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Review Article

Game of thorns: Modern day opium

P.S. Bhat ^{a,*}, Jyoti Prakash ^b, Kalpana Srivastava ^c^a Professor & Head, Department of Psychiatry, Armed Forces Medical College, Pune 411040, India^b Senior Advisor (Psychiatry), Command Hospital (Eastern Command), Kolkatta, India^c Scientist 'G', Department of Psychiatry, Armed Forces Medical College, Pune 411040, India

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ABSTRACT

With the advent of internet and mobile communication the virtual space of world wide web has become a playground; people plugged in to it at distant horizon completely unfamiliar to each other are players; keyboard, touchpad and joysticks have become the tools of play; webmaster, app developer are self designated referees of the game; while the virtual media is the largest ever spectators in this amphitheatre of the web. More and more youth are getting hooked onto this and are gradually becoming dependent on these games. World Health Organization has recognized this as a diagnosable medical illness and included as Internet Gaming Disorder (IGD) in its International Classification of Diseases (ICD) -11 released in 2018. Various aspects of this problem are discussed in this article.

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Games remain to be a vital ingredient of life. It adds spice to life, tune to the monotony, breaks the idleness, and gives reasons for fun and frolic. The story of games spans from arrows and deer in the primitive era to keys and mouse in the electronic era. Prehistoric men used talus bone as tools for games which may be taken as predecessor for future dice games.¹

The researchers have often found various **neurochemicals** and pathways of the **brain** responsible for the indulgences in games and sports and the consequent euphoria and sense of well-being which emanates from them. Various structures and **neurotransmitters** that have been implicated are nucleus accumbens and dopamine resulting in the seeking behavior for reward, amygdala for learning by emotion, adrenaline pumping the flight or the flight actions, testosterone affecting pertinacity and determination, bodily opioids working on engrossment and momentary loss of feel of pain, prefrontal

cortex monitoring appropriate decisiveness, parietal lobe providing directional senses, and oxytocin instilling cooperation.^{2,3} As electronic devices and communication systems advanced, they have incurred immense temporo-spatial shift in ways games people are playing off-late. Internet connectivity and mobile telenetwork have created a virtual arena of world wide web, where players plug themselves to a distant team hardly familiar to one another; keyboards, touchpads, and the joysticks are current day tools for the play; web designers and app-makers are all watching referees in the game; whereas, the virtual media stands as the largest conglomeration of spectators in this amphitheatre of the web. Following the creation of multiuser playing device, this advance virtual zone spans many a homes.⁴

The statistics of this game-business reflects that in Asia Pacific in the year 2016 alone, 1.5 billion out of 4 billion are online with number of players being around 1.05 billion.⁵ India

* Corresponding author.

E-mail address: bhatshivaram@rediffmail.com (P.S. Bhat).<https://doi.org/10.1016/j.mjafi.2018.12.006>

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had 120 million players online in the year 2016, primarily because of low-cost smartphones with in-app purchases, promotional advertisement, etc. Adventure, action, and puzzles games were favorite for all age and gender. Mean age of the gamer was below 24 years, and 83% of which were male. Mobiles were choicest device, and family and peer influenced them into it. Heavy players moved on to bigger screens.⁶

These virtual world games hitherto have engulfed the real-world people in a bothersome manner. Researchers based on their work have found various changes in behavior and emotions of these players which is a matter of great concern. The passion has overgrown and reached a level of obsession and the act of playing suggests compulsion, affecting the player's time, money, and studies in a negative way.⁷ The games affect their growing, being ignorant and susceptible in the prime of their development also affects their socio-psycho-cultural dimension adversely.⁸

Gaming industries continue to devise strategies to make these games more appealing and cost effective. The products appeal to easily available emotions such as anger, frustration, envy, etc. while catering to instant gratification, novelty seeking, and self-esteem appeal. These games often are harmful to the individual and his environment. Games such as blue whale or Chinese embroidery have been found to influence a person's adventurous streak in a threatening manner, challenging the gamers to execute a hierarchy of risky acts often culminating to playful intended cessation of self.⁹

Internet gaming disorder/gaming disorder

Behavioral scientists and authors have found many disturbing behaviors in these players warranting therapeutic attention. International Classification of Diseases-11 Revision talks about gaming disorder as a type of addictive disorder; whereas, the internet gaming disorder (IGD), diagnosis akin to it in diagnostic and statistical manual of mental disorders-5th edition (DSM-5), has been mentioned as a tentative diagnosis requiring further workup, and this is not yet an established clinical body. IGD requires five or more of the following criteria: (i) preoccupation with games, (ii) withdrawal symptoms when gaming is withdrawn, (iii) tolerance, necessitating increasing amounts of time spent in games, (iv) unsuccessful attempts to control participation in games, (v) loss of interest in previous hobbies and entertainment as a result of, and with the exception of, games, (vi) continued excessive use of games despite knowledge of psychosocial problems, (vii) deceiving family members, therapists, or others regarding the amount of gaming, (viii) use of games to escape or relieve negative moods, and (ix) jeopardizing or losing a significant relationship, job, education, or career opportunity, because of participation in games.

