Original Research Article

Adult ADHD and internet addiction among undergraduate medical college students

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A B S T R A C T

Context: Attention-deficit /hyperactivity disorder (ADHD) was originally defined in children but is now recognized to persist into adulthood or is independently diagnosed in some adults. It is associated with impairment across multiple domains, including home, college and, work and can lead to excessive internet usage, social withdrawal, substance abuse disorders, fatigue, job loss, mood changes, and distress.

Aim: To look for adult ADHD and Internet Addiction among undergraduate medical college students.

Settings and Design: Designed as a cross-sectional study conducted on undergraduate medical college students.

Methods and Material: This is a cross-sectional study involving 501 undergraduate medical college students between 18-25 years of age. The Adult ADHD Self-report scale (ASRSv1.2) was applied to screen for adult ADHD. Young's internet addiction scale (IAT) was applied to look for internet addiction.

Statistical analysis used: Statistical analysis was done using SPSS version 25.

Results: The mean age of the participants was 20.3 years. Most of the participants (54.9%) who screened positive for adult ADHD belonged to the younger age group (20-21 years). Mild internet addiction was seen in 34.5% of the participants, moderate in 6.4%, severe in 0.2 % and 58.9% had no internet addiction. Students who had screened positive for adult ADHD reported more addictive tendencies.

Conclusions: Higher levels of ADHD symptoms were associated with increased Internet addiction among undergraduate medical college students.

Key Messages: This study shows that adult ADHD can be one of the reasons leading to internet addiction among students. An understanding of the magnitude of the problem is essential for early screening and timely psychiatric intervention for the better functional outcome for the students.

1. Introduction

Attention deficit/hyperactivity disorder (ADHD) is a childhood-onset chronic neurobiological disorder persisting into adolescence and adulthood.[1] As opposed to childhood ADHD, only recently has adult ADHD become a focus of widespread clinical attention, as most of the earlier studies on ADHD did not include adults in their samples.

Adult ADHD with a prevalence of 4.4% was observed in the National Comorbidity Survey-Replication in the United States, while a study among college students in Chandigarh, India estimated it to be 5.4%.[2,3] High prevalence of self-reported ADHD symptoms were found among university students in Kenya.[4] Inattention was the most frequently associated symptom of ADHD among young adults which was more significant in male adults.[5]

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In literature, adults screened positive for ADHD but who were never formally diagnosed had greater levels of functional impairment and lower quality of life than individuals who did not screen positive for ADHD.[6] Symptoms of ADHD are commonly found in psychopathologies such as depression, anxiety, oppositional defiance, conduct disorder, substance use disorders and finally internet addiction (IA).[7–10]

Internet addiction is the inability to control internet use despite negative consequences, resulting in marked distress and/or functional impairment in daily life.[11,12] The explosive growth in the use of the internet not only in India but also worldwide, especially among adolescents and young adults is concerning. A study exploring technology use patterns found internet addiction among 24.6% of adolescents.[13] Among health professional undergraduates, the total prevalence of internet addiction was 19.85%, with moderate and severe internet addiction being 19.5% and 0.4%, respectively.[14] Male adolescents were most prone to the development of IA.[15] Being easily bored and having an aversion to delayed rewards are two key symptoms of ADHD which contribute to excessive internet use resulting in a decreased feeling of boredom and providing immediate rewards.[16]

A study by Tateno M et al. showed that students with a positive ADHD screen scored significantly higher on the Internet Addiction Test than those negative for an ADHD screen.[17] The prevalence of ADHD in IA groups was found to be between 19.5% and 42.5%, while it was 4.6% to 15.2% in the control groups.[5] The presence of probable ADHD and both inattention and hyperactivity/impulsivity symptom dimensions were related to the severity of IA.[18] A stronger relationship was found between inattention symptoms and IA.[19] Patients with IA present with more severe symptoms of ADHD than healthy controls and IA by itself has an adverse influence on ADHD.[5] Both adult ADHD and IA may lead to educational failure and long-term occupational disability.[20]

Adult ADHD, which is a condition with high levels of impulsivity and emotional dysregulation as a phenomenological key factor, has already been reported as a risk factor for IA.[21] Deficient inhibitory control and the lack of strategic flexibility in subjects with ADHD may interfere with the self-regulation of internet use.[22] However, evidence supporting a causality between adult ADHD and IA is still lacking. As there are fewer studies reported on this topic under this setting, this study is taken up to screen for adult ADHD and internet addiction among undergraduate medical college students considering understanding of the relationship between adult ADHD and internet addiction.

