



ADICÇÃO EM INTERNET EM ESTUDANTES SECUNDARISTAS: PREVALÊNCIA E CORRELAÇÕES

Internet addiction in high school students: prevalence and correlations

Alexandre Botelho Brito¹
Wesley Miranda Lourenço de Freitas²
Débora Guimarães Cunha³
Kewla Dias Pires Brito⁴
Romerson Brito Messias⁵
Lucineia Pinho⁶
Maria Fernanda Santos Figueiredo Brito⁷
Marise Fagundes Silveira⁸

Abstract: Objective: to investigate the prevalence of Internet addiction among high school students in Montes Claros-MG and the associated Internet usage profile. **Methodology:** This is a quantitative, analytical and cross-sectional study of a sample of 966 high school students, both public and private. A questionnaire was applied that includes socio-demographic variables, training and Internet usage profile, as well as Internet Addiction Test. The Pearson correlation coefficient was used to test the linear correlation between the characteristics of use and internet addiction, at a statistical significance of 5% ($p < 0.05$). This study was conducted within the standards of the Helsinki Declaration and approved by the Research Ethics Committee under Protocol # 1,520,173 / 2016. **Results:** The prevalence of addiction was 9.8%, correlated with type of institution ($p = 0.005$), daily frequency of internet use ($p = 0.001$), number of days of weekly use ($p = 0.014$), number of hours of use on weekends and holidays ($p = 0.041$) and use at night ($p = 0.004$). No correlation was found to access online games, to perform school activities or for professional purposes, but was found with access to social networks ($p = 0,000$), e-mails ($p = 0,033$) and with the purpose of watching movies, music and videos ($p = 0,014$). Addicted users also demonstrated an awareness of addiction / addictive behavior ($p = 0.000$). **Conclusion:** It was concluded that addiction is associated with habits of Internet use and that they are aware of their addiction.

Keywords: Internet; Addiction; Students.¹

Autor para correspondência: Alexandre Botelho Brito
E-mail: alexandre.brito@ifnmg.edu.br

¹Doutorando em Ciências da Saúde Instituto Federal do Norte de Minas Gerais (IFNMG); alexandre.brito@ifnmg.edu.br

²Graduando em medicina Universidade Estadual de Montes Claros (UNIMONTES); wesley18miranda@gmail.com

³Graduanda em medicina Universidade Estadual de Montes Claros (UNIMONTES); debguimaraes2@gmail.com

⁴Mestre em Educação Matemática Instituto Federal do Norte de Minas Gerais (IFNMG); kewla.brito@ifnmg.edu.br

⁵Mestrando em Cuidados Primários da Saúde Universidade Estadual de Montes Claros (UNIMONTES); romersonbrito@yahoo.com.br

⁶Doutora em Ciências da Saúde Universidade Estadual de Montes Claros (UNIMONTES); lucineiapinho@hotmail.com

⁷Doutora em Ciências da Saúde Universidade Estadual de Montes Claros (UNIMONTES); nanda_sanfig@yahoo.com.br

⁸Doutora em Saúde Coletiva Universidade Estadual de Montes Claros (UNIMONTES); ciaestatistica@yahoo.com.br

