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Internet Gaming Disorder - Ayurvedic Perspective

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ABSTRACT

Internet gaming is the most entertaining activity of current generation, especially of the young adolescents. Gaming provides, a sense of accomplishment through a virtual reality platform and finally, intense degree of fun. Anyhow Spending too much time and avoiding all necessary activities for gaming leads to Internet gaming addiction. Due to the negative consequences in the behavioral and cognitive components and the alteration in reward and anti-reward system it is considered as a disorder in DSM 5 and ICD 11. Symptoms include anxiety, depression, preoccupied thoughts, irritability, playing games to feel better, insomnia, feeling of emptiness, inability to control the gaming, restlessness, fantasies and dreams about the game. In this review, the concept of gaming disorder in Ayurveda is concentrated in the light of *Manovikaras/ Manasika Bhava, Prajnaparadha* and *Asathmya Indriyarthasamyoga*. Management approaches are discussed in preventive and curative aspects. Management can also be done by assessing the dosha predominance and severity in each stage.

Key words: Internet gaming disorder, reward system, antireward system, Prajnaparadha, Asathmya Indriyarthasamyoga, Manovega

INTRODUCTION

Internet gaming disorder (IGD) is a pattern of gaming behaviour characterized by impaired control over gaming, increasing priority given to gaming over other activities. Continuation or escalation of gaming, despite the occurrence of negative consequences, as per DSM 5.^[1] Video games helps in problem solving, visual processing, memory enhancement, executive functions, augmentation of intelligence and social skill

enhancement. Anyhow moderation is the key, anything which is out of proportion can be harmful. Spending an unhealthy amount of time and avoiding all necessary activities for gaming potentially nullifies any of the benefits mentioned above and it become a disorder then.^[2] IGD is otherwise known as Gaming disorder, Video game addiction and problematic online gaming.

History of video game

The entry of video games happened as commercial video games in 1970s. But it took 13 years to report the first video game addiction. Later researchers concluded that videogames will increase the dopamine secretion. Virtual reality game became a new form of escapism then. Due to increasing prevalence of IGD more studies conducted and video game addiction documented as a psychological disorder. In 2016, mobile games make over \$40 billion and after that in 2017, games became the most popular category in apple app. Now in 2023, in this most modern era, gaming addiction is at its peak.^[3]

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Prevalence

Globally IGD is having a prevalence of 10.1% and In India the overall prevalence estimate of IGD is 3.50% among the school children and it is higher among male students (8.8%) than female students (0.8%).^[4]

Diagnosis

According to DSM5, for the diagnosis of gaming disorder the behavior pattern must be of sufficient severity to result in significant impairment in all areas of functioning. Out of the 9 points shown below at least 5 must be present for a period of 12 months or more. They are-preoccupation with online gaming, withdrawal symptoms, tolerance, unsuccessful attempts to control, loss of interest, continued online gaming despite negative consequences, deceptive behavior regarding gaming activity, escape and jeopardizing relationships/job/ educational opportunities.^[1]

Risk factors

One with problem in impulse control is having more risk. For people with this condition, controlling their behaviors may be very challenging. Also, one with reduced self-esteem, introverted people, one with history of childhood trauma/neglect, people who have lack of vision, unrealistic expectations of others, sexual fantasies etc. and also due to growing demand of internet day by day persons become addicted to it. Novelty seeking behavior and adventurous mentality can also be a contributing factor. The existence of hazardous things or sites on the internet - due to virus, malware, bugs are also a contributing factor.^[5]

Symptoms of IGD

Various Physical, Psychological and behavioral symptoms can occur in Internet addictions.^[6]

Table 1: Symptoms of IGD

Physical	Psychological	Behavioural
Nausea	Anxiety	-
Headache	Depression	Preoccupied thoughts

Fever	Irritability	Playing games to feel better
Cold	Insomnia Feeling of emptiness	Inability to control the gaming addiction
Allergies	Restlessness Fantasies and dreams about the game	