2. Materials and Methods

The present study was a cross-sectional observational study conducted on undergraduate medical students after obtaining approval from Institutional Ethics Committee. A convenience sample of students was approached to participate in this study. All the students between 18 to 25 years of age, willing to give informed consent were included. Those with a history of acute surgical and medical illness and those with a history of prior psychiatric illness were excluded. Five hundred and one students meeting the fixed criteria were taken as subjects for the study. Written informed consent was obtained at the beginning of the interview from all participants after explaining the purpose and nature of the study in understandable language, responding to questions and concerns, providing adequate opportunity to withdraw from the study at any point in time, and verbally assuring about the confidentiality of their information. Data were collected between 1 January 2022 to 30 June 2022.

Sociodemographic details were obtained, including age, gender, year of study, and living status-hostler/day scholar using a semi-structured proforma developed in the Department of Psychiatry. Adult Self-Report Scale (ASRSv1.2) and Internet Addiction Test (IAT) by Dr Kimberly Young were applied to screen for adult ADHD and internet addiction, respectively.

Adult Self-Report Scale (ASRSv1.2) is a validated, revised version of the ASRS v1.1 screening scale. It consists of 6 questions, 4 questions based on the DSM 5 and 2 non-DSM 5 questions. The questions require a response in the range of 0 (never) to 4 (very often). Total scores are in the possible range of 0 to 24. A score of 14 or higher is suggestive of a positive screen for adult ADHD (91.4% sensitivity, 96.0% specificity). The scale is short, easily scored and has been shown to correctly identify adults who meet the diagnostic criteria for ADHD.[23]

Internet Addiction Test (IAT) is a reliable and valid measure of addictive use of the internet, developed by Dr Kimberly S. Young. It consists of 20 items that measure mild, moderate, and severe levels of internet addiction. Each item is rated on a 5-point Likert scale ranging from 0 to 5 (does not apply, rarely, occasionally, frequently, often, and always), with the total maximum score being 100. A higher score signifies a higher level of internet addiction. A total score that does not exceed 30 indicates a normal level of internet use, whereas total scores between 31 and 49 indicate mild level addiction, 50-79 designates moderate addiction, and scores of 80 or above reflect a severe internet addiction.[24]

Statistical Package for Social Sciences (version 25.0, released in 2017 by IBM Corp. Armonk, New York, United States of America) was used for the analysis of the data. Mean and standard deviation was used to describe continuous variables, whereas frequencies and percentages

were obtained for categorical data. The relationship between variables was assessed using Pearson correlation. A probability value of less than 0.05 has been taken as statistically significant.

3. Results

3.1. Description of the participants

The study involved 501 undergraduate medical college students with a mean age of 20.32 ± 1.55 years. One hundred and sixty (31.9 %) participants were aged 18-19 years, 236 (47.1%) of the participants were aged 20-21 years, 92 (18.4%) of the participants were aged 22-23 years and only 13 (2.6%) of the participants were aged 24-25 years. (Table 1)

In this study, 70.5% of the participants were female and 29.5% were male participants. Most of them (52.7%), were availing of hostel facilities while 47.3% were day scholars.

3.2. Self-reported ADHD symptoms using the ASRS scale

The results revealed the prevalence of self-reported ADHD symptoms was 54.9% and the mean ASRS score was 12.54 ± 4.12. The majority (42.5%) of the participants who were screened positive for adult ADHD symptoms belonged to 20-21 years of age followed by 31.6 % to 18-19 years of age, 23.6% belonged to 22-23 years and only 2.2% belonged to 24-25 years. (Table 2)

3.3. Internet addiction (IA)

Table 3 depicts the distribution of internet users in the total sample. The mean internet addiction test scores were 28.87±13.23. Out of this, the major proportion of respondents (58.9%) had no internet addiction and 41.1% of the participants reported internet addiction. Out of them, 34.5% of the participants had mild, 6.4% had moderate and only 0.2% had severe internet addiction.

