestations. Moreover, emotional problems commonly observed in individuals with ADHD, such as anxiety and depression, may increase the psychosocial risks associated with nomophobia (8).

Although some studies in the literature have addressed the relationship between ADHD and nomophobia, and have reported higher rates of nomophobia in individuals with ADHD (12,13). However, the prevalence of nomophobia among individuals with ADHD and its association with other mental health conditions, such as anxiety and depression, have not been sufficiently explored. Therefore, investigating the levels of nomophobia, anxiety, and depression in children diagnosed with ADHD is expected to fill a critical gap in the literature and provide valuable insights for both clinical practice and preventive mental health strategies. Our study offers an important foundation for better understanding the mental health problems associated with digital dependence in children with ADHD and for developing targeted intervention strategies.

To the best of our knowledge, this is among the first studies to explore the relationship between nomophobia subscales and symptoms of anxiety and depression in children diagnosed with ADHD**.**

Our research hypotheses:

1. Children with ADHD exhibit higher levels of nomophobia compared to their healthy peers.
2. Certain subdimensions of the Nomophobia Scale may show significant differences in distinguishing children with ADHD from healthy children.
3. In children with ADHD, there is a significant positive correlation between nomophobia levels and symptoms of anxiety and depression.
4. The subscales of nomophobia in children with ADHD may show significant differences based on gender.

MATERIALS and METHODS

The study included 51 children aged between 6 and 16 years who were diagnosed with ADHD according to DSM-5

criteria and admitted to the Child and Adolescent Psychiatry outpatient clinic of Zonguldak Bülent Ecevit University between January 2024 and March 2025, as well as 51 healthy controls. The healthy control group consisted of children who visited the clinic during the same period but did not receive any DSM-5 diagnosis following an assessment with the K-SADS-PL (Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version). During the research process, participants were administered the Sociodemographic Data Form, the Turkish version of the Nomophobia Questionnaire (NMP-Q), the State-Trait Anxiety Inventory for Children (STAIC), and the Children's Depression Inventory (CDI). Children outside the 6–16 age range or those with additional cognitive or motor impairments that could interfere with completing the scales were excluded from the study.

Data Collection Tools

Sociodemographic Data Form

A 113-item form developed by the researchers was used to collect detailed information about participants' sociodemographic characteristics and psychiatric history.

K-SADS-PL (Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version):

This semi-structured diagnostic interview was updated by Kaufman et al. based on DSM-5 diagnostic criteria. Its Turkish adaptation was conducted by researchers through a rigorous translation and back-translation process. Differences between versions and the functionality of the interview form were evaluated through pilot interviews with parents and children. As a result, the Turkish version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version, DSM-5 (K-SADS-PL-DSM-5-T), was finalized on November 5, 2016 (14).

The first part of the interview consists of an unstructured assessment to gather general information regarding the child and family's sociodemographic data, complaints, developmental history, health status, and functioning at home and school. The second part evaluates over 200 symptoms through structured questions, while the third part involves clinical assessment and observation to confirm DSM-5 diagnoses. Each section is scored separately, and the final evaluation is based on the clinician's judgment. The Turkish adaptation's validity and reliability study was conducted by Ünal et al. in 2019 (14).

Turkish Version of the Nomophobia Questionnaire (NMP-Q)

The Nomophobia Questionnaire (NMP-Q) was developed by Yıldırım and Correia in 2015 and adapted into Turkish by Yıldırım and colleagues in the same year (15). The scale has four sub-dimensions: 'Not being able to communicate (NC)' (6 items), 'Losing connectedness (LC)' (5 items), 'Giving up convenience (GC)' (5 items), 'Not being able to access information (NAI)' (4 items). The items on the scale are rated by individuals on a 7-point Likert scale (1: Strongly Disagree, 7: Strongly Agree). The Cronbach's alpha coefficient of the scale is 0.92, and the total scores that can be obtained range from 20 to 140. Higher scores indicate a higher level of nomophobia (16).