Resumo: Objetivo: investigar a prevalência de adicção em internet dos estudantes secundaristas de Montes Claros-MG e o perfil de utilização da internet associados. **Metodologia:** Trata-se de um estudo quantitativo, analítico e transversal em uma amostra de 966 alunos do ensino médio público e privado. Foi aplicado um questionário que contempla variáveis sociodemográficas, de formação e de perfil de utilização da internet, além do *Internet Addiction Test*. O coeficiente de correlação de Pearson foi usado para testar a correlação linear entre as características de utilização e a adicção em internet, a uma significância estatística de 5% ($p < 0,05$). Este estudo foi conduzido dentro dos padrões da declaração de Helsinki e aprovado pelo Comitê de Ética em Pesquisa sob protocolo nº 1.520.173/2016. **Resultados:** A prevalência de adicção encontrada foi de 9,8%, correlacionada com o tipo de instituição ($p = 0,005$), frequência diária de uso da internet ($p = 0,001$), número de dias de uso semanal ($p = 0,014$), número de horas de utilização em fins de semana e feriados ($p = 0,041$) e utilização no período noturno ($p = 0,004$). Não foi encontrada correlação ao acesso para ver jogos online, realizar atividades escolares ou com finalidade profissional, mas foi encontrada com o acesso a redes sociais ($p = 0,000$), e-mails ($p = 0,033$) e com o objetivo de ver filmes, músicas e vídeos ($p = 0,014$). Os usuários adictos demonstraram ainda ter ciência do comportamento adicto/viciante ($p = 0,000$). **Conclusão:** Concluiu-se que a adicção está associada com hábitos de utilização da internet e que os mesmos têm consciência da sua adicção.

Palavras-chave: Internet; Adicção; Estudantes.

INTRODUCTION

In the last decade there was an exponential growth of internet usage, with more than 2.5 million active users.¹ The majority of these are teenagers or young adults, and next to this increase, the problematic use and vicious of this tool has developed, being called internet addiction.^{1,2}

The addiction Internet, terminology that began to be used by Young in 1998, was characterized by uncontrollable behavior related to the use of computer or internet access.^{3,4} The individual addict has greater inclination for a life based on online interaction at the expense of real relationships.³ Students with this type of disorders can develop serious personal, social and family problems that are permeated by the intense changes both biological and psychological, in this age range.^{1,4}

The plurality of means of access to the network has expanded considerably.⁴ In a study conducted between 2006 and 2017 with 792 students, it was found that the problematic internet use by means of smartphones has increased in the last

decade.⁵ As a catalyst in this process there are the social networks, which have been the target of a chinese study that showed that 25% of 1015 high school students had a certain degree of addict in this tool.⁶

The number of hours that the young person spends in front of the computer also has an important relationship with the levels of addiction.⁷ In a survey conducted with 1450 adolescents, 13.7% had internet dependency, being that 4.2% of these spent more than 5 hours online daily.⁸ In another study conducted with adolescents in Xanghai revealed that, of 449 addicts identified, 23.2% spent more than 28 hours per week online.⁷ Furthermore, it was observed that the days of the week influence the risk of dependence. The addicts used the internet more frequently on weekends and public holidays than on weekdays. This is explained by the fact that adolescents have more free time these days and also lower level of parental supervision.⁷

Genre is another important factor that must be considered when

investigating internet addiction of young people. In several studies, men have a higher prevalence of addiction than women.^{9,10} In addition, the characteristics of use of these addicts are also different. While boys are more addicted in online games, the girls have a greater predisposition to develop

dependence on social networks.^{4,11}

Thus, a diversity of variables is identified that underlie the development of Internet addiction in adolescents. In addition, the objective of this research is to investigate them in population of high school students of Montes Claros, MG.

METHODOLOGY

This was a cross-sectional study of quantitative nature, which investigated a population consisting of high school students regularly enrolled in public and private schools, from the 1st to the 3rd series of the city of Montes Claros, Minas Gerais. The sample size was defined by means of calculation for finite populations, considering the prevalence of the event of 50%, confidence level of 95%, standard error of 5%. Data were used from the school census of 2012 and 2014 for the number of students of education network of the municipality. It was estimated the participation of at least 748 adolescents. It was adopted the correction for the design effect ($Deff=2.0$) and was established also an increase of 20% as non-response rate. It was used as an inclusion criterion being a student regularly registered in the institution and in the selected class.

As an exclusion criterion, it was considered the fact that the student will not be present on the day scheduled for the data collection or not handing the informed consent.

As an instrument of data collection, a questionnaire was used which included sociodemographic variables (sex, age and socioeconomic class), training (institution of study, shift and series) and use of the internet such as hours of use, time, days of access and means to do it).