Nearly half (46.2%) of students in the 24–25yr age group had mild IA followed by 20-21yr with 39%. Groups 18-19yr and 22-23yr had a similar amount of mild IA students of around 30%.

20-21yr and 22-23yr groups had a similar distribution of moderate IA of around 5% each and almost double (9.4%) in the 18-19yr group and none in the 24-25yr group.

Only one case of severe IA was seen, belonging to the 18-19yr group.

But the sample sizes (n value) were not equal for all groups, with the least in the 24-25yr group and the highest in the 20-21yr group. This can be considered a limitation of this study.

3.4. Relationship between age, self-reported ADHD symptoms and internet addiction test (IAT) (Table 4)

Correlational analysis revealed a negative correlation between age and ASRS scores suggesting ADHD symptoms may decrease with increasing age. The relationship between ASRS and IAT was examined. Moderate positive correlations were found between overall ASRS scores and the IAT scores suggesting individuals who screened positive for ADHD symptoms reported more addictive tendencies.

3.5. Investigating predictors of Internet addiction

To determine the relative contribution of these variables to the IAT score, multiple logistic regression was conducted with the IAT score as the dependent variable and the following independent variables: ASRS scores, age, gender, year of study, and living status. The results indicated that ASRS scores (p=0.0001) remained significant predictors of IA. Age, gender, year of study, and living status were not significant predictors of IAT scores (p > .05).

4. Discussion

In this study, we examined ADHD signs via the ASRS scale and its relation with IA among undergraduate medical students. In total 501 students distributed in each academic year were represented in the data. First and second-year students were more represented in the total sample when compared to final years.

In this study, the majority (42.5%) of the participants belonged to the younger age group i.e., 20-21 years and 54.9% of the total participants showed symptoms suggestive of adult ADHD which was higher when compared to other studies. A study by Atwoli L et al., in which most of the study population were medical students belonging to 17-20 years of age, accounted for the self-reported ADHD symptom prevalence rate of 21.8%.[4] This raises the possibility that this new instrument, which has never been used in this setting before, maybe over-inclusive with many false positive results. Many researchers have attributed the variation in the prevalence of ADHD to the different methodologies used, rather than to any cultural or geographical difference between the populations and that community prevalence rates might be even higher than that suggested by this study, as demonstrated by studies that have shown that ADHD prevalence rates are lower in university and college populations than in the general population.[25]

A negative correlation between age and ADHD symptoms was detected in this study suggesting an age-dependent decline in ADHD symptoms consistent with the findings by Dupaul GJ et al., Atwoli L et al.[4,26]

Female students were higher in number than male students in this sample yet no statistically significant gender differences were found in ASRS scores similar to a study by Panagiotidi M et al., in which the mean age of their

Table 1: Distribution of participants by age

Age	Frequency (%) (n)	Mean age ± S. D
18-19 years	31.9% (n=160)	
20-21 years	47.1% (n=236)	
22-23 years	18.4% (n=92)	20.32 ± 1.55 years
24-25 years	2.6% (n=13)	
Total	100% (n=501)	

Table 2: Variation of self-reported ADHD symptoms (using ASRS scale) with socio-demographic factors

Variable (No.)	ADHD screen positive (%)	Chi-square value	P-value
Age group			
18-19 (n=87)	31.6%		
20-21 (n=117)	42.5%	12.34	0.006*
22-23 (n=65)	23.6%		
24-25 (n=6)	2.2%		
Gender			
Female (n=197)	55.8%	0.406	0.524
Male (n=78)	52.7%		
Year of study			
1st (n=67)	47.5%		
2nd (n=47)	58.8%		
3rd (n=60)	61.2%	5.22	0.266
4th (n=61)	56%		
Intern (n= 40)	54.8%		