State-Trait Anxiety Inventory for Children (STAIC)

This is a self-report inventory designed to assess anxiety in children. It consists of 20 items and does not impose a time limit for completion. In the State Anxiety section of the inventory, children are asked to assess how they feel "at that moment" and choose one of three possible responses for each item. The scale aims to evaluate emotions related to state anxiety, such as tension, nervousness, restlessness, and uneasiness. Half of the items reflect the absence of these emotional states, while the remaining items indicate their presence. Each item is scored between 1 and 3 based on the intensity of the reported anxiety symptom. The total score ranges from 20 to 60. A score of 3 indicates a strong presence of tension or nervousness, while a score of 1 reflects its absence. Lower scores indicate calmness and a sense of peace. Moderate scores suggest a medium level of tension or uneasiness. Higher scores point to intense tension and anxiety. The Turkish validity and reliability study of the inventory was conducted by Öner and Le Compte, based on the original version developed by Spielberger et al. (17).

Children's Depression Inventory (CDI)

The Children's Depression Inventory (CDI), developed by Kovacs in 1980, is one of the most widely used instruments for assessing depression in childhood. It is suitable for children aged 6 to 17 years. The scale consists of 27 items, each containing three statements that reflect different levels of symptom severity. Responses are scored as 0, 1, or 2, depending on the presence and intensity of the symptom. The total score ranges from 0 to 54, and a cut-off score of 19 has been suggested to identify clinically significant depressive symptoms. The Turkish version of the scale was validated and tested for reliability by Öy (18).

Statistical Analysis

The statistical analyses of the study were performed using the Jamovi 2.6.19 and R 2024.12.0 software packages. Descriptive statistics for categorical variables were presented as frequencies and percentages, while continuous variables were summarized with means, standard deviations, medians, minimum, and maximum values. The normality of distribution for continuous variables was assessed using the Shapiro-Wilk test. For comparisons between two independent groups, the independent samples t-test was used

when the data were normally distributed. When normality was not met, the Mann-Whitney U test was applied. For comparisons of categorical variables between groups, the Pearson chi-square, Yates' correction chi-square, Fisher's exact chi-square, and Fisher-Freeman-Halton chi-square tests were used as appropriate. Correlations between continuous variables were evaluated using Pearson's correlation coefficient. The discriminative ability of the STAIC-T and GC subscales in identifying ADHD was evaluated using ROC analysis and the Youden Index. The cut-off values obtained for both parameters were presented along with their sensitivity and specificity scores. For all comparisons with a p-value below 0,05 are assumed as statistically significant. In addition to statistical significance testing, effect size metrics (e.g., Cohen's d) were calculated for key comparisons to provide a measure of the practical significance of the observed differences.

The required sample size was calculated using the G*Power 3.1.9.2 software with a 95% confidence level, 85% statistical power, and an effect size of 0.60. As a result of the preliminary analysis, it was determined that a total of 102 participants were needed, with at least 51 participants in each group.

RESULTS

A total of 102 children and adolescents were included in the study, consisting of 51 individuals diagnosed with ADHD and 51 healthy controls. The mean age of the participants was 11.53 ± 3.018 years (mean±SD). Sociodemographic data are presented in Table 1.

Although the Nomophobia Scale total scores were found to be higher in the ADHD group compared to the control group, this difference was not statistically significant (p = 0.135) (Table 2).

In the evaluation conducted using the State-Trait Anxiety Inventory for Children (STAIC), the total STAIC scores of the ADHD group did not show a significant difference compared to the control group (p = 0.278). However, in the Trait Anxiety subscale (STAIC-T), the ADHD group had significantly higher scores, and this difference was statistically significant (p <0.001).

There was no correlation between NMP-Q and CDI, STAIC, and STAIC-Trait Subscale Score in the ADHD group (p values 0.548, 0.082 and 0.126, respectively).

In the comparison of the CDI scores between groups, the mean depression scores in the ADHD group were similar to those in the control group (p = 0.076). However, when the cutoff scores were considered, high depression scores were observed in both groups (Table 2).

Among the nomophobia subscales, the GC scores were significantly higher in the ADHD group compared to the control group (p = 0.032) (Table 3).

In the comparison of nomophobia subscales by gender, only in the ADHD group was the 'not being able to communicate (NC)' subscale found to be significantly higher in females than in males (p = 0.016). In the control group, no statistically significant differences were observed in any of the subscales by gender (Table 4.1 and 4.2).

