# Meta-Analysis of Psychiatric Outcomes Associated with Internet Addiction in Indian Medical Students

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## *Abstract*

**Background and objectives**. Internet addiction (IA) is characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to functional impairment or distress. Aim of the current research has been the analysis of the effect size of the multiple variables responsible for internet addiction in medical students.

**Methods**. The current study is a cross-sectional and descriptive co-relational design. The opportunistic sample included 666 undergraduate medical students enrolled in the Medicine Bachelor and Bachelor of Science (MBBS) in a major medical university in India. Data analysis included meta-analysis for the coefficient of heterogeneity $I^2$, *Z*-statistics and the effect size Cohen's *d*.

**Results**. High effect size (d>1.0) were shown by the prevalence of IA (d=5.40), gender (d=4.85), area of residence (d=2.60), level of depression (d=1.79), level of anxiety (d=2.99) and level of stress (d=1.98). The correlation of IA scale with psychiatric scale also showed a high effect size (d=2.40). IA presents with higher effects size in female students with moderate levels of anxiety.

**Discussion**. Overall, our results support previous findings of a strong relationship between Internet addiction and psychological states such as depression, anxiety and stress.

## Introduction

Internet addiction is characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to functional impairment or distress. The condition has attracted increasing attention in the popular media and among researchers, and this attention has paralleled the growth in computer and Internet access. Prevalence estimates vary widely. The disorder occurs worldwide, but mainly in countries where computer access and technology are widespread. Studies have utilized various methods to identify, internet addicts, and have used numerous terms such as compulsive computer use [1], internet dependency [2], problematic internet user [3], pathological internet use [4] and internet addiction [5]. These terms suggest a tension between those who view the disorder as involving any abnormal or pathological computer use and those who focus specifically on internet usage. In this dissertation the term internet addiction was used to describe the collective phenomenon, acknowledging all forms of inappropriate and excessive internet use. It fits DSM-IV-TR definition of a mental disorder, described as a "clinically significant behavioural or psychological syndrome that is associated with present distress or with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom" [6]. Whether it is valid as a distinct disorder or is part of a larger behavioural syndrome is still not clarified [7,8]. Clinical samples and most of relevant surveys report a male preponderance. Onset is reported to occur in the late 20s or early 30s age group, and there is often a lag of a decade or more from initial to problematic computer usage. Internet addiction has been associated with dimensionally measured depression and indicators of social isolation. Psychiatric co-morbidity is common, particularly mood, anxiety, impulse control and substance use disorders. Aetiology is unknown, but probably involves psychological, neurobiological and cultural factors. There are no evidence-based treatments for internet addiction. Cognitive behavioral approaches may be helpful. There is

no proven role for psychotropic medication. Marital and family therapy may help in selected cases, and online self-help books and tapes are available. Lastly, a self-imposed ban on computer use and Internet access may be necessary in some cases. Overall, prevalence surveys conducted in various countries fall into two main categories, online vs. offline studies, with the former typically yielding higher rates, most likely because of inherent selection bias. Only two epidemiological studies exploring the prevalence of problematic Internet use in the general population have been published. One was conducted in the United States [9], the other in Norway [10].The US [9], study used random-digit telephone dialling to interview 2,513 adults taken from all 50 states in a manner proportional to the population in each state. Participants' average age was 48 and 68.9% were regular Internet users. The authors' diagnostic definition was based on published criteria and on similarities with impulse control disorders, substance dependence and obsessive-compulsive disorder. This definition yielded a point prevalence of 0.7%. Less stringent definitions yielded higher prevalence rates. Severe consistent problems were noted in 13.7% of users. In the Norway study [10], Young's Diagnostic Questionnaire were mailed to 10,000 inhabitants of Norway,randomly selected from a database of the entire population, only 3,399 completed questionnaires were returned. Among respondents, 87% were Internet users. The prevalence of "addicted Internet use" was calculated to be 1%, whereas the prevalence of "at risk" Internet use was 5.2%. Considering only relatively large and offline studies, research from China [11], South Korea [12,13], Greece [14],Norway [15], and Iran [16] has yielded prevalence estimates ranging between 2% and 11%. Chakraborty et al. (2010) [17] reviewed the fast-growing literature on Internet addiction found that the overall prevalence of internet addiction was around 0.3% to 38%. Studies from India [18], China [19], Italy [20], and Nigeria [21] found the prevalence of IA to be ranging from 3.3%−6%. Thus, the results regarding the prevalence and severity of IAD can vary widely and are difficult to compare, due to minimal uniformity of the definitions employed or assessment methods used, differences in Internet access, recruitment methodology, the exact age bracket studied, and the definitions utilized. This wide prevalence range emphasizes the need to create a universal definition of internet addiction as well as an assessment that can be used across studies to get a more accurate picture of the prevalence of this phenomenon.

