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ASSOCIATION BETWEEN EXCESSIVE DAILY SLEEPING AND INTERNET ADDICTION AMONG UNIVERSITY STUDENTS IN SOUTHERN BRAZIL

General Medicine

Rosângela de Mattos Müller*	Postgraduate Program in Public Health, Federal University of Rio Grande, RS, Brazil. *Corresponding Author
Vera Regina Levien	Maternal and Child Department, Federal University of Pelotas, RS, Brazil
Elaine Tomasi	Department of Social Medicine, Federal University of Pelotas, RS, Brazil
Elaine Albernaz	Maternal and Child Department, Federal University of Pelotas, RS, Brazil
Samuel C. Dumith	Postgraduate Program in Public Health, Federal University of Rio Grande, RS, Brazil

ABSTRACT

Introduction: The Internet has an undeniable importance in facilitating communication and integration between people from all over the world in a globalized society. However, some users use the network in an exacerbated way, mainly teenagers and young adults, and may show interpersonal conflicts, academic or financial losses, changes in their daily routine, modifying their circadian cycle, and consequently, triggering sleep disorders and excessive daytime sleepiness. **Objective:** To verify the prevalence of daytime sleepiness in university students and investigate the association with Internet addiction. **Method:** This is a cross-sectional study conducted at two universities in southern Brazil. The Internet Addiction Test was used to verify the presence of Internet addiction, and the Epworth Sleepiness Scale to assess excessive daytime sleepiness. **Results:** Of the 985 university students interviewed, 34% had a screening test showing mild Internet addiction and 7.5% moderate addiction. No student was classified as having severe Internet addiction. The prevalence of excessive daytime sleepiness was 30% (95% CI 27-33). A positive linear relationship was identified between excessive daytime sleepiness and Internet addiction. University students without addiction had a prevalence of 23%, mild addiction 36%, and those with moderate addiction 45.5% (p-value of linear trend <0.001). **Conclusions:** One in three university students showed excessive daytime sleepiness, and Internet addicts are more likely to show this outcome. Longitudinal studies are mandatory to establish the reasons for excessive internet use and its relationship with sleep disorders.

1. INTRODUCTION

Studies show that adolescents and young adults stay connected longer than planned, predisposing them to changes in the pattern of the sleep-wake cycle, shorter duration and quality of sleep, and excessive daytime sleepiness (EDS)[1,2].

Understanding the implications of the Internet's exacerbated use on the sleep pattern of adolescents and young adults is relevant to establishing a balance between technology use and the user's daily routine. Negative repercussions may occur in the academic life or at work and in the health of these individuals if this balance is not achieved, and may develop to the internet addiction disorder. There is no consensus on the most appropriate term to characterize the disorder[3]. Some authors argue that the most appropriate term would be "pathological use of the Internet", which can be classified as generalized or specific depending on the type of network use[3,4].

A meta-analysis carried out between January 1999 and August 2018 with a sample of 35,684 individuals in 14 countries, including South Korea, Turkey, China, Japan, Taiwan, Spain, Hong Kong, Vietnam, Nepal, Lebanon, Iran, Switzerland, United States of America and Israel, showed that users classified as internet addicts had twice as many sleep disorders as non-addicts, OR=2.20 (95% CI 1.77–2.74)[5]. This study aimed to investigate the association between excessive daytime sleepiness and Internet addiction in university students in southern Brazil.

2. MATERIAL AND METHODS

This is a cross-sectional study carried out at two higher education institutions, one private (Catholic University of Pelotas) and one public (Federal University of Pelotas), located in southern Brazil. A random draw was performed of those who would be part of the sample from the list of courses in each institution. We included students enrolled in the first or second semester of the courses drawn. The collection was carried out between August 2016 and March 2017 through anonymous, self-administered questionnaires, containing closed-ended and open-ended questions.

2.1. INSTRUMENTS

The Epworth Sleepiness Scale[6] was used to evaluate EDS, with eight daily situations where the individual has the possibility of napping or falling asleep, and a four-point Likert scale, ranging from zero (no chance of napping) to three (high chance of napping), making a total of 24 points. Individuals with a score above 10 points were considered to have EDS. The Internet Addiction Test (IAT)[7] was employed to classify university students with Internet addiction. This instrument assesses the use of the network using a 20-item self-completion scale. Each item ranges from one (rarely) to five (always), making a total of 100 points. Individuals with a score of up to 30 points were considered normal, those scoring from 31 to 49 points, mild addicts, from 50 to 79 points, moderate addicts, and above 80 points, severe addicts.

2.2. DATA PROCESSING AND ANALYSIS

The data were double-entered in the Epi-Info[8] program and analyzed using the Stata 15.1[9] program using logistic regression. Possible confounding factors were adjusted by the following intervening variables: gender, age, skin color, economic level (according to the assets index)[10], body mass index[11], physical activity[12], and depressive symptoms[13].

2.3. ETHICAL ASPECTS

All students who agreed to participate in the study signed the Informed Consent Form. Students with screening tests altered for Internet addiction, at risk for gambling addiction and depression were referred to the outpatient clinics of the researched institutions for evaluation. The Ethics Committee of the Catholic University of Pelotas approved the study under opinion N° 56053616.2.0000.5339.

