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Original Article

Investigation of adolescents and their mothers in terms of nomophobia

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ABSTRACT

Background. Nomophobia (NoMP) is the fear of being unable to interact with others via mobile phones and is a current topic in adolescents' mental health. The purpose of this study was to investigate the association between NoMP in adolescents and their mothers' level of NoMP.

Methods. The levels of depression, anxiety, attention deficit/hyperactivity-impulsivity symptoms, NoMP, and perceived parental emotional availability were examined.

Results. One hundred fifty-five adolescents (60% girls) were included in the study with their mothers. Ninety-three (60%) adolescents (67.7% girls) and 64 (41.3%) mothers were classified as nomophobic. There was a positive correlation between the NoMP levels of adolescents and their mothers. Nomophobic girls perceived less paternal support. All psychopathologic symptoms were higher in the nomophobic mothers. There was no difference between nomophobic and non-nomophobic adolescents in terms of maternal psychopathologies.

Conclusions. We suggest that parental effects should be investigated during the assessment of NoMP, especially in adolescent girls. The phone usage habits of mothers and their relationship with their adolescent children were closely associated with adolescent NoMP.

Key words: nomophobia, adolescent, parent, emotional availability, psychopathology.

Nomophobia (No MobilePhone Phobia-NoMP) is a newly defined concept of the technological world where fear of being unable to be in contact with a mobile phone causes anxiety or provokes existing anxiety-related behaviors (e.g., compulsive checking of phones, social anxiety). The thought of being unable to access information and communicate when the mobile phone is unavailable causes discomfort, anxiety, and nervousness.[1] Nowadays, almost every mobile phone is 'smart', so the terms 'mobile phone' and 'smartphone' have been used interchangeably.

Smartphones provide many benefits in communication, information, education, entertainment, and business. On the other hand, becoming anxious when forgetting the mobile phone, when the battery of the phone is low, when the signal is lost, and/or carrying the mobile phone everywhere, checking it even if it is not ringing are the basic symptoms of NoMP.[2] These lead to physical problems (e.g., neckaches), traffic accidents, decreased sleep quality, and disturbances in social and psychological well-being.[3]

NoMP has not been considered a psychopathology. It demonstrates problematic behaviors and feelings due to the problematic use of a smartphone.[4] In the 20th century, mobile phones have become a part of daily life and NoMP is becoming more common among

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youth.[5] The factors related to NoMP are similar to those related to psychopathologies, especially anxiety disorders and addiction. Those factors related to psychopathologies could be divided into individual (young age, low self-esteem, having symptoms of depression/anxiety, etc.), familial (conflicts in the family, parental modeling, parenting style, etc.), and social (social pressure, social withdrawal, etc.) factors. Impulsivity[6], depression, stress, and anxiety[7] have been associated with NoMP in youth. Age is important, as NoMP is more common among people under the age of 20, like separation anxiety disorder, social anxiety disorder, and phobias.[2,8] According to the DSM-5 these disorders could be seen at any age, but with a lower rate in adults, and they aggregate within families. This could also be true for NoMP.

If smartphones are thought to be related to anxiety, familial factors should also be investigated. In this study, we aimed to investigate the levels of parental emotional availability, depression, anxiety, attention deficit/hyperactivity-impulsivity, and NoMP among mothers of adolescents. It was hypothesized that mothers of adolescents with NoMP were more depressed, had high levels of attention-deficit/hyperactivity-impulsivity and anxiety symptoms, and had lower emotional availability. Additionally, mothers with NoMP had high levels of psychopathological symptoms.

Material and Methods

This research has been approved by the Hacettepe University Non-Interventional Clinical Research Review Board (GO 22/205). All adolescents who applied to Hacettepe University Department of Child and Adolescent Psychiatry between December 2021 and March 2022 were invited. Adolescents and/or mothers who did not have a smartphone, could not complete the scales (due to physical problems, intellectual disability, or autism spectrum disorder) or were diagnosed with psychotic disorders were excluded. Also, adolescents whose mothers were deceased were not included. Among the 170 adolescents (aged 12-17 years) who met the inclusion criteria, five adolescents/mothers did not want to participate, and ten adolescents/mothers did not fill out the scales fully. Written consent was obtained from all adolescents and their mothers. The following scales were given.