In order to assess the Internet addiction, it was used the *Internet Addiction Test* (IAT). The scale consists of 20 items that cover all three dimensions: Isolation and social problems, time management and performance and replacement of reality. Each item is in a Likert scale from 1 (rarely) to 5 (always). The total score can vary from 20 to 100 points. The

classification of the addiction is performed according to the score obtained by the individual in:

- Median user, who has full control over its use (20 to 39 points);
- Problematic user, that has occasional problems (40 to 69 points);
- User with addiction, which has significant problems because of the use of the Internet (70 to 100 points).

Data collection was carried out in the classroom, between the second half of 2016 and the first half of 2017. The instrument was delivered, after the teachers' authorization, being answered by the students and collected, shortly after, along with the Free and Informed Consent Form (ICF) signed by the interviewees' parents, along with the

Adicção em internet em estudantes secundaristas: prevalência e correlações

BRITO, A. B.; FREITAS, W. M. L.; CUNHA, D. G.; BRITO, K. D. P.; MESSIAS, R. B.; PINHO, L.; BRITO, M. F. S.F. SILVEIRA, M. F.

informed consent signed by the same.

For data analysis, the statistical software SPSS (*Statistical Package for Social Sciences*), version 20.0 was used, the results regarding the studied sample were obtained by means of simple descriptive statistics (frequency, percentage, mean and standard deviation). The Pearson correlation coefficient was used to test the linear correlation between the characteristics of Internet use (use profile) and internet addiction, at a statistical significance of 5% ($p < 0.05$).

This study, complying with resolution # 466 dated from December 12th of 2012 and the Operational Norm no. 001/2013 dated from September 30th of 2013 of the National Health Council/Ministry of Health, was approved by the Research Ethics Committee under protocol no. 1.520.173/2016.

RESULTS

In this study, it was observed that 53.4% of 966 participants were female and 46.6% male, aged between 14 and 25 years, being that 78.7% were between 15 and 17 years. The majority was public school student (84.8 %) and studied in the morning

period (91.5%) and 82.2% stated not to reconcile work and study

Table 1 - Sociodemographic characteristics of high school students in the municipality of Montes Claros - MG.

	N	%
Sex		
Female	516	53.4
Male	450	46.6
Age		
15-17 years	761	78.8
≤ 18 years	205	21.2
Shift		
Morning	883	91.5
Afternoon	3	0.3
Night	54	5.6
Full time/Daily	25	2.6
Types of Educational institution		
Public	819	84.8
Private	147	15.2
Reconciles work and study		
Yes	172	17.8
No	793	82.2

Through the application of Internet Addiction Test (IAT), it was found that 9.8% of the students presented themselves as users addicts and the majority of the sample (52.3%) made problematic use of internet, while the remainder (37.9%) presented as median user.

Correlation was found between addiction and the type of institution of the student ($p= 0.005$). Being a public-school student is associated with the internet addiction (among median users 87.8% are public school students, while among addicted users this percentage rises to 93.3%)

Table 2 - Relations between the internet addiction and the type of institution of high school students in the municipality of Montes Claros - MG.

TYPE OF INSTITUTION	IAT			Total
	Median User	Problematic User	Addicted User	
Public	87.8%	83.0%	93.3%	85.9%
Private	12.2%	17.0%	6.7%	14.1%
Total	100.0%	100.0%	100.0%	100.0%

Regarding the frequency of daily/weekly use of the internet, some correlations were observed. Addicted users use the internet more times per day ($p=0.001$). Among addicts 75.2% use the internet more than 6 times a day, already among the median users this percentage decreases to 37.6%. Addicted users also use the Internet more days of the week ($p=0.014$). Among the median users 58.6% access the internet every day of the week and 92.1% among addicts access the internet every day of the week. 99.1% of the addicts access the internet more than 4 days a week, while among the median users the percentage drops to 73.6%. There was also a positive correlation with the addiction and the number of hours of internet use per

day, on weekends and holidays ($p=0.041$)

Addicted users use the Internet more during the night period ($p= 0.004$). 92.3% of addicted users said to use the internet at night, compared to 66.3% of the median users (Table 3). However, regarding the number of hours that utilize the internet by night, there was a borderline correlation that addicted students use the internet for more hours in the evening period than the non-addicted users ($p=0.058$). It was also found a direct correlation but borderline between addiction and hours of internet use per day ($p=0.056$).