*Statistically significant

Table 3: Variation of internet addiction test (IAT) scores with socio-demographic factors

Variable	Mild IA	Moderate IA	Severe IA	Normal	Chi-square value	P-value
Age group						
18-19yr	30%(n=48)	9.4%(n=15)	0.6%(n=1)	60%(n=96)		
20-21yr	39%(n=92)	5.1%(n=12)	0	55.9%(n=132)		
22-23yr	29.3%(n=27)	5.4%(n=5)	0	65.2%(n=60)	10.55	0.308
24-25yr	46.2%(n=6)	0	0	53.8%(n=7)		
Total	34.5%(n=173)	6.4%(n=32)	0.2%(n=1)	58.9%(n=295)		
Gender				60%(n=96)		
Female	36.5%(n=129)	7.4%(n=26)	0.3%(n=1)		5.53	0.137
Male	29.7%(n=44)	4.1%(n=6)	0			
Year of Study						
1st	24.1%(n=34)	9.9%(n=14)	0			
2nd	50%(n=40)	6.3%(n=5)	0			
3rd	35.7%(n=35)	4.1%(n=4)	1%(n=1)		30.84	0.002*
4th	42.2%(n=46)	6.4%(n=7)	0			
Intern	24.7%(n=18)	2.7%(n=2)	0			

*Statistically significant

Table 4: Relationship between age, self-reported ADHD symptoms (ASRS scale) and internet addiction test (IAT)

Variable	Mean ± S.D	Correlation	P value
Age			
ASRS	20.32 + 1.55		
Age vs ASRS	12.54 + 4.12	-0.136	0.002*
Age	20.32 + 1.55		
Internet addiction	28.87 + 13.23		
Age vs IAT		0.006	0.887
ASRS vs IAT		0.341	0.0001*

*Statistically significant

sample was 30.23 + 12.17 years and the female population outnumbered the male population.[19] The lack of significant difference between the genders in this study seems to agree with a meta-analysis by Simon V et al., who demonstrated that gender differences were not associated with adult ADHD rates.[27]

Therefore, contrary to the conventional concept of adult ADHD regarding a continuation of childhood ADHD condition, recent findings indicated that two distinct childhood onset and adulthood onset ADHD might exist and adult ADHD is not a simple continuation of childhood ADHD.[28,29]

Consistent with the finding by Wang et al., no significant difference between age and Internet addiction was observed in the current study.[5] Yet a survey by Panagiotidi M et al., reported age was another significant predictor of IA, more specifically, younger individuals reported excessive internet use.[19] This may suggest that all age groups should be targeted for IA prevention with no specific focus on certain age groups.

The present study found no gender differences on the Internet Addiction scale similar to the study by Dalbudak et al., but is in contrast to the observation by Panagiotidi M et al.[16,19]

In a study by Bakken IJ et al., wherein a group of participants aged 16-29 years, male participants in comparison to the female participants were classified as having internet addiction or at-risk addiction in Norway.[30] In a study by Gedam et al., male gender was thought to be one of the most important predictors of internet addiction among students.[14] But Yen JY et al., demonstrated the association between attention deficit and Internet addiction was more significant among female college students.[31] One reason for this might be because of the cultural norms of developing countries like India and Turkey which tend to be more conservative in general where freedom, options and exposure to the internet are biased towards men as opposed to western nations like the UK. This is just one such assumption and further studies on gender roles are to be done to evaluate this hypothesis before applying it across nations.