3. RESULTS

A total of 985 university students were interviewed, of which 60% were female, and 80% were white. The mean age was 23 years (SD 7.15), with 42% of the sample being under 20 years of age. We found that 64% of university students were enrolled in the public university. Regarding tobacco use, 10% of university students were smokers, and 31% were overweight. Moreover, we identified that 63% of university students were sedentary. The presence of depressive symptoms among university students was investigated, and we found that 18% of them had an altered screening test. It should be noted that no student had severe depressive symptoms. Regarding addiction to games, we observed that 3% of university students were at risk of game addiction. We identified that 34% (95% CI 31-37) of the students had a screening

test showing mild Internet addiction, and 7.5% (95% CI 4.5-11) moderate addiction. No student was classified as severely addicted.

The prevalence of EDS was 30% (95% CI 27-33). A positive linear relationship was found between Internet addiction and EDS, in which university students without Internet addiction had a 23% prevalence, mild addiction 36%, and those with moderate addiction 45.5% (p-value of linear trend <0.001). Figure 1 illustrates the odds ratios obtained for the association between excessive daytime sleepiness and Internet addiction, both in the crude and adjusted analysis. A dose-response gradient is perceived, where individuals with mild addiction (OR=1.89; 95% CI 1.32-2.71) were 89% more likely to show drowsiness, and those with moderate addiction (OR=2.30; 95% CI 1.26-4.22) were 130% more likely to show drowsiness (p-value of trend <0.001).

Figure 1. Excessive daytime sleepiness by internet addiction level, and crude and adjusted odds ratios*. Pelotas (RS), Brazil, 2017.
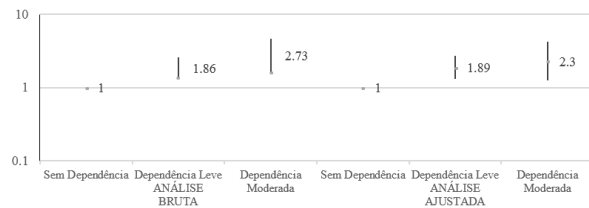
Captions: No addiction, Mild addiction, Moderate addiction (x2), Crude Analysis, Adjusted Analysis.
* Gender, age, skin color, economic level, body mass index, physical activity, and depressive symptoms.

4. DISCUSSION

EDS is defined as an increased subjective perception of the need for sleep. It can affect academic or work performance, social interactions, and predispose to car accidents[14] with severe consequences for society as a whole. The prevalence of EDS among university students in southern Brazil was 30%. A similar result was found in the study by Lund et al., Carried out by the National Sleep Foundation in the U.S., with a sample of 1,125 students, which evidenced a prevalence of EDS of 25% in students aged between 17 and 24 years[15]. Due to extended connection, especially at night, students may develop EDS, hindering their academic and professional growth[14].

Studies show that the adolescent age group would have a higher risk of developing problematic internet use[14-16,20]. It should be noted that the anonymity of the network and the feeling of independence in the virtual environment reinforce this behavior among adolescents, which may predispose them to impulse control disorders, including Internet addiction or problematic use of the Internet[17].

It was found that 34% of university students had mild Internet addiction. A similar result was found by Milani et al., who observed that 36.7% of Italian adolescents had problematic use of the internet[20]. Another study carried out with 2,350 students aged 18 to 25 years, from public and private schools in Turkey, found a lower prevalence, and 17.7% of students were classified as Internet addicts[18]. This difference between rates may have occurred because the Turkish study used a higher cutoff point (IAT score> 65), whereas a lower score was used to categorize students as Internet addicts (IAT score> 30) in this study.

We investigated the relationship of adolescents and young adults with the Internet and its repercussions on the sleep pattern of these young people and found that the excessive use of the network can alter the sleep-wake cycle, predisposing them to excessive daytime sleepiness. It was observed that university students classified as Internet addicts were more likely to show EDS than non-addict students since those with moderate addiction were twice more likely to show EDS than non-addict ones.

The measure of effect found was similar to that evidenced in the meta-analysis by Alimoradi et al., which found that users who were addicted to the Internet had twice as many sleep disorders as non-addicts, OR=2.20 (95% CI 1.77–2.74)[5]. Another similar result was found in a study conducted in Portugal, which showed a statistically significant relationship between Internet addiction and EDS among Portuguese adolescents (p<0.01)[19].

5. LIMITATIONS

This study had some limitations, such as the use of self-administered questionnaires, which can interfere with their proper completion. Moreover, its cross-sectional design may have led respondents to have some memory bias, compromising the accuracy of the completed data, and also hindered the establishment of causality.

6. CONCLUSIONS

One in three university students had EDS, and Internet addicts were more likely to show this outcome. Longitudinal studies that investigate the causal relationships of Internet addiction are mandatory in order to establish the reasons for the excessive use of the network and its relationship with sleep disorders. Health professionals must guide adolescents and young adults on the appropriate use of technology, in order to establish a balance between the infinite network-provided features and the user's daily routine, keeping healthy lifestyle habits and adequate sleep hygiene.

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