## Materials and methods

The current study is a cross-sectional and descriptive co-relational design. The opportunistic sample included 666 undergraduate medical students enrolled in the Medicine Bachelor and Bachelor of Science (M.B;B.S) in a major medical university in India. The duration of the study was two years, from October 2012 to September 2014. Subjects of age 18 and above, and subjects who agreed to give written informed consent were included in the study. Subjects who were not exposed to internet usage and who did not comprehend the questionnaires or were deaf were excluded from the study. Prior to the undertaking of this study, the researchers obtained the ethical approval from the dean of the Medical Institute. Researchers explained the purpose of the study and asked for their cooperation and permission. The researchers then went to classrooms where they introduced the purpose of the study and explained to the potential subjects how to respond to the questionnaire, that the data collected would be used solely for the study, and that their privacy and anonymity would be fully protected. The students filled in the questionnaire in a self-reporting format, after which the researchers collected the data along with the written consents that the students had duly signed. Students were also informed about their right to withdraw consent at any time, and the absence of monetary or other benefits deriving from participating to the study. Each student was given twenty minutes to complete the questionnaire. Sample size needed for the study was calculated for a margin of error of 5% and confidence level of 99% where the recommended sample sizes were meant to be at least 334 subjects for the total sample and 158 for those resulting positive in the Internet addiction.

*Statistical methods* were meta-analysis to compute the coefficient of heterogeneity $I^2$, Cohen's *d* effect size, Chi-square statistics, frequency distribution, Pearson correlation coefficient, 95% confidence intervals for the proportions, and odd ratios. The initial analysis of the data collected was performed by SPSS-13.0 version. After the data were first elaborated, they underwent a second stage of analysis through meta-analysis. All the statistics included the evaluation of Z-statistics and the effect size Cohen's *d*. Statistical packages for the meta-analysis and effect size included Open Meta-Analyst by the Brown School of Public Health [22], Comprehensive Meta-Analysis by Biostat [23], Lenhard and Lehnard [24] effect size calculator for the Z-scores obtained from the meta-analysis, and Lyson-Morris [25] effect-size calculator to compute global Cohen's d from single effect size *d*.

The instruments used were the Young's Internet Addiction Test [26], Depression-Anxiety-Stress Scale (DASS) [27], and the Modified Kuppuswamy Scale [28]. A basic sociodemographic schedule was used to collect demographic details of the sample such as age, sex, and area of residence.

*Young's Internet Addiction Test* [26] is a 20-item scale rated on a 5-point Likert scale. Scores range from 30 to 100 and the higher the score indicates the greater the level of addiction. The test measures the degree of preoccupation, compulsive use, behavioral problems, emotional changes, impact of general functioning and extent of client's involvement with the computer [27] and classifies the addictive behaviour in terms of mild, moderate, and severe impairment.

The *Depression Anxiety Stress Scale* (DASS)[28]: The DASS is a 42-item self-report inventory developed by the University of New South Wales (Australia). It provides scores on three subscales: Depression (14-items), anxiety (14-items), and stress (14-items). Each item was rated on a 5-point Likert scale. The Depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement, anhedonia, and inertia. The Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The Stress scale is sensitive to levels of chronic non-specific arousal, difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Subjects were asked to use 4-point severity/frequency scales to rate the extent to which they experienced each state over the previous week.

*Modified Kuppuswamy Scale–2012* [29]. The original Kuppuswamy scale was modified in 2007 for use in both urban and rural areas. It includes education, occupation of the head of the family, monthly income of the family in rupees the socio-economic classes. Scoring is as follows: (1) Upper: 26–29 (2); Upper Middle: 16–25; (3) Lower Middle: 11–15 (4); Upper Lower: 5–10 (5); Lower: >5.

Biographical aspects of the population ($n$=666) show that in our sample 72% were females, 88% from urban areas, and 50% from upper social class (Table 1).

