

Editorial

Co-Morbidity of Internet Addiction with Anxiety and Depression

Aviv Weinstein*

Department of Behavioral Science, University of Ariel, Israel

INTRODUCTION TO INTERNET ADDICTION

Problematic Internet use [PIU], or Internet addiction, is characterized by excessive use, impairment, or distress as result of the use of the internet. Early studies by Young [1] Griffiths, [2,3] and Aboujaoude [4] defined this disorder and included extensive research on it. The condition has attracted increasing attention in the popular media and among researchers, and this increase in attention has paralleled the growth in computer use and Internet access [5]. Phenomenologically, there appear to be at least three subtypes of Internet addiction: excessive gaming or gambling, sexual preoccupations [cybersex], and socializing or social networking including e-mail and text messaging. Internet addicts may use the Internet for extended periods, isolating themselves from other forms of social contact, and may focus almost entirely on the Internet rather than on other life events. Adolescents with problematic Internet use showed dysfunctional coping strategies with problems in school and home and exhibited poor interpersonal relations [6]. Internet addiction can also be explained by a need to escape from oneself, which may account for the excessive playing of Internet games [7]. Three different models have been proposed for PIU [8-11]. Some researchers have considered impulse control disorders as part of the obsessive-compulsive disorder spectrum as a model. This model is supported by brain-imaging and pharmacological treatment studies with *selective-serotonin reuptake inhibitors* [SSRIs] [12] although other treatments and brain-imaging studies may challenge it. PIU has also been conceptualized as an impulse control disorder, characterized by the urge to repeatedly engage in a behavior-going online- that is pleasurable in the moment but can lead to negative downstream effects [4] Third, Internet addiction has been suggested for inclusion in the behavioral addiction spectrum because it involves excessive use despite adverse consequences, withdrawal phenomena, and tolerance, all of which characterize many substance-use disorders. The frequent appearance of Internet addiction in the context of numerous comorbidity conditions raises complex questions of causality.

PSYCHIATRIC COMORBIDITY

Cross-sectional studies on samples of patients report high comorbidity of Internet addiction with psychiatric disorders, such as affective disorders, anxiety disorders [including generalized anxiety disorder and social anxiety disorder], and *attention-*

deficit hyperactivity disorder [ADHD]. Floros [15] assessed the comorbidity of IAD with other mental disorders in a clinical sample of college students who presented for treatment of IAD. The clinical sample revealed a high percentage of comorbidity with Axis I and II disorders. Half of the sample [25/50] presented with comorbidity of another Axis I disorder and 38% [19/50] presented with a concurrent Axis II personality disorder. The majority of Axis I disorders [51.85%] were reported before the onset of IAD, 33.3% were reported after the onset, and 14.81% of the cases were unclear. There is evidence on the co-occurrence of Internet addiction with depressive mood disorder in adults [16-18]. A single study on bipolar depression [19] screened a clinical sample of 368 treatment seekers for excessive to addictive Internet use for bipolar spectrum disorders. Comorbid bipolar disorders were more frequent in patients who met the criteria for Internet addiction [30.9%] than among the excessive users [5.6%]. This sub group show edheightened psychopathological symptoms, including substance use disorders, affective disorders, and personality disorders.

Anxiety disorder was found in several studies of adult problematic Internet users [20-21]. Weinstein [22] investigated the association between Internet addiction and social anxiety in two samples of 120 university students [60 males and 60 females in each sample]. The results showed a correlation between Internet addiction and social anxiety in the two samples, with no difference in the level of Internet addiction between males and females. The results also showed no preference for social networks among participants with high levels of social anxiety. Furthermore, the results of the study support previous evidence on the co-occurrence of Internet addiction and social anxiety. Weinstein [23] found an association between compulsive buying on the Internet and anxiety as well as obsessive-compulsive traits. The participants were 120 habitual [more than twice a week] shoppers [70 men and 50 women]. Weinstein showed that the *Edwards Compulsive Buying Scale* measures were associated with the Spielberger trait, but not state anxiety measures. The Spielberger trait anxiety measures are also correlated with measures on the *Yale-Brown Obsessive-Compulsive Scale* [Y-Bocs]. The link between behavioral addictions, such as Internet addiction and compulsive buying, and anxiety and obsessive-compulsive measures has therefore been established.