Prevalence

Various studies have brought out prevalence which is wide and varying. While Rehbein et al. found the prevalence to be as low as 1.2% in their study of German adolescents, Grusser et al. found the same to the tune of 11.9%.^{10,11} Shrivastava et al. assessed 250 employees of various government/private

sector organizations (using internet for more than a year and education level of graduation and above) in South India using a cross-sectional research design. They found that 9.2% participants were falling in category of occasional problems/"at risk" for developing addiction in functioning/moderate impairment due to internet use.¹²

Phenomenology and comorbidity

Internet gaming disorders have been found to be associated with low mood, sleep problems, self-harm, and even disruptive behaviors.^{9,13} IGD has been found to be common in attention-deficit hyperactive disorder with increase in impulsive behavior and hostility.¹⁴ Real-time strategy and role-playing video games were found to have increased association with pathological play in comparison with the action or the phone games.¹⁵ Stetina et al. opined that among the various types of games, massively multiplayer online role-playing games (MMORPGs) players had more chances of getting depressed.¹⁶

Neurobiology

Researchers have found that IGD do show identical neural mechanisms to that of substance use and any other behavioral addictions such as pathological gambling.¹⁷ Tenets of cognitive control encompass the capability to resolve conflict-inducing situations and as well to inhibit prepotent responses. These can be assessed using Stroop tasks. Problems in inhibiting a prepotent response, which has important role in abstaining using internet on cue, have been found in Stroop test in cases of IGD.¹⁸ Increased errors of response have been observed during incongruent condition of Stroop test task.¹⁹ Reduced thickness of cortex and enhanced amplitude of reduced frequency fluctuation at Orbito frontal cortex was found to have correlation with color word performances of Stroop task in the young cases of IGD.¹⁸ Functional magnetic resonance imaging has revealed dysfunction in striatum during the response inhibition among the study subjects.²⁰ Positron emission tomography study has shown reduced availability of dopamine D2 receptor in caudate bilaterally and the right putamen.²¹ Enlarged volumes of dorsal (caudate) and ventral striatum (nucleus accumbens) has also been noted.²² Diffusion tensor imaging has shown dysfunctional connections within central executive networks and an ineffective connectivity of the salience network in the IGD in adolescents. Decreased fractional anisotropy in salience network, central executive network (right), and within-network, i.e. anterior cingulate cortex-right dorsolateral prefrontal cortex tracts pathway, have been seen. Research evidence reflects dysfunctional cognitive control in IGD and is probably mediated through the deranged interactions and the structural connectivity between the intrinsic large-scale neural networks.²³

Assessment scales

Diagnosis of IGD itself lacks conceptual validity, and relevant studies baffle further because of variance in methodology. IGD

evaluation tests focus on certain probable problem areas such as that of substance use disorders, pathological gambling, etc. Pontes and Griffiths made Internet Gaming Disorder Scale—Short-Form, an assessment tool based on criteria given by DSM. It is a reliable and cross-culturally validated scale.²⁴ Other commonly utilized instrument are Problem Video-game Playing Scale, Online Game Addiction Scale for Adolescents, etc.²⁵

Treatment

Pharmacotherapy and psychotherapy, both have been tried with differing results. Bupropion or methylphenidates have been used in IGD adolescent patients.²⁶ A comparative study of psychological and pharmacological methods of management did not yield any notable differences in efficacy for reduction of symptoms and time consumed in internet addiction.²⁷ No controlled studies are there to find out long-term efficacy of medications for IGD. Ambiguity further exists as to what range and severity of illness will gain from pharmacotherapy. Poor diagnostic clarity in IGD and minimal studies of follow-up of assessment further limits our steps toward any premature suggestion of any specific intervention.

Predictors and course

Literature suggests annual incidence of internet addiction and its remission rates to be 7.5% and 49.5%, respectively. Increased exploratory excitability, reduced dependence on reward, poor self-esteem, family dysfunction, and online game playing predict emergency whereas decreased hostility and interpersonal sensitivity forecasts remission in internet addiction.²⁸ Factors that may explain the motivations for gaming are achievement (a desire for advancement and power), sociability (teamwork), and immersion (exploring, customization of character, and escape from real life problems).²⁹ Literature finds the immersion is specific to be a notable predictor of problematic internet use with addicted players scoring more in the immersion.³⁰ Risk for addiction further increases with indulgence in MMORPGs.¹⁶

Conclusion

With the technological revolution, games have spatially shifted from the real-world arena to virtual world web. Researchers are now-a-days commonly seeing problematic game use, often expanding to the severity of addiction. The classificatory system in psychiatry has placed internet gaming disorder into an area of clinical interest warranting further insight and research. Assessment and therapy are at its primitive stage owing to deprived diagnostic clarity, inadequate research, and the uncertainties in and around the requirement of treatment. However, the data from available literature and the policies of ever expanding gaming industry do alert us toward building robust algorithm for timely action.

Conflicts of interest

The authors have none to declare.

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