Socio-demographic form: The questions pertained to socio-demographic characteristics and the daily time spent using a smartphone.

Nomophobia Questionnaire (NMP-Q): Yildirim & Correia developed and translated this scale into Turkish.[9] It is a 20-item questionnaire that evaluates nomophobia in four dimensions: Fear of not being able to communicate (fear of losing instant communication), fear of losing connectedness (thinking of being disconnected from friends and social media identity), fear of not being able to access information (feeling discomfort from not getting information via smartphones), and giving up convenience (feeling discomfort from any situation that distorts access to phones, like a low battery). It is a 7-point Likert-type scale with a cut-off score of 60. The Cronbach's alpha value of NMP-Q is 0.92 in its validity and reliability study, which was performed in a population with a mean age of 20.[9] It has been used in adolescents[10] and adults[11] with the same threshold values. Higher scores indicate a higher severity of nomophobia: 0-20: Absence of nomophobia, 21-59: Mild level, 60-100: Moderate level, and 101-140: Severe level. This study calculated the NMP-Q scores of adolescents (NMP-A) and mothers (NMP-M). The adolescents whose NMP-A<60 were referred to as absence/mild nomophobia (Without-NoMP), and those whose NMP-A≥60 were referred to as moderate/severe nomophobia (With-NoMP).

Lum Emotional Availability of Parents (LEAP): This scale rates the emotional availability of each parent. It has 15 items. Higher scores reflect higher levels of parental emotional availability. The highest possible score is 90.[12] Turkish validation of this scale was performed.[13] Adolescents filled out the scale. This study

calculated LEAP scores for mothers (LEAP-M) and fathers (LEAP-F).

Social Support Appraisal Scale for Children (SSAS-C): This scale evaluates the level of supportive behaviors from peers, family, and teachers. It has 41 items. Higher scores indicate a higher level of support. The highest possible score is 205.[14] The Turkish validation study of SSAS-C was performed.[15] Adolescents filled out the scale. Scores of family support were used in this study (SSAS-C-F).

Beck Depression Inventory (BDI): This inventory evaluates the severity of depressive symptoms with 21 items. The cut-off point is 17. The severity of depression is minimal (0-9), mild (10-16), moderate (17-28), and severe (29-63).[16] Its reliability and validity in Turkish were conducted.[17] The scale was given to mothers.

Beck Anxiety Inventory (BAI): This questionnaire evaluates the severity of anxiety symptoms. It has 21 items. The cut-off point is 16. The severity of anxiety is minimal (0-7), mild (8-15), moderate (16-25), and severe (26-63).[18] Its reliability and validity in Turkish were conducted.[19] The scale was given to mothers.

Adult Attention Deficit Hyperactivity Disorder Self-Report Scale (A-ADHD-SRS): The scale has been developed by the World Health Organization (WHO) for screening ADHD symptoms. It has 18 items: 9 inattention and 9 hyperactivity/impulsivity criteria.[20] Turkish reliability and validity of this scale were performed.[21] Mothers filled out the scale. Total score, scores of inattentiveness (A-ADHD-SRS-I) and hyperactivity/impulsivity (A-ADHD-SRS-HI) were calculated.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) 26 was used for data analysis. The normality of the data was evaluated by Kolmogorov-Smirnov statistics. Descriptive analysis (mean, standard deviation [SD], percentage) was used. Student's t-test was performed to compare the two independent groups when parametric test assumptions were met. The Chi-square test was used to compare two categorical variables, and Fisher's exact test was performed when the sample size was small (i.e. psychiatric diagnosis, time spent on the phone, phone usage). The Pearson correlation coefficient was calculated to determine the relationship between two continuous variables. The Cronbach's alpha value for NMP-Q was calculated for internal consistancy. A p value of <0.05 was accepted as the level of statistical significance.