*Corresponding author

Aviv Weinstein, Department of Behavioral Science, University of Ariel, Israel, Email: avivweinstein@yahoo.com

Submitted: 01 May 2016

Accepted: 03 May 2016

Published: 07 May 2016

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Among South Korean adolescents, Internet addiction has been associated with depression in one study [24] and high levels of depression and suicidal ideation in another study [25-26]. ADHD symptoms, depression, social phobia, and hostility were high in adolescents with Internet addiction in Taiwan [27-28]. In a later study,

Yoo [29] examined the factors influencing Internet addiction and mental health in a nationally representative sample of 74,980 Korean middle- and high-school students.

The odds ratios for potential Internet addiction were higher in boys and girls who reported suicidal ideation, depressive mood, moderate or higher subjective stress, moderate or more happiness, or ever having engaged in problematic substance use. Excessive gaming was associated with severe depression, social phobia, and Internet addiction symptoms in Taiwan. Female online gamers had fewer weekly online gaming hours and a shorter previous online gaming history, but tended to have more severe somatic pain and social phobic symptoms [30]. In Turkey, Bozkurt [31] investigated the prevalence and patterns of psychiatric disorders in young subjects with IAD. A sample of children and adolescents [mean age, 13.38 ± 1.79 years; 45 boys and 15 girls] had been referred to the Istanbul Medical Faculty Child and Adolescent Psychiatry Department. All subjects [100%] had at least one comorbid psychiatric disorder and 88.3% [$n = 53$] had at least two comorbid psychiatric disorders. The frequencies of the diagnostic groups were as follows: behavioral disorder [86.7%], anxiety disorder [71.7%], mood disorder [38.3%], elimination disorder [26.7%], tic disorder [16.7%], and substance use disorder [6.7%].

The most common psychiatric disorders were ADHD [83.3%], social phobia, [35%] and major depressive disorder [30%]. In Australia, King [32] assessed the clinical features of *pathological video gaming* [PVG] and PIU in a cohort of 1,287 South Australian secondary school students. Depression, panic disorder, and separation anxiety were most prevalent among adolescents with PIU. Adolescents with PIU appear to be at greater risk of Axis I comorbidity than adolescents with PV Galone. In Germany, Fischer [33] investigated associations between Internet addiction and depression, deliberate self-harm and suicidal behavior among a representative sample of 1,435 German adolescents. Risky and pathological Internet users showed significantly higher rates of depression, deliberate self-harm and suicidal behavior compared with students whose Internet use was normal. The results suggest that in addition to pathological Internet use, risky Internet use is associated with symptoms of depression, self-harm, and suicidal behavior. A few studies have investigated the relationships between the development of Internet addiction and comorbid psychiatric conditions. A relationship between anxiety, depression, and future Internet addiction among South Korean males has been established [34] and an exacerbation of depression, hostility, and social anxiety in the process of acquiring Internet addiction among adolescents has been reported [35]. In contrast, depression, hostility, and social anxiety decreased in the process of remission.

CONCLUSIONS

It is debatable whether Internet addiction stands as its own diagnosis or should be considered a product of other existing

disorders such as anxiety, depression, ADHD, or impulse control disorders. The evidence collected so far shows that depression and hostility aggravate Internet addiction in adolescents, and when there is a remission from Internet addiction, there is a decrease in depression, hostility, and social anxiety, although no causal role has been established between Internet addiction and psychiatric comorbidity.

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Cite this article

Weinstein A (2016) Co-Morbidity of Internet Addiction with Anxiety and Depression. *JSM Anxiety Depress* 1(1): 1003.