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Anxiety, Addiction to Social Networks, Internet and Smartphones in Paraguayan Adolescents: A Brief Report

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Abstract

Background: Several authors have pointed out that the use of smartphones might have an impact on mental health in general. Most of the evidences are focused on the incorrect or overblown use of smartphones, videogame or Internet, particularly focusing on related addiction problems among adolescents.
Objective: The present study, although preliminary, aims to report the first evidence in Paraguay regarding the association between anxiety and addiction to social networks/internet as well as the use of smartphones among adolescents.
Method: Participants (100 adolescents, aged 12- 17 years old) were assessed in a school setting with the Beck Anxiety Inventory (BAI) and the Scale of risk of Addiction to Social Networks and Internet for adolescents (ERA-RSI). Categorical variables and associations were statistically assessed.
Results: The average smartphone use in boys rated 8.06 ±3.81 hours and in girls 9.46 ±4.4 hours. The BAI mean score was 20.71 ± 13.2. Of the participants, 27% reported moderate anxiety, and 36% severe anxiety and scores on this scale were not associated with hours of smartphone use. The ERA-RSI mean score was 1.94 ± 0.46 and anxiety was related to the symptoms-addiction, social-use, and nomophobia dimensions of the scale.
Conclusion: The misuse of smartphones in the Paraguayan pediatric population has been reported to be closely related to anxious symptoms. Our results suggest further research with an impact on possible public health policies aimed at preserving the mental health of children and adolescents exposed to internet and electronic devices.

Keywords: Adolescents; Anxiety; Addiction; Internet; Smartphone.

Introduction

Emotional regulation is an important skill to be developed during the childhood and adolescence in order to learn how to manage and cope with external and internal stimuli (1).

Several authors have pointed out that the use of smartphones might have an impact on mental health in general. Most of the evidences are focused on the incorrect or overblown use of smartphones, videogame or Internet, particularly focusing on related addiction problems (2–4).

In Paraguay, the number of smartphone users is supposed to be 5,914,711, which means 91.6% of the national population. Also, approximately 1.3 million people use the internet, 700 thousand Paraguayans are registered on Facebook and the current internet presence throughout the national territory is supposed to be of 20% (5).

Over the past decade, there has been an increase in smartphone use among children and young people (6) with an increase in common mental disorders across the same-age group, including anxious and

depressive symptoms, sleep deprivation, and suicidal ideation (7,8). All these data have had an impact on quality of lives and economy (9,10).

Smartphone ownership in children aged ≥11 years old seems to be pervasive as well as the prevalence of mental health problems during adolescence. There is uncertainty gap regarding the possible association between smartphone use and mental health in children and adolescents, and policies are missing based on the lack of evidences (4).

Explicitly, it has been debated if any association between the amount of time spent using smartphones with clinically defined mental health outcomes in children may be recognized (11,12). Also, the agreement on operational criteria for defining addiction has been not reached in the literature (13). This may lead to contradictory findings on the smartphone use, poor mental health, and smartphone-related behaviors.

The concept of addiction remains difficult to establish, and even the use of the term addiction has often been considered controversial; however, what is nuclear in its conception is dependence on a substance or activity (14).

Smartphone addiction can be defined as a behavioral addiction including mood tolerance, salience, withdrawal, modification, conflict, and relapse (15). Moreover, tolerance, salience, withdrawal, and cravings have been associated with excessive smartphone use (16).

Smartphone addiction not only has physical effects, but also psychological and academic effects. Sleep deficit, anxiety, stress, and depression, all of which are associated with Internet abuse, have also been linked to smartphone use (17). In particular, research has shown that higher levels of anxiety have been observed in adolescents at high risk for smartphone addiction (18,19).

In Paraguay, the reported frequency of anxiety disorders in children and adolescents is 12.5% (20); however, to the best of our knowledge, no previous study has explored the possible association between the development of anxious symptoms and the use of smartphones in this population. Also, evidence regarding the internet/social network addiction is not available. This present study, although preliminary, aims to report the first evidence in Paraguay regarding the association between anxiety and addiction to social networks/internet as well as the use of smartphones among adolescents

Methods
Participants
This was a descriptive, cross-sectional, temporally prospective study. The sample included 100 adolescents, aged 12 -17 years old, attending two public schools in the city of Asunción, capital of Paraguay, selected by convenience, during December 2021. Informed consent and permissions were obtained from pupils' parents to conduct the research. All participants and their parents received full information about the purpose of the study, privacy, and data processing. No payment was provided for participating in the study.

Measures
Age, gender, amount of time spent using the smartphone, score at the Beck Anxiety Inventory (BAI), and score at the Scale of Risk of Addiction to Social Networks and Internet for adolescents (ERA-RSI) were assessed.