Results

A total of 155 adolescents (93 girls, 60%) and their mothers were evaluated. The mean age of adolescents was 14.87±1.47 years. The Cronbach's alpha value for NMP-A was 0.808 and indicated acceptable internal consistancy. Among the adolescents, 93 (60%) were in the With-NoMP group, while 62 (40%) were in the Without-NoMP group. There were significantly more girls in the With-NoMP group (n:63, 67.7% girls) ($p<0.05$). The mean NMP-A scores for girls and boys were 69.04±23.78 and 62.0±25.81, respectively ($p=0.083$). There were no statistically significant differences in sociodemographic variables (parents' age, occupational status, educational status, living place, number of siblings) between the two groups.

The mean age of mothers was 42.22±6.54 years (median:42.5, min:24, max:55). Sixty-four mothers (41.3%) were classified as nomophobic based on their NMP-M scores.

Results of scales

Nomophobic adolescents spent more time on smartphones than non-nomophobic adolescents. The level of nomophobia was higher in mothers of the With-NoMP group, and the emotional availability of fathers were lower in the With-NoMP group compared to the Without-NoMP group. (Table I) Pearson correlation analysis revealed a significant correlation between NMP-A and NMP-M (r:0.311, $p<0.001$). (Table II)

Table I. Variables among adolescents in terms of NoMP.

Variables	Without-NoMP (n:62)	With-NoMP (n:93)	p-values
Gender			
Girls	30 (48.4%)	63 (67.7%)	0.019*
Boys	32 (51.6%)	30 (32.3%)	
Psychiatric diagnosis			
Depressive disorders	16 (25.8%)	37 (41.1%)	0.06[a]
Specific phobia	6 (9.7%)	12 (13.3%)	0.613[a]
Social phobia	14 (22.6%)	23 (23.6%)	0.705[a]
Generalized anxiety disorder	13 (21%)	27 (30%)	0.262[a]
Obsessive compulsive disorder	5 (8.1%)	4 (4.4%)	0.487[a]
ADHD	21 (33.9%)	45 (50%)	0.07[a]
ODD	1 (1.6%)	8 (8.9%)	0.08[a]
Binge eating disorder	3 (4.8%)	11 (12.2%)	0.158[a]
Time spent on smartphone (hours/day)			
<1	7 (11.3%)	2 (2.2%)	0.032[a]*
1-2	19 (30.6%)	12 (13.3%)	0.013[a]*
2-4	17 (27.4%)	26 (28.9%)	1.000[a]
4-6	15 (24.2%)	25 (28.9%)	0.709[a]
>6	4 (6.5%)	25 (27.8%)	0.001[a]*
Phone usage main purposes			
Playing games	10 (16.1%)	23 (25.6%)	0.230[a]
Watching videos	25 (40.3%)	24 (26.7%)	0.08[a]
Social media	10 (16.1%)	24 (26.7%)	0.166[a]
Communication	11 (17.7%)	16 (17.8%)	1.000[a]
Education	6 (9.7%)	3 (3.3%)	0.160[a]
Age (year)	14.76±1.48	14.95±1.46	0.436[b]
NMP-A	41.87±11.03	82.46±16.75	<0.001[b]*
Not being able to communicate	9.0±3,42	15.63±5.53	<0.001[b]*
Losing connectedness	10.56±4.39	20.34±6.46	<0.001[b]*
Not being able to access information	15.16±6.28	31.14±7.27	<0.001[b]*
Giving up convenience	7.15±2.89	15.34±6.35	<0.001[b]*
NMP-M	45.08±16.13	55.30±23.56	0.003[b]*
BDI	12.55±8.34	13.19±7.81	0.628[b]
BAI	12.11±9.25	11.97±10.64	0.930[b]
A-ADHD-SRS			
Total	21.48±9.83	21.33±9.57	0.924[b]
Inattentiveness	10.13±5.62	10.86±5.45	0.420[b]
H/I	11.35±5.63	10.47±5.28	0.323[b]
SSAS-C-F	39.77±12.83	37.66±11.13	0.277[b]
LEAP-M	71.56±18.54	67.92±21.24	0.274[b]
LEAP-F	64.08±22.38	54.02±24.92	0.013[b]*

Data are presented as mean +/- SD or n (%), as appropriate; [a]Fisher's exact test, [b]Student's t-test, *Statistically significant, ADHD: Attention Deficit Hyperactivity Disorder, A-ADHD-SRS: Adult Attention Deficit Hyperactivity Disorder Self-report Scale, BAI: Beck Anxiety Inventory, BDI: Beck Depression Inventory, H/I: hyperactivity/impulsivity, LEAP-M: Lum Emotional Availability of Parents-Mothers, LEAP-F: Lum Emotional Availability of Parents-Fathers, NMP-A: Nomophobia Questionnaire-Adolescents, NMP-M: Nomophobia Questionnaire-Mothers, NoMP: nomophobia, ODD: Oppositional Defiant Disorder, SD: standard deviation, SSAS-C-F: Social Support Appraisal Scale for Children- Family.