***Table 1. Biographical data of the population***

| **Population (*n*=666)** | **Biographical data** | ***N*** | **%** |
|---|---|---|---|
| **Gender:** | **Males** | **184** | **27.6%** |
| | **Females** | **482** | **72.4%** |
| **Area of residence:** | **Urban** | **584** | **87.7%** |
| | **Rural** | **82** | **12.3%** |
| **Socioeconomic status (SES):** | **Upper** | **332** | **49.8%** |
| | **Upper middle** | **238** | **35.7%** |
| | **Middle** | **64** | **9.6%** |
| | **Lower** | **2** | **0.4%** |

## Results and discussion

In the sample considered, only 33% (95%CI=0.30–0.37) of students interviewed presented with internet addiction.

*Effect size of individual variables.* Internet addition was present in 33% of the sample population (d=1.40) and was mostly of mild degree (d=3.37), involving female students (d=2.97), from urban geographical area (d=6.72), from upper (d=2.81) and upper middle (d=1.34) social class. Psychiatric scales reported mild degree of depression (d=0.93), moderate (d=0.96) to severe (d=0.83) degrees of anxiety, and moderate degree of stress (d=0.99) (Table 2). Cohen's d scores were not related to the mean scores found in the psychiatric scales, in gender, and geographical area of residence (Table 3). The IA scale scores were correlated with scores in the scales measuring depression (d=0.82), anxiety (d=1.18), and stress (d=0.77). An intermediate effect size was found by Chi-square statistics (Table 4) matching IA scale with depression scale (d=0.62), anxiety scale (d=0.68) and stress scale (0.70). All individual categories showed a statistically significant heterogeneity at meta-analysis ($I^2$>90%; $p$<0.001) (Table 1). Statistically significant heterogeneity ($I^2$=89%, $p$<0.001) was also found in the mean scores of psychiatric scales (Table 3).

*Combined effect size from individual categories.* The effect size was also calculated for combined categories. High effect size (d>1.0) were shown by the prevalence of IA (d=5.40), gender (d=4.85), area of residence (d=2.60), level of depression (d=1.79), level of anxiety (d=2.99) and level of stress (d=1.98). The correlation of IA scale with psychiatric scale also showed a high effect size (d=2.40). Overall the current study shows that the factors with the

highest effect size on the Internet addition are played by the female gender and level of anxiety. In other words, *IA presents with higher effects size in female students with moderate levels of anxiety* (Table 1, 3 and 4).

## Conclusion

Overall, our results support previous findings of a strong relationship between Internet addiction and psychological states such as depression, anxiety and stress. These results have many implications. For instance, the relatively high scores of depression, anxiety and stress in IAs would be useful in determining optimal clinical counseling and interventions for adolescents. As yet, there is no official psychiatric diagnosis of an Internet addiction. It remains to be seen whether this type of addiction will be incorporated into formal diagnosis classification systems. Several limitations of the study should be noted, to provide direction for future research. Firstly, a self-administered questionnaire was used, so there was no possibility of identifying false reports. Secondly, participants were MBBS students and replication of this study for targeting other student populations should be made to generate a more solid relationship among constructs examined in this study, because generalization of the results is somewhat limited. Thirdly, as correlational statistics were utilized no definitive statements can be made about causality. For a medium that has so radically changed the way we conduct our lives, the Internet's effects on our psychological health remain understudied. Simply stating that similar fears were raised when the radio, movies and early video games were introduced is not sufficient: the immersive and interactive qualities of the virtual world, and its sheer penetrance, make it potentially more serious. Also deserving of exploration are the subtler psychological changes that occur in the virtual world, such as online disinhibition and increased risk-taking [30]. Those changes are not necessarily evidence of "Internet addiction", and may not be pathological, but, as important features of the new virtual psychology, should also be studied. As our field continues to debate whether their condition belongs in the next edition of the DSM [31]patients continue to present with symptoms born out of the digital age, and their symptoms are changing as the technology evolves from browsers, to "crackberries", to "smart phones" that combine texting, talking, video games, and browsing in one device that to many is like a new appendage. Future studies should explore the possibility of gender differences in components of Internet addiction, such as gaming, e-mail, chatting, shopping, information retrieval etc. Even the "problematic Internet use" designation now seems outdated, which is why some have wisely opted for "pathological use of electronic media", instead [31]. Technology, like media outlets, remains far ahead of scientific investigation. Given the dramatic changes that our society is undergoing because of the Internet revolution, it behooves us to try to bridge the gap.