Table 1. Sociodemographic data of the participants

	ADHD (n=51)	Control (n=51)	Total (n=102)	*p*
Age ($\bar{x}$±s) (years)	12.00 ± 3.27	11.08 ± 2.70	11.53± 3.018	0.148[a]
Gender (M), n (%)	37 (72.5)	25 (49)	62 (60.7)	**0.015**[b]

[a]Independent samples t test; [b]Pearson Chi-Square test; **M:** male; **ADHD:** Attention Deficit Hyperactivity Disorder

Table 2. Comparison of Nomophobia Scale, State-Trait Anxiety Inventory for Children, and Children's Depression Inventory Scores Between Groups

Scales	ADHD (n=51)	Control (n=51)	*p*	*Cronbach's Alpha*	*Effect size*
NMP-Q	61.16 ± 26.60 58 (21-136)	52.88 ± 22.47 52 (20-110)	0.135[a]	0.863	-0.336[b]
CDI	28.04 ± 3.67 28 (14-34)	29.37 ± 2.96 30 (23-38)	0.076[a]	0.810	0.399[b]
Total STAIC	40.49 ± 9.68 44 (12-50)	40.41 ± 8.43 43 (17-52)	0.278[a]	0.741	0.124[b]
STAIC-T subscale	40.10 ± 8.02 40 (24-59)	34.18 ± 7.91 33 (20-54)	**<0.001**[a]	0.885	-0.743[b]

[a]*Mann-Whitney U test;* [b]*Cohen effect size*

ADHD: Attention Deficit Hyperactivity Disorder, **NMP-Q:** Turkish Version of the Nomophobia Questionnaire, **CDI:** Children's Depression Inventory, **STAIC:** State-Trait Anxiety Inventory for Children, **STAIC-T:** State-Trait Anxiety Inventory for Children-Trait Anxiety subscale

Table 3. Comparison of Nomophobia Subscale Scores Between Groups

Nomophobia Subscale	ADHD (n=51)	Control (n=51)	*p*	*Cronbach's Alpha*	*Effect size*
NAI	11.59 ± 5.58 10 (4 - 28)	10.63 ± 5.59 10 (4 - 25)	0.321[a]	0.750	0.172[b]
GC	18.25 ± 12.95 17 (5 - 88)	13.63 ± 6.44 14 (5 - 32)	**0.032[a]**	**0.554**	**0.452[b]**
NC	19.82 ± 10.86 18 (5 - 42)	17.82 ± 9.77 15 (6 - 38)	0.412[a]	0.901	0.194[b]
LC	11.49 ± 6.61 9 (5 - 35)	10.80 ± 5.62 9 (5 - 26)	0.749[a]	0.778	0.112[b]

[a]*Mann-Whitney U test;* [b]*Cohen effect size*

ADHD: Attention Deficit Hyperactivity Disorder, **NAI:** Not being able to access information, **GC:** Giving up convenience, **NC:** Not being able to communicate, **LC:** Losing connectedness.

Table 4.1. Comparison of nomophobia subscales between groups by gender in ADHD

	Male (n=37)	Female (n=14)	*p*	*Effect size*
NAI	11.35 ± 5.11 10 (4 - 22)	12.21 ± 6.86 9.5 (5 - 28)	0.857[a]	-0.03[b]
GC	15.81 ± 8.19 15 (5 - 32)	19.57 ± 8.44 19.5 (5 - 35)	0.213[a]	0.22[b]
NC	17.49 ± 10.11 18 (5 - 38)	26.00 ± 10.68 28.5 (9 - 42)	**0.016[a]**	0.44[b]
LC	11.43 ± 6.70 10 (5 - 35)	11.64 ± 6.59 9 (5 - 28)	0.907[a]	0.02[b]

[a]*Mann-Whitney U test;* [b]*Cohen effect size*

ADHD: Attention Deficit Hyperactivity Disorder, **NAI:** Not being able to access information, **GC:** Giving up convenience, **NC:** Not being able to communicate, **LC:** Losing connectedness.

Table 4.2. Comparison of nomophobia subscales between groups by gender in the control group

	Male (n=25)	Female (n=26)	*p*	*Effect size*
NAI	10.28 ± 5.65 10 (4 - 25)	10.96 ± 5.62 10 (4 - 23)	0.589[a]	0.08[b]
GC	13.76 ± 7.58 12 (5 - 32)	13.50 ± 5.27 15 (5 - 23)	0.712[a]	0.06[b]
NC	16.52 ± 9.26 15 (6 - 38)	19.08 ± 10.27 16.5 (6 - 37)	0.322[a]	0.16[b]
LC	10.96 ± 6.10 9 (5 - 26)	10.65 ± 5.25 9.5 (5 – 20)	0.985[a]	0.01[b]

[a]*Mann-Whitney U test;* [b]*Cohen effect size*

ADHD: Attention Deficit Hyperactivity Disorder, **NAI:** Not being able to access information, **GC:** Giving up convenience, **NC:** Not being able to communicate, **LC:** Losing connectedness.