Table 3 - Characteristi of internet usage of high school students in the municipality of Montes Claros - MG.

DIMENSIONS	IAT			
	Median User	Problematic User	Addicted User	Total
Frequency of daily use of Internet				
None	7.2%	2.7%	1.6%	4.3%
1 to 3 times	37.9%	11.5%	11.4%	21.4%
4 to 6 times	17.2%	17.0%	11.8%	16.6%
More than 6 times	37.6%	68.8%	75.2%	16.6%
Total	100.0%	100.0%	100.0%	57.7%
				100.0%
Frequency of days of the week that uses internet				
None	6.3%	1.0%	0.0%	2.9%
1	4.6%	0.9%	0.0%	2.2%
2 to 3	15.5%	4.6%	0.8%	8.3%
4 to 6	15.0%	8.9%	7.0%	11.0%
7	58.6%	84.6%	92.1%	75.5%
Total	100.0%	100.0%	100.0%	100.0%
Internet use nighttime				
No	33.7%	13.9%	7.7%	20.8%
Yes	66.3%	86.1%	92.3%	79.2%
Total	100.0%	100.0%	100.0%	100%

For the purpose of internet access, addicted users access social

networks with greater frequency than non-addicted users ($p=0.000$). 74.2% of the addicted users always access social networks, while only 25.8% of the median users do it. Among the addicted students 40.6% claim to access the e-mail almost always or always, while the median users this percentage drops to 11.8% ($p=0.033$). There is a greater

frequency of access to watch movies, music and videos among the addicted users ($p=0.014$). No correlation was found with the use of internet to access online games, to perform school /academic activities or professional purposes.

Table 4 - Relations of purpose of internet use in addicted students or not of high schools in the municipality of Montes Claros - MG.

DIMENSIONS	IAT			
	Median User	Problematic User	Addicted User	Total
Frequency access to social networks				
Never/Rarely	13.0%	0.9%	0.0%	5.3%
Occasionally	13.0%	2.3%	0.0%	6.1%
Often	30.1%	27.1%	22.4%	27.8%
Almost always	18.2%	15.0%	3.4%	15.1%
Always	25.8%	54.7%	74.2%	45.7%
Total	100.0%	100.0%	100.0%	100%
Frequency access to e-mail				
Never/Rarely	43.4%	30.9%	30.0%	35.5%
Occasionally	34.5%	35.8%	16.2%	33.3%
Often	10.3%	12.8%	13.1%	11.9%
Almost always	6.6%	14.7%	26.3%	12.8%
Always	5.2%	5.7%	14.3%	6.4%
Total	100.0%	100.0%	100.0%	100%

Frequency internet access, music and movies

Never/Rarely	19.2%	7.4%	4.6%	11.6%
Occasionally	14.8%	7.9%	7.6%	10.5%
Often	10.5%	20.4%	6.3%	18.5%
Almost always	22.9%	24.5%	18.5%	23.3%
Always	24.1%	39.8%	62.9%	36.1%
Total	100.0%	100.0%	100.0%	100%

Correlation between addiction and self-declared addiction was evaluated. The majority of addicted users (64.2%) considered themselves as very or extremely addicted to the internet, i.e., the students are aware of their "addiction" on the internet (p= 0.000)

Table 5 - Relations between self-declared addiction and the internet use of high school students in the municipality of Montes Claros - MG.