***Table 2. Characteristic of the population with internet addiction and meta-analysis***

| Categories | | N | UP[a] (95%CI) | Z-value | Cohen's d | Heterogeneity $I^2$ (%) |
|---|---|---|---|---|---|---|
| **Prevalence of Internet addiction (*n*=666):** | **Present** | **226** | **0.33 (0.30–0.37)** | **8.63*** | **1.40** | |
| | **Absent** | **440** | **0.66 (0.62–0.69)** | **12.21*** | **2.78** | |
| | **Combined** | | | **14.10*** | **5.40** | **99.34*** |
| **Degree of severity of Internet addiction (*n*=226):** | **Mild** | **168** | **0.74 (0.68–0.80)** | **12.93*** | **3.37** | |
| | **Moderate** | **54** | **0.23 (0.18–0.29)** | **7.21*** | **1.09** | |
| | **Severe** | **4** | **0.01(0.00–0.03)** | **1.50+** | **0.20** | |
| | **Combined** | | | **4.38*** | **0.60** | **99.66*** |
| **Gender distribution of internet addiction (*n*=226):** | **Male** | **70** | **0.31 (0.24–0.37)** | **8.37*** | **1.34** | |
| | **Female** | **156** | **0.69 (0.63–0.75)** | **12.48*** | **2.97** | |
| | **Combined** | | | **13.90*** | **4.85** | **98.69*** |
| **Area of residence (*n*=226):** | **Urban** | **210** | **0.92 (0.89–0.96)** | **14.41*** | **6.72** | |
| | **Rural** | **16** | **0.19 (0.10–0.28)** | **6.55*** | **0.96** | |
| | **Combined** | | | **11.93*** | **2.60** | **99.92*** |
| **Social class (*n*=226):** | **Upper** | **128** | **0.56 (0.50–0.63)** | **11.25*** | **2.81** | |
| | **Upper middle** | **72** | **0.31 (0.25–0.37)** | **8.37*** | **1.34** | |
| | **Middle** | **18** | **0.08 (0.04–0.11)** | **4.35*** | **0.60** | |
| | **Upper lower** | **8** | **0.03 (0.01–0.05)** | **2.60**** | **0.35** | |
| | **Lower** | **0** | **0.00 (0.00–0.00)** | **0.70+** | **0.09** | |
| | **Combined** | | | **3.34*** | **0.45** | **99.02*** |
| **Depression in subjects suffering from Internet addiction (*n*=226):** | **Nil** | **126** | **0.55 (0.49–0.62)** | **11.14*** | **2.20** | |
| | **Mild** | **42** | **0.18 (0.13–0.23)** | **6.37*** | **0.93** | |
| | **Moderate** | **30** | **0.13 (0.08–0.17)** | **5.42*** | **0.77** | |
| | **Severe** | **8** | **0.03 (0.01–0.05)** | **2.60**** | **0.35** | |
| | **Very severe** | **20** | **0.13 (0.08–0.17)** | **5.42*** | **0.77** | |
| | **Combined** | | | **10.03*** | **1.79** | **98.26*** |
| **Anxiety in subjects with Internet addiction (*n*=266):** | **Nil** | **102** | **0.45 (0.38–0.51)** | **10.08*** | **1.80** | |
| | **Mild** | **16** | **0.07 (0.03–0.10)** | **3.97*** | **0.54** | |
| | **Moderate** | **43** | **0.19 (0.13–0.24)** | **6.55*** | **0.96** | |
| | **Severe** | **36** | **0.15 (0.11–0.20)** | **5.82*** | **0.83** | |
| | **Very Severe** | **30** | **0.13 (0.08–0.17)** | **5.42*** | **0.77** | |
| | **Combined** | | | **12.50*** | **2.99** | **96.27*** |
| **Level of stress in Internet addicted (*n*=266):** | **Nil** | **126** | **0.55(0.49–0.62)** | **11.14*** | **2.20** | |
| | **Mild** | **26** | **0.11 (0.07–0.15)** | **4.98*** | **0.70** | |
| | **Moderate** | **46** | **0.20 (0.15–0.25)** | **6.72*** | **0.99** | |
| | **Severe** | **12** | **0.05 (0.02–0.08)** | **3.36*** | **0.45** | |
| | **Very severe** | **16** | **0.07 (0.03–0.10)** | **3.97*** | **0.54** | |
| | **Combined** | | | **10.60*** | **1.98** | **98.12*** |

[a]UP=Untransformed proportions; Significance: *≤0.001;**≤0.05;+n.s.