Table II. Univariate analysis of the relationships between NMP-A and the other variables.

Variables	r[a]	p
NMP-M	0.308	*<0.001**
BDI	0.048	0.555
BAI	0.063	0.434
A-ADHD-SRS	0.043	0.595
SSAS-C-F	-0.144	0.074
LEAP-M	-0.050	0.540
LEAP-F	-0.157	0.055

[a]Pearson correlation analysis, *Statistically significant, A-ADHD-SRS: Adult Attention Deficit Hyperactivity Disorder Self-report Scale, BAI: Beck Anxiety Inventory, BDI: Beck Depression Inventory, LEAP-M: Lum Emotional Availability of Parents-Mothers, LEAP-F: Lum Emotional Availability of Parents-Fathers, NMP-A: Nomophobia Questionnaire-Adolescents, NMP-M: Nomophobia Questionnaire-Mothers, SSAS-C-F: Social Support Appraisal Scale for Children- Family

The only difference found when comparing nomophobic girls with nomophobic boys was in LEAP-F scores, which was lower in girls. (Table III) Nomophobic girls also had higher NMP-M scores (43.37±17.96 and 55.46±23.99, p:*0.016*) and lower LEAP-F scores compared to non-nomophobic girls (62.18±22.68 and 48.55±25.51, p:*0.018*).

Results of mothers

Mothers were considered nomophobic if their NMP-M score was ≥60. Table IV shows the differences between nomophobic and non-nomophobic mothers. The two groups differed in terms of time spent on smartphones, BDI, BAI, and A-ADHD-SRS.

Discussion

In this study, the prevalence of NoMP among adolescents was found to be 60%, which is consistent with the range reported in previous population-based studies in our country (40-80%).[10,22,23] The higher prevalence in this clinical sample may be due to the nature of the population studied.

In our study, the prevalence of NoMP among mothers was 41%, which was lower than the prevalence among adolescents. Studies of NoMP

Table III. Comparison of nomophobic girls with nomophobic boys.

Variables	Girls with-NoMP (n:63)	Boys with-NoMP (n:30)	p-values
NMP-A	81.94±16.45	83.57±17.60	0.663
Not being able to communicate	15.62±5.44	15.67±5.80	0.969
Losing connectedness	20.79±6.30	19.40±6.81	0.334
Not being able to access information	31.02±7.37	31.40±7.17	0.813
Giving up convenience	14.51±6.20	17.10±6.42	0.065
NMP-M	55.46±24.0	54.97±23.03	0.925
BDI	13.40±7.60	12.77±8.35	0.718
BAI	12.25±10.65	11.37±10.78	0.709
A-ADHD-SRS			
Total	21.73±10.23	20.50±8.09	0.565
Inattentiveness	11.06±5.97	10.43±4.22	0.605
H/I	10.67±5.53	10.07±4.77	0.611
SSAS-C-F	36.13±11.56	40.87±9.59	0.05
LEAP-M	65.89±21.62	72.20±20.11	0.182
LEAP-F	48.55±25.51	65.34±19.55	*0.002**

Data are presented as mean +/- SD or n (%), as appropriate; *Statistically significant, A-ADHD-SRS: Adult Attention Deficit Hyperactivity Disorder Self-report Scale, BDI: Beck Depression Inventory, BAI: Beck Anxiety Inventory, H/I: hyperactivity/impulsivity, LEAP-F: Lum Emotional Availability of Parents-Fathers, LEAP-M: Lum Emotional Availability of Parents-Mothers, NoMP: Nomophobia, NMP-A: Nomophobia Questionnaire-Adolescents, NMP-M: Nomophobia Questionnaire -Mothers, SD: Standard deviation, SSAS-C-F: Social Support Appraisal Scale for Children- Family

Table IV. Characteristics and levels of depression, anxiety, and attention/hyperactivity in mothers.