Do you think your are addicted to the internet?	IAT			Total
	Median User	Problematic User	Addicted User	
Nothing	28.8%	7.8%	2.6%	15.2%
Very little	41.3%	18.6%	5.2%	25.8%
More or less	27.6%	48.1%	28.0%	38.3%
A lot	2.3%	19.5%	44.2%	15.5%
Extremely	0.0%	6.0%	20.0%	5.1%
Total	100.0%	100.0%	100.0%	100%

The time when the student usually sleeps, or wakes was not correlated with the addiction in internet

(p> 0.05), as well as the frequency of access to the internet to conduct school /academic or professional activities and

access online games and be the owner of any type of electronic device with internet access, with the exception of being owner of portable computer (for

DISCUSSION

The correlations found between the addiction and the variables related to the frequency and duration of use of the internet corroborates studies that reveal the long time spent browsing the internet by young students: Three quarters of young people from a research developed with Portuguese adolescents used the internet daily and 41% used it for three or more hours per day, especially at home.¹² 42.2% of the Turk students spent from 0 to 59 minutes on the computer and 4.2% spent more than 5 hours navigating the computer all day.⁸

The present results indicate that almost all of the addicted students (92.2%) use the internet every day, index higher than that found in two Chinese samples by Tan (2016) and Mo (2018) where 52.0% of the participants in the sample used the internet 2 to 6 days per week and 18% almost every day in the first study, more than half

Adicção em internet em estudantes secundaristas: prevalência e correlações

BRITO, A. B.; FREITAS, W. M. L.; CUNHA, D. G.; BRITO, K. D. P.; MESSIAS, R. B.; PINHO, L.; BRITO, M. F. S.F. SILVEIRA, M. F.

which there was a borderline correlation).

(52.1%) of the students spent over 11 hours on the internet per week and approximately 9% reported having browsed for more than 50 hours per week in the second survey.^{13,14} The borderline correlation between the time of night access to the internet and addiction suggests possible sleep disorder, providing drop in income in school activities and other activities developed by adolescents in the daytime, as already reported by Ekinçi (2014).¹⁵

Concerning the profile of activities carried out online by addicted users a correlation was found with the use of social networks, email and access to movies, music, and videos. No correlation was found with the access to online gaming, refuting the idea that addiction in internet was nothing more more than addiction to online games,¹² and with the achievement of academic and professional purpose, indicating that the use of the internet for labor

activities does not lead to addiction.

These results indicate the disassociation between the addiction in internet and addiction to online games. The Internet addiction is characterized by constant and frequent use of the internet with different objectives such as access to social networks, e-mails, movies, videos and also games. It is also evident among addicted users a greater use of the internet on weekends and holidays, moments when they access the network with a lower parental supervision and responsibility, since they do not have the obligations to study.⁷

Addicted Internet users use more times per day, more days per week, more hours per day on weekdays and on weekends/holidays than non-addicted students. These results indicate the importance of limiting the time for computer use, both during the day and night for young people at school age.¹⁶

Being the owner of laptop (notebook, netbook ultrabook, etc.) showed a borderline correlation with addiction on the internet but having another type of electronic apparatus such as mobile, tablet, and desktop computer with internet access was not related. These results indicate the necessity of continuity of research for the detection of correlation between

ownership of the means of access to the internet with the addiction or disposal of the possibility of correlation.

It was not found in the scientific literature of the past five years, studies that corroborate the correlation found between addiction and being a public-school student. Research developed in Iran found correlation with addiction and being a private institution of education student, despite the same survey report that public schools students are more prone to the development of other addictions.¹⁷

Finally, 64% of the addicted students have consciousness of their addiction on the internet, either by their own perception of exaggerations or by charging of family and friends. But this perception has a tendency to fall by a progressive normalization of the integration of technology in the day-to-day.⁶

The cross-sectional nature of the study is a limitation that prevents the establishment of causality in the correlations found. But the results provide important implications for internet users and their families: the observation of their habits of internet usage for the detection or alert to a possible addiction or problematic use of the same.

CONCLUSION

According to the results of the research, Internet addiction is a problem that is becoming increasingly prevalent among young people, given that a significant fraction of students showed some degree of dependence.