Table 5. ROC analysis results of the STAIC-T and GC subscales

	Cut-off Value	Sensitivity (95% CI)	(Specificity) (95% CI)	AUC (95% CI)	*p*
STAIC-T	>33	80.4 (66.9 – 90.2)	58.8 (44.2 – 72.4)	0.710 (0.612 – 0.795)	**<0.001[a]**
GC	>18	44.0 (30.0 – 58.7)	82.4 (69.1 – 91.6)	0.616 (0.514 – 0.711)	**0.042[a]**

[a]ROC Analysis; **STAIC-T:** State-Trait Anxiety Inventory for Children Trait Subscale Score; **GC:** Giving up convenience, **AUC:** Area Under Curve

** The STAIC-Trait (STAIC-T) subscale demonstrated statistically significant discriminative ability between children with ADHD and healthy controls (p<0.001; AUC = 0.710). A STAIC-T score greater than 33 was identified as the optimal cut-off point, yielding a sensitivity of 80.4% and a specificity of 58.8%.

** The GC subscale also showed statistically significant discriminative power between the ADHD and control groups (p = 0.042; AUC = 0.616). A GC score above 18 served as the cut-off point, with 44.0% sensitivity and 82.4% specificity. Findings from the ROC analysis are summarized in Table 5.

DISCUSSION

In this study, levels of nomophobia, anxiety, and depression were evaluated in children diagnosed with ADHD, and the relationships among these variables were examined. The findings revealed that children with ADHD had higher levels of nomophobia compared to healthy controls; however, this difference was not statistically significant. Moreover, nomophobia levels were not found to be significantly associated with anxiety or depression levels.

When examining the subdimensions of nomophobia, notable differences were observed in our study. In particular, individuals with ADHD had significantly higher scores on the

GC subscale compared to the control group. Additionally, gender-based subgroup analyses revealed that girls with ADHD had significantly higher scores on the 'Not being able to communicate' subscale of nomophobia.

Although our findings partially align with previous literature suggesting that tendencies toward nomophobia may increase concurrently with ADHD symptoms, they contradict those studies in terms of statistical significance (12,19). Symptoms frequently encountered in ADHD, such as impulsivity and inattention, may predispose individuals to greater sensitivity to digital stimuli (20). This vulnerability can heighten the risk of nomophobic symptoms, particularly in situations where access to mobile technologies—such as smartphones—is restricted (21).

However, despite an increase in overall nomophobia scores among children with ADHD in our study, this difference was not statistically significant. One possible explanation for this may be that nomophobic tendencies differ according to the ADHD subtype—whether predominantly inattentive or predominantly hyperactive/impulsive. Furthermore, the fact that many participants in the ADHD group were actively receiving medical treatment may have mitigated impulsivity, thereby reducing nomophobia symptoms.

Nonetheless, when the nomophobia subscales were analyzed, the GC subscale scores were significantly higher in the ADHD group compared to the control group. This finding suggests that children and adolescents diagnosed with ADHD may experience greater distress when they are unable to access their phones, as they may be more dependent on such devices for daily comfort, routines, or habits. The commonly observed impulsivity and low frustration tolerance in individuals with ADHD might make the absence of a smartphone a more uncomfortable or even distressing experience. Moreover, these individuals may rely more heavily on their smartphones as coping tools to manage distractibility or emotional regulation. In addition, our study provides novel findings regarding the significant associations between GC scores and the diagnostic process of ADHD. In our sample, 44% of individuals with a GC score above 18 were diagnosed with ADHD. This suggests that higher scores may be associated with ADHD; however, the positive predictive value (44%) does not offer sufficient specificity for diagnostic purposes on its own. Conversely, 82.4% of individuals with a GC score below 18 were found to be healthy. This indicates that lower scores serve as a more reliable indicator for ruling out ADHD, reflecting a high negative predictive value of the test. These findings suggest that the GC subscale may serve as a useful auxiliary measure in ADHD screening, particularly valuable for excluding the likelihood of ADHD in individuals with low scores.