***Table 3. Combined variables in Internet addiction, mean scores (± SD) in psychiatric scales for Internet addicted and meta-analysis***

| | Mean (±SD) | Mean (95%CI) | Z value | Cohen's *d* | Heterogeneity $I^2$ (%) |
|---|---|---|---|---|---|
| **Psychiatric scales (*n*=266):** | | | | | |
| **Depression** | **10.67 (±8.26)** | **10.67 (9.59–11.74)** | **19.42*** | **n.a.** | |
| **Anxiety** | **11.1 (±7.9)** | **11.10 (10.07–12.13)** | **21.12*** | **n.a.** | |
| **Stress** | **15.2 (±8.4)** | **15.20 (14.10–16.29)** | **27.20*** | **n.a.** | |
| **Combined:** | | **12.25 (11.63–12.87)** | **39.01*** | **n.a.** | **88.89*** |
| **Average scores in Internet addiction:** | | | | | |
| **Gender:** | | | | | |
| **Male (*n*=70)** | **43.1 (±9.81)** | **43.10 (40.80–45.39)** | **36.75*** | | |
| **Female (*n*=156)** | **43.4 (±12.81)** | **43.40 (41.39–45.41)** | **42.31*** | | |
| **Combined:** | | **43.27 (41.75–44.78)** | **56.05*** | **n.a.** | **0** |
| **Residence:** | | | | | |
| **Urban (*n*=210)** | **43.51 (±12.18)** | **43.51 (41.86–45.15)** | **51.76*** | | |
| **Rural (*n*=16)** | **40.88 (±8.11)** | **40.88 (36.90–44.85)** | **20.16*** | | |
| **Combined** | | **43.12 (41.60–44.64)** | **55.54*** | **n.a.** | **30.35+** |
| **Correlation of scores at Internet Addiction Scale with psychiatric scales scores** | | | | | |
| ***n=226*** | ***rho*** | ***rho* (95%CI)** | | | |
| **Depression** | **0.38*** | **0.38 (0.26–0.48)** | **5.97*** | **0.82** | |
| **Anxiety** | **0.51*** | **0.51 (0.40–0.60)** | **8.40*** | **1.18** | |
| **Stress** | **0.36*** | **0.36 (0.24–0.46)** | **5.62*** | **0.77** | |
| **Combined:** | **0.41** | **0.41 (0.35–0.48)** | **11.55*** | **2.40** | **56.28+** |

Statistical significance at $^{*}p<0.001$; $^{+}p$=n.s.

***Table 4. Matching (Chi-square) of degrees of internet addiction (IA) with degrees of severity in psychiatric scales, gender and residence***

| Matching (*n*=226) | Chi-square (d.f.) | Significance p | Cohen's d |
|---|---|---|---|
| IA[a]×Depression[b] | 20.06 (4df) | <0.01 | 0.62 |
| IA×Anxiety[b] | 23.51 (4df) | <0.01 | 0.68 |
| IA×Stress[b] | 25.27 (4df) | <0.01 | 0.70 |
| IA×Social class[c] | 8.77 (4 d.f.) | <0.05 | 0.36 |
| IA×Gender[d] | 0.44 (1 d.f.) | n.a. | 0.08 |
| IA×Residence[e] | 1.56 (1.d.f) | n.a. | 0.16 |

[a]Degrees of severity in Internet addiction classified as 'Mild' and 'Moderate to Severe' to cancel cell with less than 5 observations in Chi-square statistics.
[b]Degree of severity in psychiatric scales classified as 'Normal (no pathological score), Mild, Moderate, Severe, and Very Severe'.
[c]Social class divided in: upper, upper middle, middle, upper lower, lower.
[d]Gender: male and female. [++]Residence: urban and rural.
[e]Residence divided in: urban and rural.