Variables	NMP-M<60 (n:91, 58.7%)	NMP-M≥60 (n:64, 41.3%)	p-value
Age (year)	42.40±6.33	42.98±5.35	0.613
Socioeconomic status (TL/month)			
Low (<5000)	26 (28.9%)	16 (25.0%)	
Moderate (5001-19999)	90 (68.9%)	45 (70.3%)	0.632
High (>20000)	2 (2.2%)	3 (4.7%)	
Living place			
Rural	3 (3.3%)	1 (1.6%)	0.643
Urban	88 (96.7%)	63 (98.4%)	
Educational status			
Primary school (4 years)	21 (23.3%)	7 (10.9%)	
Middle school (4 years)	5 (5.6%)	8 (12.5%)	0.125
High school (4 years)	41 (45.6%)	29 (45.3%)	
University	23 (25.6%)	20 (31.3%)	
Occupational status			
Not working	56 (61.5%)	36 (56.2%)	0.512
Working	35 (38.5%)	28 (43.8%)	
"Do you think you use the phone too much?"			
Yes	32 (35.2%)	35 (54.7%)	*0.021**
No	59 (64.8%)	29 (45.3%)	
Time spent on smartphone (hours/day)			
<1	36 (39.6%)	10 (15.6%)	
1-2	32 (35.2%)	25 (39.1%)	
2-4	18 (19.8%)	20 (31.3%)	*0.008**
4-6	4 (4.4%)	6 (9.4%)	
>6	1 (1.1%)	3 (4.7%)	
BDI	11.77±7.85	14.59±8.186	*0.03**
BAI	10.51±9.15	14.19±10.98	*0.02**
A-ADHD-SRS			
Total	19.35±9.37	24.30±9.33	*0.001**
Inattentiveness	9.38±5.37	12.25±5.30	*0.001**
Hyperactivity/Impulsivity	9.97±5.50	12.05±5.10	*0.018**
NMP-A	60.45±24.11	74.44±23.51	*<0.001**
Without-NoMP (n)	46 (50.6%)	16 (25%)	*0.001**
With-NoMP (n)	45 (49.4%)	48 (75%)	

Data are presented as mean +/- SD or n (%), as appropriate; *Statistically significant, A-ADHD-SRS: Adult Attention Deficit Hyperactivity Disorder Self-report Scale, BAI: Beck Anxiety Inventory, BDI: Beck Depression Inventory, NMP-A: Nomophobia Questionnaire-Adolescents, NMP-M: Nomophobia Questionnaire-Mothers, NoMP: Nomophobia, SD: Standard deviation, TL: Turkish lira.

among adults are scarce. In a population-based study among adults, moderate/severe NoMP was more common in younger participants, with a prevalence of 58%.[4] The prevalence of specific phobia and separation anxiety disorder in adults is 2.6-12.5% and 6.6%, respectively.[24,25] However, the prevalence of NoMP, even though it is considered a type of phobia or separation anxiety disorder, was much higher than both. In some studies, excessive smartphone usage due

to professional responsibilities was associated with NoMP among young adults[23], while in this study, we did not find any differences in sociodemographic variables.

Girls were found to be more nomophobic in our study, which is consistent with many previous studies.[9,10,22] It is possible that girls are more open to seeking psychiatric services, which could explain their higher representation in this clinical sample.[26] Moreover, the prevalence of anxiety disorders is generally higher in girls and the definition of NoMP is discussed based on anxiety.[1,27] Girls also tend to use smartphones more for communication purposes[28], and NoMP is rooted in the fear of being unable to interact with others. These factors may contribute to the gender differences observed. However, it should be noted that some studies have found males to be more nomophobic[29], and while others have found no significant gender differences.[30] These discrepancies may be attributed to the variations in sample ages or the countries where the studies were conducted.