The main finding of the present study was that screen-positive ADHD symptoms were related to IA. A moderate positive association between overall ASRS scores and IAT suggesting participants who had screened positive for adult ADHD reported more addictive tendencies like the findings by Dalbudak et al., Panagiotidi M et al.[16,19] This says that students may enjoy the multiple options which the Internet provides them. Internet is characterized by quick responses providing immediate rewards and multiple windows with various activities and may reduce the feelings of boredom or aversion to delayed reward in students with symptoms of ADHD. The internet can also provide an unreal life for these students, in which they can go into artificial lives or live out their fantasies without inhibition. Lack of self-control may make it difficult for these students to control their internet use, making them vulnerable to IA.[32] Nevertheless, the cross-sectional design of the present study makes it impossible to say anything about the direction of the causal relationship. Previous studies indicated that adult ADHD status is linked with the developmental trajectories of cortical components, and white matter alterations of several networks.[33] Similarly, recent studies have demonstrated that IA might cause functional, and structural changes and abnormalities in the brain.[34] Based on these findings, we might speculate that functional and structural brain abnormalities related to IA might also be related to adult ADHD-like cognitive symptoms, which should be differentiated from an independent ADHD disorder. The high comorbidity between IA and ADHD might be accounted for cognitive and behavioural symptoms related to IA rather than symptoms of an independent ADHD disorder.[35] The shortage of self-control may make college students have difficulty controlling internet use after engaging in internet activity. Thus, they have a higher risk to progress to internet addiction because of the interaction between their deficits and internet function.

Among all the variables, we found that ASRS scores were the best predictor for internet addiction as supported by Dalbudak et al., 2014.[32] It was expected that children who had ADHD would not be able to perform well in school, and hence, lesser numbers would be able to enter professional colleges where tough entrance exams need to be cleared.[36] However, a meta-analysis of four studies evaluating academic functioning among college students with ADHD concluded that ADHD impacts the academic functioning of a relatively selective sample of college students. It was also reported that college students with ADHD may represent a distinct set of individuals who have better cognitive abilities and better compensatory adaptive skills than the general population with ADHD.[37] This supported the findings of the present study as the individuals with ADHD constituting better abilities might have had no difficulty in achieving and pursuing a medical college education. However, the restricted participant selection limits the extent of the generalizability of the findings in the study.

5. Strengths

To our knowledge, this was the first study to investigate the relationship between adult ADHD symptoms (using this scale) and internet addiction among medical college students from this area of the country and it will therefore serve to broaden the body of knowledge on ADHD in this setting. This study could establish the presence of Adult ADHD symptoms to be one of the best predictors of internet addiction.

6. Limitations

A major limitation of this study was that these findings only relate to self-reported symptoms of ADHD and not the syndrome itself. College students who participated were non-clinical samples. Thirdly, since this study was cross-sectional, the findings of this study cannot address the causal relationships among the primary constructs of interest. The sample sizes (n value) were not equal for all groups, with the least in the 24-25yr group and the highest in the 20-21yr group.

7. Conclusion

To conclude, this study represented that with increasing age, there was a decrease in Adult ADHD symptoms. Higher levels of ADHD symptoms were associated with increased Internet addiction and of all the other socio-demographic variables, Adult ADHD was one of the best predictors of internet addiction. Never the less, further studies in such age groups with standardized diagnostic tools need to be conducted for early detection and prevention programmes for a better quality of life for future generations.

8. Source of Funding

None.

9. Conflicts of interest

There are no conflicts of interest.

