

Internet Gaming Disorder Co-morbidity Linked to Depression and Other Affective Problems

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Editorial

The links between excessive internet game play and depressive symptoms are well-established [1,2]. Many of the problematic and dysfunctional tendencies often defined by loss of impulse control that are linked with internet/video gaming and the diagnosis of internet gaming disorder (IGD) have been shown to have connections also with other conditions, including emotional, cognitive, motivational and somatic disruptions expressed in anhedonia, anxiety, sleep disturbance and depressive states and various types of social and generalized anxiety, psychological distress, lower levels of psychological resilience and symptoms of attention-deficit hyperactivity disorder [3-7]. IGD exerts a negative impact upon physical, psychological, social, and occupational functioning within several domains of the affected individual, which often leading to severe consequences [8]. Users combining computer-games and smart phone-games were observed to exhibit a higher prevalence of IGD, depression and anxiety disorders, and substance use disorders [9]. Unsurprisingly, 89 percent of IGD-diagnosed and 92 percent of IGD-diagnosed, respectively, presented symptoms of depression and anxiety [10]. Patients presenting IGD were shown to be of younger age, with a greater likelihood of being single and unemployed, as well as presenting also a lower age-level for disorder onset [11]. Additionally, these patients expressed a lower level of somatization and depressiveness scores together with lower prevalence of tobacco use but higher food addiction scores accompanied by a higher mean body mass index. Furthermore, they evidenced lower novelty-seeking and persistence traits. Thus, the consensus of several clinical and non-clinical studies establishes that in IGD depressiveness and other affective problems, including gender, problematic alcohol use, anxiety, and a past history of psychiatric counselling or treatment due to internet gaming use, are common co-morbidities [12]. These issues serve to underline the problematic nature of IGD [13,14].

Suffice it to say, the gaming disorder constitutes a particular form of behavioral addiction that has been described as the individual's loss of control with persistent and recurrent use of internet gaming culminating in the marked impairment of adequate psychosocial functioning [15]. The poor quality of interpersonal relationships, as shown by impaired social support and social network, social isolation and loneliness, all serve to express the emotional underpinnings of disorder [16-18]. Relationships between major depressive disorder or dysthymic disorder among college students have been reported, although there are negative findings and inconsistency [19-22]. Individuals who used internet gaming more persistently showed greater signs of depressiveness than those individuals who did not, observed from a two-year longitudinal study [23]. It has been found that the symptoms of IGD were associated positively with depression and impulsiveness and concurrently associated negatively with the

quality of the afflicted individual's interpersonal relationships, the latter emphasising strong mediational influences; notably, hyper-impulsiveness was linked to greater deterioration of interpersonal relationships [24]. Among patients presenting IGD diagnosis, Bupropion, a noradrenergic-dopamine reuptake inhibitor and nicotine-receptor antagonist, induced greater therapeutic effects than the serotonin reuptake inhibitor, citalopram, upon the reduction of impulsiveness and attentional problems whereas the decreased brain connectivity between the salience network and the default mode network seems to be associated with an improvement in excessive IGD symptoms and impulse-control problems [25]. In this context, it has been observed that the co-morbidity relationship between IGD combined with alcohol use disorder presented higher levels of severe psychopathological impairments, and in these cases the respective afflicted individuals spent more money on gaming than either the IGD diagnosed or alcohol use disordered individuals by themselves [26]. IGD individuals and alcohol abusing individuals differ also with regard to attributes associated with temperament and character whereby the severity of the former correlated positively with novelty seeking score, impulsiveness and attention and the latter expressed harm avoidance score and depressed mood [27].

Alterations of regional brain integrity has been found to be compromised also: it has been observed that there was a lesser extent of gray matter density in the left dorsolateral prefrontal cortex among the IGD patient group than among the Internet gaming control group and the non-gaming control group with the gray matter density being associated with a lifetime usage of Internet gaming, depressed mood, craving, and impulsivity among the gaming users; a striatal volumetric analysis found a marked reduction in the right nucleus accumbens region in the IGD patient group and its relationship with lifetime usage of gaming and depressive symptoms; these findings imply that changes within the brain structures involved in the reward system, or pertaining to a reward deficiency syndrome, subtend a relationship with IGD-related behavioral characteristics and/or attributes [28]. In patients presenting co-morbid IGD and major depressive disorder, there was an association between reduced inter-hemispheric connectivity in the frontal region and vulnerability to attention problems implying that intra-hemisphere connectivity in the fronto-temporo-parieto-occipital areas may be the consequence of excessive online gaming behaviour [29]. Procrastination, associated with the clinical severity of IGD, positively associated with depression, hostility, and impulsivity, but after controlling for depression, hostility, and impulsivity, is still linked with IGD among young adults presenting the disorder [30]. Several other affective conditions are associated with excessive gaming or computer over-usage: thus Thomee et al. [31], observed both cross-sectional and prospective relationships between computer gaming and overweight/obesity among 20 to 24 year-old Swedish young women (n=4073), following adjustment for age,

occupation, physical activity, sleep, social support, and total computer use. In a follow-up study Thomee et al. [32], it was found that sleep disturbances among male participants (n=1458, 20 to 24 years-of-age) were associated with high-to-medium computer users as opposed to low computer users; medium computer-gaming among women users (n=2705) was linked to symptoms of depression. Finally, juveniles presenting IGD displayed markedly blunted neural responses within various different subcortical and cortical brain regions such as the striatum, insula, lateral prefrontal cortex and anterior cingulate while responding to negative affective cues, as well as during emotion regulation., as confirmed by Independent component analysis identified additionally between-group differences in the engagement of a fronto-cingulo-parietal network, involving decreased engagement among the IGD juveniles in comparison with the control group [33]. The demand for treatment interventions pertaining to problems related to the use of video games has increased enormously among adolescents whom in most cases present co-morbid affective disorder pathologies [34,35].

In conclusion, the present treatise describes several affective, comorbid component disorders, most seriously depression and anxiety, that may or may not accompany the IGD disorder whether diagnosed or not. Thus, those individuals defined by chronic, compulsive video game-playing persistence and addiction display an increased incidence of major depressive disorders through which the excessive or problematic game-playing may interact with depression, anxiety and/or several affective conditions, clinically, and may magnify the impulsive behaviors associated with video gaming disorders.

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