Beck Anxiety Inventory (BAI)
BAI is a useful tool assessing somatic symptoms of anxiety, both in anxiety disorders and depressive disorders. The questionnaire consists of 21 questions, providing a range of scores between 0 and 63. The total score is the sum of all items. Symptoms refer to the last week and to the current period (21). In this research we used the Spanish adaptation of the BAI. This adaptation has been validated and demonstrated excellent psychometric properties, with Cronbach's alpha coefficients of internal consistency reliability for three samples of .90, .91, and .88, respectively (22). Cronbach's alpha for the current sample is described in the results section of the present study.

Respondents were invited to report the duration of any of 21 symptoms in the last week. Each symptom item reports four answer choices: Not at All; Mildly (*It did not bother me much)*; Moderately (*It was very unpleasant, but I could stand it*), and Severely (*I could barely stand it*). The clinician may assign the following values to each response: Not at All = 0; Mildly = 1; Moderately = 2, and Severely = 3. The values for each item are summed yielding an overall or total score for all 21 symptoms that can range from 0 to 63 points. A total score of 0–7 is interpreted as a "Minimal" level of anxiety; 8–15 as "Mild"; 16–25 as "Moderate", and; 26–63 as "Severe" (23).

Scale of risk of addiction to social networks and Internet for adolescents (ERA-RSI)
Originally developed in Spanish by Peris et al (24), this scale consists of 29 items grouped into four factors: symptoms-addiction, social-use, freak-traits, and nomophobia. The symptom-addiction factor has 9 items and checks on behaviors of addiction to non-toxic substances, taking up the criteria of addiction to online technologies. The social-use factor includes 8 items and assesses habitual behaviors of adolescents who use social networks and the Internet for social-virtual interaction. The freak-traits factor, with 6 items, includes aspects such as joining groups

with specific interests, playing virtual and role-playing games and, in general, typical behaviors of people who excessively and obsessively practice a largely extravagant, rare or eccentric hobby. Finally, the nomophobia factor groups 6 items related to behaviors that indicate an intense fear of being without a cell phone (25). The internal consistency of the scale has been confirmed (α=.90). Cronbach's alpha for the current sample is described in the results section of the present study.

The scores range from 1: Never or almost never; 2: Sometimes; 3: Quite often; and 4: Many times or always. The score for each dimension is obtained by adding the corresponding items and dividing by the number of items, as well as with the total scale.

Statistical analysis

Data were loaded into a spreadsheet and then processed with the statistical package EpiInfo version 7.2. Categorical variables were summarized with descriptive statistics, through measures of central tendency and dispersion. To assess associations, Student's t-tests and ANOVA were used, as appropriate, after testing for normality and homogeneity of variances. A significance equal to $p<0.05$ was considered.

Scales' reliability was measured with Cronbach's alpha. Alpha values are described as excellent (0.93–0.94), strong (0.91–0.93), reliable (0.84–0.90), robust (0.81), fairly high (0.76–0.95), high (0.73–0.95), good (0.71–0.91), relatively high (0.70–0.77), slightly low (0.68), reasonable (0.67–0.87), adequate (0.64–0.85), moderate (0.61–0.65), satisfactory (0.58–0.97), acceptable (0.45–0.98), sufficient (0.45–0.96), not satisfactory (0.4–0.55), and low (0.11) (22).

Ethical considerations

The study was approved by the Department of Medical Psychology of the National University of Asuncion, School of Medical Sciences (Paraguay). Data were treated with confidentiality, equality, and justice, respecting the Helsinki principles.

Participants who required feedback from the survey were invited to write down their email address and received information or specific helpful suggestions.

Results

A total of 100 subjects were surveyed, of whom 68 % were women. Age ranged from 12 to 17 years old with a mean of 15.39 ± 1.6 years and a median of 16 years (IQR=3).

Regarding the number of hours spent with the smartphone, it has reported that the average was 9 ± 4.2 hours with a median of 8 hours (IQR=7) ranging between 1 and 18 hours. A weak correlation was found between age and hours of smartphone use (r=0.256; p=0.010). The average smartphone use in boys was 8.06 ± 3.81 hours and in girls 9.46 ± 4.4 hours. However, this difference was not significant (t=1.54, df=98, p=0.127).

BAI reported a strong Cronbach's alpha of .926 (22). The mean score of the scale was 20.71 ± 13.2. Of the participants, 22% have shown minimal anxiety, 15% reported mild anxiety, 27% moderate anxiety, and 36% severe anxiety. Scores on this scale were not associated with hours of smartphone use. Age was also not associated with BAI scores.

TABLE 1. Scores of the ERA-RSI related to anxiety state (n=100)

Dimension	Minimal anxiety		Mild anxiety		Moderate anxiety		Severe anxiety		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	p-value
Symptoms-addiction	1.78	0.48	2.01	0.43	2.19	0.54	2.38	0.72	0.002
Social-use	1.69	0.45	1.87	0.54	1.85	0.50	2.14	0.68	0.026
Freak-traits	1.52	0.44	1.67	0.50	1.68	0.42	1.44	0.43	0.141
Nomophobia	1.64	0.44	2.00	0.71	2.03	0.78	2.33	0.76	0.006

ERA-RSI: Scale of risk of Addiction to Social Networks and Internet for adolescents.

