

## Mindfulness-Based Interventions: Potentials for Management of Internet Gaming Disorder

### Abstract

Mindfulness-based interventions have been found to be efficacious among cases with substance addiction. Its role in Internet gaming disorder (IGD) has not been extensively studied. Prisma model approach was used to search for relevant articles from January 2009 to March 2021, to synthesize the role of empirical findings with mindfulness-based interventions to address various psychological domains in IGD. Eighteen relevant papers were included to understand the role of mindfulness-based interventions in IGD. Studies revealed the role of mindfulness-based interventions in the promotion of emotional regulation, metacognitive awareness, adaptive coping/cognition, reducing impulsivity, and craving for playing games. Studies also reveal neuro-biological basis for the effect of these interventions among users with IGD. Mindfulness-based interventions are potentially useful in IGD. It implicates the need to understand the empirical linkages within the root factors for a comprehensive understanding of the phenomenon of mindfulness-based treatment in IGD.

**Keywords:** Internet gaming disorder, mindfulness, treatment

### Introduction

There is a global concern on the rising trend in addictions and addictive behaviors, specifically, nonsubstance-related addictions such as gambling and Internet addictions.<sup>[1]</sup> Unhealthy lifestyles and advancements of technology have led to increased internet addictions of all types such as cybersex and relationship addictions, gaming addictions, information seeking, and compulsive interactive activity addiction (shopping, gambling, auctions, and stock trading).<sup>[2]</sup> A cross-national representative survey has recorded a steep increase in Internet gaming disorder (IGD) cases over the last decade in young adults as they have easy access and spend an excessive amount of time on Internet activities.<sup>[3]</sup> Past research has shown that the prevalence of IGD is between 4% and 12% among adolescents and adults.<sup>[4]</sup> High rates of psychiatric comorbidities are associated with higher risk for IGD and it includes depression, anxiety, attention deficit hyperactivity disorder, and alcohol use disorder.<sup>[5,6]</sup> The research in the Indian context revealed that 6.8% ( $n = 60$ ) individuals had a lifetime psychiatric history. Furthermore, a positive relationship was observed between

internet gaming and depression ( $r = 0.412$  at 0.05 level) and anxiety ( $r = 0.408$  at 0.001 level), respectively.<sup>[7]</sup> Gaming often serves as a passive strategy/palliative coping strategy to manage real-life problems by providing a temporary escape into a virtual reality.<sup>[8,9]</sup> Gaming may help the users find an expression of basic needs (i.e., physiological, safety, social, self-esteem, and self-actualization).<sup>[10]</sup> Individuals with IGD also report more difficulties in emotional regulation (ER) along with higher impulsivity.<sup>[11]</sup> However, in contrast with other addictions, individuals with IGD are reported to have greater decisional impulsivity (than impulsive disinhibition) and prefer small immediate rewards over larger delayed rewards.<sup>[12]</sup>

Mindfulness that facilitates metacognitive awareness of the present moment experiences is recognized to be a promising intervention for treating addictions.<sup>[13]</sup> Mindfulness encompasses two major components: (1) self-regulation of attention and (2) adoption of a particular orientation toward one's experiences. Self-regulation of attention means nonelaborative observation and awareness

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of sensations, thoughts, or feelings from moment to moment. Orientation to experience refers to the kind of attitude that one holds toward one's experience, mainly an attitude of curiosity, openness, and acceptance. Basically, the core concept of mindfulness involves awareness of one's moment-to-moment experience nonjudgmentally and with acceptance.<sup>[14]</sup> Mindfulness practices impact reward pathways by bringing awareness into the relative lack of the reward over the long run (immediate reward but long-term loss) originating from the addictive habits.<sup>[15]</sup> Studies have shown that mindfulness is negatively correlated with Internet addiction behavior and is considered to be a protective factor.<sup>[12]</sup>

Although a few studies have explored the domains of mindfulness and Internet gaming, there have been no attempts so far to synthesize this information to decide future direction for research. We, therefore, decided to perform a brief review of the current evidence on mindfulness and Internet gaming. Guided by the PRISMA model, we searched for peer-reviewed English language publications indexed in PubMed, Google Scholar, Research Gate, PsycInfo, PsycNet, and Science Direct using the keywords: mindfulness, meditation, internet gaming, gaming disorder, internet addiction, and well-being. The search was conducted from January 2009 to March 2021. Studies that were mixed methods or qualitative were excluded. The reference list of primary retrieved articles was screened to identify any relevant articles for inclusion in the synthesis. Out of 33 articles that were retrieved initially, 18 papers were included after removing duplicates. Data were extracted on broad categories of association of mindfulness and neurobiology of gaming, coping technique, ER, and metacognitive awareness.