In our study, another nomophobia subscale— 'Not being able to communicate (NC)'—was found to be significantly higher in girls with ADHD compared to boys. This situation may be attributed to differences in social expectations and communication needs between genders. Considering that girls with ADHD tend to be more sensitive and relationship-oriented in their social interactions and may have a stronger motivation to maintain social bonds, it is understandable that their fear of being unable to communicate without a mobile phone could be higher compared to boys. Girls' sensitivity to social support may influence their levels of nomophobia. Especially in girls with ADHD, a more pronounced need for emotional connection and social approval may lead to increased anxiety in the absence of communication maintained through mobile phones.

In addition, gender roles may also play a role in explaining this difference. Traditionally, girls are expected to be more active and connected in social relationships, while boys' behaviors are more tolerated. Therefore, higher dependency on communication tools among girls may influence nomophobic symptoms. Another possible explanation is that ADHD in girls is often diagnosed later, and their symptoms are more internalized. This may lead them to meet their social communication needs through digital means, resulting in greater anxiety in the absence of a mobile phone.

One study highlighted a positive relationship between nomophobia and both anxiety and depression, reporting that adolescents with higher levels of anxiety and depression tend to exhibit higher nomophobia scores (19). Similarly, a very recent study conducted on pregnant women found that as nomophobia increased, levels of depression, anxiety, and stress also rose (22). On the other hand, there are also studies in the literature reporting no significant association between nomophobia and internalizing or externalizing symptoms in adolescents (13). In our study as well, no significant differences were found between groups in terms of anxiety and depression scores concerning nomophobia. The broad age range of participants (6–16 years), heterogeneity in ADHD subtypes, and concurrent pharmacological treatments may have influenced the obtained results. Such variability could have attenuated potential associations, as the clinical and developmental profiles of the participants were not homogeneous. Previous studies have also shown that sample characteristics can significantly affect the strength of observed relationships between nomophobia and emotional symptoms (23,24). Therefore, the absence of a strong association in our study may partly reflect these methodological factors.

However, in our study, individuals diagnosed with ADHD were found to have significantly higher levels of trait anxiety compared to the control group. This finding supports the frequently emphasized relationship between ADHD and trait anxiety in the literature (23-25). This finding may indicate the persistence of anxiety-related mood symptoms in individuals with ADHD.

Previous studies have reported elevated rates of anxiety and depression in children with ADHD (26-28). Mood disorders have been shown to increase in both ADHD and nomophobia (13,26). Emotional dysregulation, which is commonly observed in individuals with ADHD, may contribute to difficulties in managing and controlling emotions. Similarly, anxiety levels may rise in individuals with nomophobia, who may increasingly rely on technology as a means of emotional regulation (13). In our study, it was found that 80.39% of individuals with a STAIC-T subscale score above 33 were diagnosed with ADHD. This indicates that individuals with high scores have a considerably increased likelihood of receiving an ADHD diagnosis. This finding reflects a high positive predictive value, meaning that individuals scoring above 33 on this scale are highly likely to have ADHD. In our study, 58.82% of individuals with a STAIC-T subscale score below 33 were found to be healthy. Although this suggests that the negative predictive value is lower—indicating that most individuals with low scores are healthy—it also shows that this predictive power is more limited in ruling out the diagnosis when compared to its ability to confirm it. These findings represent novel contributions specific to our study. Although depression scores did not differ significantly between groups, both groups showed elevated depressive symptoms compared to normative levels. This may reflect the general trend of increasing depression rates among children and adolescents. Nomophobia tends to become more pronounced during late adolescence and early adulthood—a period marked by identity formation, increased autonomy, and heightened digital interaction (15,24). Therefore, the relationship between nomophobia, anxiety, and depression may be less evident in younger age groups. In childhood, such tendencies may be more strongly shaped by behavioral habits or other contributing environmental factors. In younger age groups, nomophobia may be less pronounced due to limited access to smartphones and lower dependence on digital communication. The literature indicates that the psychological effects of nomophobia become more evident during adolescence, as peer relationships and individual autonomy increasingly rely on technology (23,29). The heterogeneous age distribution in our study may explain the absence of significant associations with anxiety and depression in the overall sample.