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## References


1. Black DW, Belsare G, Schlosser S. Clinical features, psychiatric comorbidity, and health-related quality of life in persons reporting compulsive computer use behavior. J Clin Psychiatry 1999; 60: 839-44.
2. Scherer K. College life online: healthy and unhealthy Internet use. J Coll Stud Dev. 1997; 38:655-665.
3. Caplan SE. Preference for online social interaction: A Theory of problematic internet use and psychosocial well- being. Comm Research 2003; 30: 625–648.
4. Davis RA. A cognitive-behavioral model of pathological internet use. Comput Human Behav 2001; 17: p. 187-195.
5. I. G. Internet addiction disorder. [Online].; 1996 [cited 2007 May 7. Available from: URL: http://www.cog.brown.edu/brochure/people/ duchon/humor/internet.addiction.html.
6. Young K, Pistner M, O'Mara J, Jenifer Buchanan J. Cyber-disorders: The mental health concern for the new millennium. CyberpsycholBehav 2000; 3: 475–479.
7. Griffiths, MD. Internet addiction: Does it really exist? In J. Gackenbach (Ed.), Psychology and the Internet: Intrapersonal, Interpersonal and Transpersonal Applications. pp. 61-75. New York: Academic Press; 1998.
8. Huisman A, van den Eijnden R, Garretsen H. 'Internet addiction'–a call for systematic research. Journal of Substance Use, 2009; 6: 7–10.
9. Aboujaoude E, Koran LM, Gamel N, Large MD, Serpe RT. Potential markers for problematic internet use: a telephone survey of 2,513 adults. CNS Spectr. 2006; 11(10):750–755.
10. 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: 121–127.
11. Cao F, Sue L. Internet addiction among Chinese adolescents: prevalence and psychological features. Child Care Health Dev. 2007; 33: 275-281. [11]
12. Harris Hyun-soo Kim H(2016) The impact of online social networking on adolescent psychological well-being (WB): a population-level analysis of Korean school-aged children. Int J Adolesc Youth 2016; 22: 364–376.
13. Park SK, Kim JY, Cho CB. Prevalence of Internet addiction and correlations with family factors among South Korean adolescents. Adolescence 2008; 43: 895–900.
14. Siomos KE, Dafouli ED, Braimiotis DA, Mouzas OD, Angelopoulos NV. Internet addiction among Greek adolescent students. CyberpsycholBehav. 2008; 11: 653-657.
15. Johansson A, Götestam KG. Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years). Scand J Psychol. 2004; 45(3): p. 223-9.
16. Ghassemzadeh L, Shahraray M, Moradi A. Prevalence of internet addiction and comparison internet addicts and non-addicts in Iranian high schools. CyberpsycholBehav. 2008; 11: 731–733.
17. Chakraborty K, Basu D, Vijaya Kumar KG. Internet addiction: Consensus, controversies. East Asian Arch Psychiatry 2010; 20: 123–132
18. Malviya A, Dixit S, Shukla H, Mishra A, Jain A, Tripathi A. A Study to evaluate internet addiction disorder amoung students of a medical college and associated hospital of central India. National Journal of Community Medicine 2014; 5: 93–95.
19. Tang J, Yu Y, Du Y,Ma Y, Zhang D , Wang J. Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. Addict Behav.2014; 39:744-477.
20. Poli R,Agrimi E. Internet addiction disorder: prevalence in an Italian student population. Nord J Psychiatry 2012; 66:55–59. doi: 10.3109/08039488.2011.605169. Epub 2011 Aug 23.
21. AdieleI, Olatokun W. Prevalence and determinants of internet addiction among adolescents. Computers in Human Behavior 2014; 31: 100–110.
22. Brown School of Public Health. Open Meta-Analyst. 2018; available at: http://www.cebm.brown.edu/openmeta/download.html.
23. Biostat (2018). Comprehensive Meta-Analysis. Available at: https://www.meta-analysis.com.
24. Lenhard W, Lenhard A (2016). Calculation of effect sizes. 2016; available at: https://www.psychometrica.de/effect_size.html. Dettelbach (Germany): Psychometrica.
25. Lyons-Morris AM. Meta-Analysis. 2018; Available at: http://www.lyonsmorris.com/ma1/
26. Young KS. Internet addiction: The Emergence of a new clinical disorder. 1(3) Cyberpsychol&Behav 2009; 1: 237–244.
27. Young K. Caught in the net: how to recognize the signs of internet addiction and a winning strategy for recovery. New York, Chichester, Weinheim, Brisbane, Singatpore, Toronto: John Wiley & Sons; 1998.

28. Lovibond SH, Lovibond PF. Manual for the Depression Anxiety Stress Scales (2nd ed.). Sydney: Psychology Foundation; 1995.
29. Bairwa M, Rajput M, Sachdeva S. Modified Kuppuswamy's Socioeconomic Scale: Social Researcher Should Include Updated Income Criteria, 2012. Indian J Community Med 2013; 38: 185–186.
30. Suler J. The online disinhibition effect.CyberpsycholBehav. 2004; 7:321–326.
31. Pies R. Should DSM-V designate "Internet addiction" a mental disorder? Psychiatry 2009; 6: 31–37