Regarding gender differences, a relationship was found between sex and anxiety levels, being more frequent in women (χ2=8.65, df=3, p=0.034). Similarly, the BAI scale score was higher in women (23.26 ± 13.56) than in men (15.28 ± 10.73) and this difference was significant (t=2.92, df=98, p=0.004).

ERA-RSI proved to be reliable, with a Cronbach's alpha of .89 (22). The mean score of the scale was 1.94 ± 0.46. The mean scores for each of the 4 factors (symptoms-addiction, social-use, freak-traits, and nomophobia) were 2.14 ± 0.62, 1.93 ± 0.59, 1.56 ± 0.45 and 2.05 ± 0.74, respectively. Table 1 shows the mean and standard deviation for each of the 4

factors related to anxiety states. Anxiety was related to all dimensions, except for freak-traits.

Discussion

The aim of the study has been to assess associations between anxiety and addiction to social networks/internet as well as the use of smartphones among Paraguayan adolescents.

Our study has found a rate of moderate anxiety in 27% and of severe anxiety in 36% of sample. These rates were higher than in previous studies reporting 12.5% of anxiety disorders in children [20]. According to the literature, estimates of anxiety frequency in pediatric population may vary between 0.2% and 11% [26,27]. In a relevant meta-analysis, the mean frequency was found to be 1.9% in children and youths [28]. These differences might be due to different data-collection procedures (psychometrics or based on clinical diagnosis).

Although no association between age and anxiety symptom severity has been found in this sample, age-related changes in anxiety prevalence rates have been documented [29], and literature highlights a pattern of increasing anxiety rates during the adolescence [30]. It has been also suggested that the trajectory of prevalence rates roughly follows a U-shaped curve between the ages of 10 and 17 years, such that a pattern of decline in middle childhood is followed by an increasing trend during the late adolescence [31]. Anxiety has been associated to gender, with girls presenting more anxiety symptoms than boys in previous reports [32].

The mean duration of smartphone use was 9 ± 4.2 hours, with 8.06 ± 3.81 hours for boys and 9.46 ± 4.4 hours for girls. Previous evidences have shown an average smartphone usage time of 4.48 hours per day, with 3.40 hours for boys and 5.39 hours for girls [33]. This might be explained by the fact that the COVID-19 pandemic has increased the use of smartphones in the last years [34].

Anxiety has been associated with three of the four dimensions of the Scale of risk of addiction to social networks and Internet for adolescents (ERA-RSI), specifically with the following: symptoms-addiction (assessing addiction behaviors), social-use (virtual socialization relationships of adolescents), and nomophobia (fear, dread or anxiety produced by not being with a cell phone or not having an Internet connection) [35]. Among these dimensions, a higher mean was found for the freak-traits in males than in females, while females scored higher in social-use and nomophobia, in line with other research reports [36]. It has been reported that the number of hours spent using smartphones is a predictor of nomophobia, with a significant correlation between the duration of daily smartphone use, loneliness, anxiety, and nomophobia. In this sense, it might be stated that an increase of smartphones use among adolescents might make them feel lonelier and more anxious and, consequently, with more nomophobic behaviors [37].

The misuse of smartphones in the pediatric population has already been described in multiple studies reporting a close relationship with anxious symptoms, but also with other psychopathological symptoms such as depressive symptoms, psychosocial problems and decreased self-esteem [38,39].

A strength of this research is that, to the best of our knowledge, it is the first evidence from Paraguay regarding the association between anxiety and risk of addiction to social networks/Internet/smartphones among adolescents. Our research could serve as a starting point for further studies on the subject. In addition, the impact of the pandemic on symptoms of mental disorders in children and adolescents should be considered. Recent research conducted in the first year of the COVID-19 pandemic suggests that 1 in 4 young people worldwide have clinically elevated symptoms of depression, while 1 in 5 young people have clinically elevated symptoms of anxiety [40].

Limitations of this research may include a small sampling and the lack of data on differences in sociodemographic factors (e.g., race, ethnicity, education level, etc.) or clinical characteristics (e.g., comorbidity, etc.). Another limitation may include the self-report measures employed to determine anxiety and risk of addiction to the smartphones, even if standardized and validated properly. It should also be noted that the results obtained (hours of smartphone use, BAI, and ERA-RSI scores) might have been influenced by the ongoing COVID-19 pandemic, since pupils have partially returned to face-to-face learning in December 2021, after several months of virtual classes and social isolation.

Clinical Significance

This may encourage further research and impact on the formulation of public health policies aimed at preserving the mental health of children and adolescents exposed to internet and electronic devices.

Conflicts of interest

The authors report no conflicts of interest.

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