Emotional availability of parents refers to the emotional elements of the child-parent relationship, including parental support, sensitivity, warmth, and closeness. LEAP measures adolescents' perception of maternal and paternal emotional accessibility in terms of these factors.[10] In general the fathers tend to score lower than mothers on the LEAP scale.[31] The effect of gender on paternal LEAP scores is still controversial, with some studies reporting lower scores in girls[31,32] and others finding no gender effect.[33] Maternal emotional availability is considered more significant to a child's functioning than paternal availability.[10] However, the perception of emotional availability from the opposite-gender parent is often more important than that from the same-gender parent, particularly in daughter-father interactions. Fathers play a crucial role in introducing the world to their children, and this role is believed to be more critical for daughters during adolescence as they strive to gain autonomy and independence. Daughters may experience a more restrictive attitude from their fathers during this separation-individuation process.[34] In this study, the emotional accessibility of fathers was found to be lower and significantly related to NoMP, particularly in girls. This finding suggests that emotional distance from the father may contribute to a disrupted separation-individuation process, leading to NoMP. Additionally, high levels of NoMP in mothers could potentially influence higher NoMP levels in adolescent girls through role modeling.

Perceived social support from family was similar between the two groups of adolescents in our study. A study conducted during the COVID-19 pandemic found that greater family support protected against NoMP.[35] Some studies have found no relationship between social support and NoMP[36], while others reported a negative relationship.[37] These varying results suggest that social support may have a moderated effect on NoMP rather than a direct one. In Turkish culture, which is generally collectivistic, family connections are highly valued.[34] Therefore, it is expected that perceived social support from the family would be higher overall in our country.

In this study, we found no differences in depression, anxiety, and ADHD levels between mothers of nomophobic and non-nomophobic adolescents. The lack of association between maternal psychopathology and adolescent NoMP is interesting and similar to the findings observed in children with specific phobias.[38] Further research is needed to explore the relationship between maternal psychopathology, maternal NoMP, and adolescent NoMP.

In our study, we found that nomophobic mothers had higher scores on depression, anxiety, and ADHD scales. The anxiety experienced by mothers with NoMP may be attributed to the difficulty of reaching family members during emergencies.[39] Mothers with higher anxiety levels tend to check and use their phones more frequently to connect with their children. NoMP is associated with loneliness among adolescents[40], which could

also be applicable to adults. Mothers with NoMP exhibited more psychopathologies, and it is possible that psychopathologies could lead to or result from loneliness. Additionally, fathers with lower emotional availability may contribute less to the family, leading mothers to feel more lonely and burdened. A study found a relationship between parental depression and internet addiction.[41] Dysfunctional family dynamics increase the risk of smartphone addiction among adolescents.[42] Furthermore, a positive parent-child relationship reduces the likelihood of technological dependence in adolescents.[43] The amount of time adolescents and parents spend on smartphones is also related.[44] A higher amount of time spent by mothers on smartphones may indicate dysfunctional parenting or serve as a model for the child.

This study has many limitations. Firstly, the cross-sectional design does not allow for casual relationships to be established. Secondly, the sample was collected from a single tertiary care center, which limits the generalizability of the results. Thirdly, the use of self-reported scales introduces the possibility of reporting bias. Fourth, although NMP-Q was used in studies with adolesents[10], and the Cronbach's alpha value for NMP-A showed acceptable internal consistency in this study, the grouping of adolescents would differ with different threshold values. This could increase the risk of type I errors. Finally, it would be important to investigate whether the mothers in the study had a psychiatric diagnosis, as the scales used do not provide a diagnostic assessment.

Future studies should investigate the effects of fathers, marital harmony, and parenting styles on NoMP. Considering the treatment of NoMP, it is recommended to assess the entire family, particularly in the case of girls. Additionally, studies on NoMP in adults would provide valuable information about the impact of NoMP on parenting.

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Ethical approval

This research has been approved by the Hacettepe University Non-Interventional Clinical Research Review Board (GO 22/205). Written consent was taken from all adolescents and their mothers.

Author contribution

The authors confirm contribution to the paper as follows: study conception and design: YSÇ, BEA; data collection: YSÇ; analysis and interpretation of results: YSÇ, BEA; draft manuscript preparation: YSÇ, BEA. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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