References

1. Ramos-Quiroga JA, Montoya A, Kutzelnigg A, Deberdt W, Sobanski E. Attention deficit hyperactivity disorder in the European adult population: prevalence, disease awareness, and treatment guidelines. *Curr Med Res Opin*. 2013;29(9):1093–104. doi:10.1185/03007995.2013.812961.
2. Kessler RC, Adler L, Barkley R, Biederman J, Conners CK, Demler O, et al. The prevalence and correlates of adult ADHD in the United States: results from the National Comorbidity Survey Replication. *Am J Psychiatry*. 2006;163(4):716–23. doi:10.1176/ajp.2006.163.4.716..
3. Jhambh I, Arun P, Garg J. Cross-sectional study of self-reported ADHD symptoms and psychological comorbidity among college students in Chandigarh, India. *Ind Psychiatry J*. 2014;23(2):111–6.
4. Atwoli L, Owiti P, Manguro G, Ndambuki D. Self-reported attention deficit and hyperactivity disorder symptoms among university students in Eldoret, Kenya. *East Afr Med J*. 2010;87(5):187–91. doi:10.4314/eamj.v87i5.63072.
5. Wang BQ, Yao NQ, Zhou X, Liu J, Lv ZT. The association between attention deficit/hyperactivity disorder and internet addiction: a systematic review and meta-analysis. *BMC Psychiatry*. 2017;17(1):260. doi:10.1186/s12888-017-1408-x.
6. Able SL, Johnston JA, Adler LA, Swindle RW. Functional and psychosocial impairment in adults with undiagnosed ADHD. *Psychol Med*. 2007;37(1):97–107. doi:10.1017/S0033291706008713.
7. Herguner S, Herguner A. Psychiatric comorbidity in children and adolescents with attention deficit hyperactivity disorder/Dikkat eksikligi hiperaktivite bozuklugu olan cocuk ve ergenlerde eslik eden psikiyatrik bozukluklar. *Arch Neuropsychiatry*. 2012;49(2):114–9.
8. Barra FEDL, Vicente B, Saldivia S, Melipillan R. Epidemiology of ADHD in Chilean children and adolescents. *ADHD Attention Deficit and Hyperactivity Disorders*. 2013;5(1):1–8.
9. Klassen L, Bilkey T, Katzman M, Chokka P. Comorbid attention deficit/hyperactivity disorder and substance use disorder: treatment considerations. *Curr Drug Abuse Rev*. 2012;5(3):190–8. doi:10.2174/1874473711205030190.
10. Diamond A. Attention-deficit disorder (attention-deficit/hyperactivity disorder without hyperactivity): A neurobiologically and behaviorally distinct disorder from attention-deficit/hyperactivity disorder (with hyperactivity). *Dev Psychopathol*. 2005;17(3):807–25. doi:10.1017/S0954579405050388.
11. Tang J, Yu Y, Du Y, Ma Y, Zhang D, Wang J, et al. Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. *Addict Behav*. 2014;39(3):744–7.
12. Kardefelt-Winther D. A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers Human Behav*. 2014;31:351–4. doi:10.1016/j.chb.2013.10.059.
13. Rajanna SH, Sharma MK, Palanichamy TS. Exploration of technology use pattern among teenagers and its relationship with psychological variables. *ASEAN J Psychiatry*. 2016;17(2):1.
14. Gedam SR, Ghosh S, Modi L, Goyal A, Mansharamani H. Study of internet addiction: Prevalence, pattern, and psychopathology among health professional undergraduates. *Indian J Soc Psychiatry*. 2017;33(4):305–11.
15. Karacic S, Oreskovic S. Internet Addiction Through the Phase of Adolescence: A Questionnaire Study. *JMIR Mental Health*. 2017;4(2):e11. doi:10.2196/mental.5537.
16. Dalbudak E, Evren C, Aldemir S, Taymur I, Evren B, Topcu M, et al. The impact of sensation seeking on the relationship between attention deficit/hyperactivity symptoms and severity of Internet addiction risk. *Psychiatry Res*. 2015;228(1):156–61.
17. Tateno M, Teo AR, Shirasaka T, Tayama M, Watabe M, Kato TA. Internet addiction and self-evaluated attention-deficit hyperactivity disorder traits among Japanese college students. *Psychiatry and clinical neurosciences*. 2016;70(12):567–72.
18. Evren B, Evren C, Dalbudak E, Topcu M, Kutlu N. Relationship of internet addiction severity with probable ADHD and difficulties in emotion regulation among young adults. *Psychiatry Res*. 2018;269:494–500. doi:10.1016/j.psychres.2018.08.112.
19. Panagiotidi M, Overton P. The relationship between internet addiction, attention deficit hyperactivity symptoms and online activities in adults. *Compr Psychiatry*. 2018;87:7–11. doi:10.1016/j.comppsych.2018.08.004.
20. Fredriksen M, Dahl AA, Martinsen EW, Klungsoyr O, Faraone SV, Peleikis DE, et al. Childhood and persistent ADHD symptoms associated with educational failure and long-term occupational disability in adult ADHD. *Atten Defic Hyperact Disord*. 2014;6(2):87–99. doi:10.1007/s12402-014-0126-1.
21. Beheshti A, Chavanon M, Christiansen H. Emotion dysregulation in adults with attention deficit hyperactivity disorder: a meta-analysis. *BMC Psychiatry*. 2020;20(1):120. doi:10.1186/s12888-020-2442-7.
22. Amorim WN, Marques SC. Inhibitory control and cognitive flexibility in children with attention-deficit/hyperactivity disorder. *Psychol Neurosci*. 2018;11(4):364–74. doi:10.1037/pne0000156.
23. Ustun B, Adler LA, Rudin C, Faraone SV, Spencer TJ, Berglund P, et al. The World Health Organization Adult Attention-Deficit/Hyperactivity Disorder Self-Report Screening Scale for DSM-5. *JAMA Psychiatry*. 2017;74(5):520–6.
24. Young K. Internet addiction: The emergence of a new clinical disorder. *Cyber Psychol Behav*. 1996;3:237–44. doi:10.1089/cpb.1998.1.237.
25. Dupaul GJ, Schaughency EA, Weyandt LL, Tripp G, Kiesner J, Ota K, et al. Self-report of ADHD symptoms in university students: Cross-gender and cross-national prevalence. *J Learn Disabil*. 2001;34(4):370–9.
26. Dupaul GJ, Weyandt LL, O'Dell SM, and MV. College students with ADHD: Current status and future directions. *J Attention Disord*. 2009;13(3):234–50.