A previous study reported that nomophobia is particularly prevalent among male adolescents and identified significant associations between nomophobia, depression, anxiety, and reduced quality of life (30,31). In contrast, in our study, nomophobia scores were similar across both genders, and no significant relationship was observed with depression or anxiety scores. This similarity may be attributable to the higher prevalence of neurodevelopmental disorders such as ADHD in males, whereas mood disorders are more commonly observed in females. However, a study conducted on high school students reported that girls had significantly higher total nomophobia scores than boys (32). Another study, on the other hand, found that gender did not create a significant difference in nomophobia levels, indicating that nomophobia was observed at similar levels among both male and female students (33). These results suggest that the relationship between nomophobia levels and gender varies across studies and that the data on the gender–nomophobia relationship are inconsistent. The inconsistent findings regarding gender differences in nomophobia reported in the literature may stem from multiple factors, including variations in sociocultural context, differences in technology usage patterns, the characteristics of measurement tools, and sample characteristics.

In summary, although our study did not reveal a statistically significant difference in total nomophobia scores between the ADHD and control groups, significant differences in certain subscales underscore the importance of assessing nomophobia at the subscale level. Since nomophobia is a multidimensional construct, the total score may not adequately reflect all nomophobic tendencies of individuals. In particular, the significant association between the “Giving up convenience (GC)” subscale of the nomophobia scale and the ADHD group suggests that these children may experience more intense emotional reactions when access to their phones is restricted. Similarly, the finding that the “ Not being able to communicate (NC) “ subscale was statistically significant among girls with ADHD may indicate that girls prefer mobile phones as a primary means of maintaining interpersonal communication. It may also be related to gender roles, where emotional and social aspects are more prominent in girls. This indicates that clinically meaningful differences, which may be overlooked at the total score level, can be detected through subscale-level assessments.

One of the strengths of this study is its focus on nomophobia, a digital addiction increasingly threatening child and adolescent mental health, and the examination—for the first time—of its effects on anxiety and depression in children diagnosed with ADHD. The relationship between nomophobia and mood disorders in children with ADHD has been insufficiently explored. Additionally, by addressing a highly current topic in the field of child psychiatry, this study contributes to broadening clinicians’ perspectives. At the same time, preliminary findings regarding the distinctive features of STAIC-T and GC scores in the diagnosis of ADHD are among the original findings of our study. Similarly, the presence of original findings related to the relationship between the subscales of nomophobia and ADHD in our study constitutes another strong aspect of our research.

Our findings regarding the relationship between STAIC-T scores and ADHD diagnosis should be considered preliminary rather than conclusive. Although elevated anxiety

scores were observed in children with ADHD, using the STAIC-T as a diagnostic tool for ADHD would be premature and potentially misleading. These results primarily reflect comorbid symptomatology and highlight the potential value of anxiety assessments in better understanding children with ADHD.

However, the study also has some limitations. For example, the cross-sectional design and restriction to a single clinical setting limit the generalizability of the results. Moreover, the predominantly self-reported data collection method may introduce bias. The cross-sectional nature of the study and the inability to perform gender matching are among the confounding factors. Another limitation of our study is the lack of comparison between ADHD subtypes (predominantly inattentive type, predominantly hyperactive-impulsive type, and combined type) and levels of nomophobia. This omission hinders the identification of subtype-specific tendencies related to nomophobia. However, different ADHD subtypes may exhibit varying patterns in technology use and susceptibility to digital addictions. Additionally, the fact that the majority of participants in the ADHD group were continuing their current treatment constitutes another limitation. The use of pharmacological treatment may have reduced symptoms of impulsivity or smartphone addiction, potentially affecting the findings related to nomophobia. Therefore, confounding factors may have influenced the results. Future research would benefit from including treatment-naïve participants and conducting analyses based on ADHD subtypes to evaluate nomophobic characteristics, which could offer original contributions to the literature. Furthermore, future studies designed with a balanced gender distribution, careful consideration of age groups, and attention to technology usage purposes will allow for more accurate interpretation of the study findings.

Our findings suggest that the relationship between mobile phone addiction and psychopathology in children with ADHD may be more complex than previously assumed. They also underscore that the impact of digitalization on child psychopathology is not yet fully understood. Analyzing nomophobia at the subscale level can contribute to a more nuanced understanding of nomophobic symptoms and may help guide future clinical assessments and interventions in a more targeted manner.

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Conflicts of Interest

The authors declare no conflict of interest.

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There is no financial disclosure to declare in this study.

Ethical Approval

IRB approval for the study was procured from the Ethics Committee of Zonguldak Bülent Ecevit University [2024/23]. Informed consent was obtained from all participants. All of the study procedures were by the WHO Declaration of Helsinki and local laws and regulations.

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