### **Mindfulness and Neurobiology of Gaming**

Mindfulness practices impact the reward pathways (particularly the areas of higher cognitive control such as orbitofrontal cortex) by bringing awareness into the relative lack of the reward originating from the addictive habits.<sup>[15]</sup> A study revealed that brain regions that contribute to craving in substance dependence also contribute to online gaming urge.<sup>[16]</sup> Mindfulness-based programs may be beneficial in reducing craving for gaming and modifications in maladaptive cognitions.<sup>[17]</sup> The gray matter density has been shown to have a negative correlation with gaming addiction on one side;<sup>[18]</sup> on the other hand, positive correlation has been reported between the gray matter density and the duration of mindfulness practice experience in meditators.<sup>[19]</sup> Gray matter volume (GMV) of brain regions involved in sensorimotor processes and cognitive control was also found to be associated with the IGD tendency.<sup>[20]</sup> Meditations are known to enhance GMV in reward processing regions.<sup>[19,21]</sup> Similarly, altered inhibitory control network can be the reason for having difficulties in stopping and controlling overuse.<sup>[22]</sup> Mindfulness has been

demonstrated to foster the development of skills that can regulate inhibitory processes in early adolescence.<sup>[23]</sup>

### **Mindfulness and Coping Techniques**

Gaming often serves as a passive strategy/palliative coping strategy to manage real-life problems by providing a temporary escape into a virtual reality.<sup>[8,12]</sup> The experiential avoidance can perpetuate technology addiction. Therefore, IGD is often associated with depression and anxiety.<sup>[11]</sup> Research conducted among college students showed that mindfulness can promote positive coping techniques which in turn can enhance self-esteem and emotion regulation capabilities; on the other hand, students with low levels of dispositional mindfulness were found to be at increased risk of smartphone use disorder.<sup>[24]</sup>

### **Mindfulness and Meta-cognitive Awareness**

Mindfulness facilitates top-down regulation of the cognitive process, thereby proving conscious cognitive control over the automatic addictive impulses. It helps develop metacognitive awareness. The metacognitive awareness and reappraisal lead to awareness of triggers, craving response, which in turn leads to better coping ability. In a study, the manualized mindfulness-based intervention for IGD was found to be useful for modification of maladaptive cognitions and managing cravings related to gaming.<sup>[4,8]</sup>

### **Mindfulness and Emotion Regulation**

Increased impulsivity is a characteristic of individuals with substance use disorder. It is associated with poor treatment outcomes and higher relapse rates. Impulsive individuals are more susceptible to IGD and depression.<sup>[11]</sup> The individuals with IGD have been reported to have greater decisional impulsivity with greater preference for small but immediate rewards over larger but delayed rewards.<sup>[12]</sup> Individuals with IGD and depression have been shown to manifest higher emotion regulation (ER) difficulties and impulsivity with lower levels of mindfulness. It was observed that such individuals use Internet gaming as a maladaptive ER strategy and a way to escape negative emotions. These individuals also report difficulty in being in the present moment.<sup>[11]</sup> The mindfulness meditation practice has been shown to enhance self-control, attention regulation, and working memory. All these factors influence optimal decision-making. Another meditative practice called "receptive meditation," where the individual focuses on one's experiences from moment to moment without judgment, led to improvement in self-regulation.<sup>[25]</sup> Similarly, heightened levels of decisional impulsivity observed in individuals with IGD were observed to reduce following a mindfulness-based therapy. Further, decreased inter-temporal decisional impulsivity was found to be positively associated with reduced IGD severity.<sup>[12]</sup>

**Table 1: Summary on the effect of gaming addiction and mindfulness on various psychological and neurobiological domains**

Psychological/neurobiological domain	Gaming addiction	Mindfulness
Neurobiology: Reward circuit activation and craving	Increased <sup>[18]</sup>	Decreased <sup>[19]</sup>
Coping strategies	Passive/palliative <sup>[8,11,12]</sup>	Positive/health promotive <sup>[24]</sup>
Metacognitive awareness	Enhances cognitive maladaptations <sup>[4,8]</sup>	Facilitates top-down cognitive control <sup>[4,8]</sup>
Emotion regulation	Compromised <sup>[11]</sup>	Enhanced <sup>[25]</sup>
Impulsivity	Increased <sup>[26]</sup>	Decreased <sup>[26]</sup>
Mental co-morbidities	Higher risk <sup>[11]</sup>	Protective value <sup>[24]</sup>

## Discussion

The present synthesis provides a better insight into the role of mindfulness-based intervention in the promotion of ER, metacognitive awareness, adaptive coping/cognition, reducing impulsivity, reduction in craving for playing games, and neurobiological changes among users with IGD [Table 1]. IGD has become the emerging mental concern among young adults due to lockdown restrictions.<sup>[26]</sup> Through above-mentioned theoretical constructs and pathways, meditation may serve as a useful strategy to overcome excessive online gaming during pandemic period. The strengths of the current study include providing an up-to-date, consolidated, and systematic account of shreds of evidence on mindfulness-based intervention and IGD. Although selection bias in the included studies due to web-based data collection could be a limitation, the study has important implications for use of a mindfulness-based approach in managing the emerging problems of IGD. Future studies should focus on understanding the empirical linkages within the root factors for a comprehensive understanding of the phenomenon of mindfulness-based treatment in IGD.

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## Conflicts of interest

There are no conflicts of interest.

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