27. Simon V, Czobor P, Bálint S, Mészáros A, Bitter I. Prevalence and correlates of adult attention-deficit hyperactivity disorder: meta-analysis. *Br Jf Psychiatry*. 2009;194(3):204–11.

28. Lara C, Fayyad J, De Graaf R, Kessler RC, Aguilar-Gaxiola S, Angermeyer M, et al. Childhood predictors of adult attention-deficit/hyperactivity disorder: results from the World Health Organization World Mental Health Survey Initiative. *Biological Psychiatr*. 2009;65(1):46–54.

29. Castellanos FX. Is adult-onset ADHD a distinct entity? *American Journal of Psychiatry*. 2015;172(10):929–960.

30. Bakken IJ, Wenzel HG, Götestam KG, Johansson A, Øren A. Internet addiction among Norwegian adults: A stratified probability sample study. *Scand J Psychol*. 2009;50(2):121–7. doi:10.1111/j.1467-9450.2008.00685.x.

31. Yen JY, Yen CF, Chen CS, Tang TC, Ko CH. The association between adult ADHD symptoms and internet addiction among college students: the gender difference. *Cyberpsychol Behav*. 2009;12(2):187–91. doi:10.1089/cpb.2008.0113.

32. Dalbudak E, Evren C. The relationship of Internet addiction severity with attention deficit hyperactivity disorder symptoms in Turkish University students; the impact of personality traits, depression, and anxiety. *Compr Psychiatry*. 2014;55(3):497–503. doi:10.1016/j.comppsych.2013.11.018.

33. Karama S, Evans AC. Neural correlates of attention-deficit/hyperactivity disorder in adulthood. *Biol Psychiatry*. 2013;74(8):558–9. doi:10.1016/j.biopsych.2013.07.035.

34. Hong SB, Zalesky A, Cocchi L, Fornito A, Choi EJ, Kim HH, et al. Decreased functional brain connectivity in adolescents with internet addiction. *PloS One*. 2013;8(2):e57831. doi:10.1371/journal.pone.0057831.

35. Kim D, Lee D, Lee J, Namkoong K, Jung YC. Association between childhood and adult attention deficit hyperactivity disorder symptoms in Korean young adults with Internet addiction. *Journal of behavioral addictions*. 2017;6(3):345–53.

36. Garg J, Arun P. A follow-up study of academic functioning and social adjustment in children with attention deficit hyperactivity disorder. *Indian J Psychol Med*. 2013;35(1):47–52. doi:10.4103/0253-7176.112201.

37. Frazier TW, Youngstrom EA, Glutting JJ, Watkins MW. ADHD and achievement: Meta-analysis of the child, adolescent, and adult literatures and a concomitant study with college students. *J Learn Disabil*. 2007;40(1):49–65.

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