Variables that may influence the development of this addiction deserve special mention, by demonstrating high levels in the present study, such as the frequency of access, type of online activity and self-perception of dependency. On the other hand, the difference between the index corroboration of addicts in public and private schools draws attention, opposite result to the previous studies. However, in general the research is

directed in order to confirm the results of other studies about the epidemiological profile of addicted students.

This work is the fruit of a doctoral research developed in the Graduate Program in Health Sciences of State University of Montes Claros (PPGCS-Unimontes) with funding from Fundação de Amparo à Pesquisa do Estado de Minas Gerais (Fapemig) and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes). The authors declare they do have conflicts of interest.

REFERENCES

1. YOUNES, F. et al. Internet addiction and relationships with insomnia, anxiety, depression, stress and self-esteem in university students: a cross-sectional designed study. *PloS one*, v. 11, n. 9, p. e0161126, 2016.
2. KRISHNAMURTHY, S. et al. Internet addiction: Prevalence and risk factors: A cross-sectional study among college students in Bengaluru, the Silicon Valley of India. *Indian journal of public health*, v. 59, n. 2, p. 115, 2015.

3. YOUNG, K. S. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & behavior*, v. 1, n. 3, p. 237-244, 1998.
4. TANG, C. So-Kum; K., Yee W.; GAN, Y. Addiction to Internet Use, Online Gaming, and Online Social Networking Among Young Adults in China, Singapore, and the United States. *Asia Pacific Journal of Public Health*, v. 29, n. 8, p. 673-682, 2017.
5. CARBONELL, X. et al. Problematic use of the internet and smartphones in university students: 2006–2017. *International journal of environmental research and public health*, v. 15, n. 3, p. 475, 2018.
6. LI, J. et al. Insomnia partially mediated the association between problematic Internet use and depression among secondary school students in China. *Journal of behavioral addictions*, v. 6, n. 4, p. 554-563, 2017.
7. XU, J. et al. Personal characteristics related to the risk of adolescent internet addiction: a survey in Shanghai, China. *BMC public health*, v. 12, n. 1, p. 1106, 2012.
8. YAYAN, E. H. et al. Examination of the correlation between Internet addiction and social phobia in adolescents. *Western journal of nursing research*, v. 39, n. 9, p. 1240-1254, 2017.
9. DUFOUR, M. et al. Gender difference in internet use and internet problems among Quebec high school students. *The Canadian Journal of Psychiatry*, v. 61, n. 10, p. 663-668, 2016.
10. CHEN, Y. et al. Investigation on Internet addiction disorder in adolescents in Anhui, People's Republic of China. *Neuropsychiatric disease and treatment*, v. 12, p. 2233, 2016.
11. RIEDL, D. et al. Usage patterns of internet and computer games: Results of an observational study of Tyrolean adolescents. *Neuropsychiatrie: Klinik, Diagnostik, Therapie und Rehabilitation: Organ der Gesellschaft Österreichischer Nervenärzte und Psychiater*, v. 30, n. 4, p. 181-190, 2016.

12. FERREIRA, C. et al. Epidemiology of Internet Use by an Adolescent Population and its Relation with Sleep Habits. *Acta medica portuguesa*, v. 30, n. 7-8, p. 524-533, 2017.
13. TAN, Y. et al. Exploring associations between problematic internet use, depressive symptoms and sleep disturbance among southern Chinese adolescents. *International journal of environmental research and public health*, v. 13, n. 3, p. 313, 2016.
14. Phoenix K. H. et al. The role of social support on emotion dysregulation and Internet addiction among Chinese adolescents: A structural equation model. *Addictive behaviors*, v. 82, p. 86-93, 2018.
15. EKINCI, Ö. et al. Association between internet use and sleep problems in adolescents. *Nöro Psikiyatri Arşivi*, v. 51, n. 2, p. 122, 2014.
16. CAIN, N.; GRADISAR, M. Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep medicine*, v. 11, n. 8, p. 735-742, 2010.
17. NEMATİ, Z.; MATLABI, H. Assessing behavioral patterns of Internet addiction and drug abuse among high school students. *Psychology research and behavior management*, v. 10, p. 39, 2017.