Impact of IGD

People become addicted to gaming because they will be able to do whatever they wanted to do, normally difficult in real life, which will provide them a sense of self-worth and accomplishment. But excessive gaming is having some negative consequences in behavioural as well as cognitive level, for example-In a startling incident, a son beheaded his father for not allowing him to play the popular game Players Unknown Battleground, ubiquitously known by its acronym PUBG. Moreover, a young adult from Madhya Pradesh was allegedly so engrossed in playing PUBG that he drank acid thinking it was a bottle of water. In an incident from Nashik, a 14-year-old boy, allegedly attempted suicide in a fit of anger by consuming poison as his mother did not want him to play the PUBG.^[7] A simple game installed on a mobile or computer is making someone to do risky and strange things even homicide, how gaming change gamers to do so. So, it is clear that gaming definitely affect the behaviour of gamer in addition to a pure entertainment activity that causes addiction.

IGD as a psychiatric disorder

Due to these consequences and increasing prevalence, IGD has been included in DSM 5 and ICD 11 as a separate disorder. IGD is defined as a pattern of gaming behaviour characterized by impaired control over gaming, increasing priority given to gaming over other activities and continuation or escalation of gaming despite the occurrence of negative consequences.^[8]

Management of IGD in contemporary medicine include antidepressants and employment of psychotherapies based on the stages - CBT (gaming specific CBT), insight

oriented therapy, family therapy, motivational interviewing, solution-focused therapy and video game detox. The selection of therapy varies individually and also based on the severity of condition.

Scale to assess the severity of IGD

Internet Gaming Disorder Scale–Short-Form was the first brief standardized psychometric tool to assess IGD. It is a 9-item questionnaire based on the diagnostic criteria. Scoring ranges from 9 to 45. The Internet Gaming Disorder Test (IGD-20 Test) is also in practice.

Withdrawal symptoms

Withdrawal symptoms in IGD should be defined as symptoms that occur at least 3 hours after the most recent gaming activity and that can be relieved by further online gaming activity. This includes an attempt to rationalize a return to gaming, impatience and angry outbursts, dreams about the game etc. A hypothesis argued that brain anti-reward system activated by drug withdrawal form the basis for negative reinforcement that drives drug seeking, but also potentiate the withdrawal symptoms.^[9]

Mechanism of gaming addiction

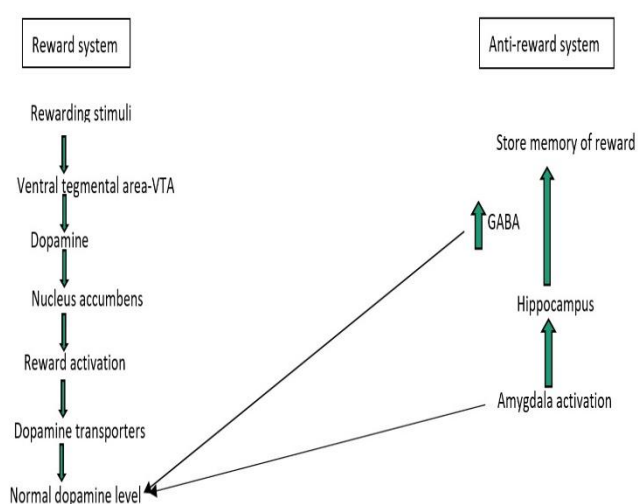
The mechanism behind any addiction is the alteration of normal reward and anti-reward system in the brain. These systems work when a reward is encountered, a reward in sense something which give us pleasure such as food, drugs etc. Here the rewarding stimuli is gaming.

Normal reward and anti-reward system

When a reward is encountered, the ventral tegmental area (VTA) of midbrain secretes dopamine (DA), which reaches nucleus accumbens of basal ganglia and drift across the synapse – bind with dopamine receptors in the post synaptic membrane, carry the signal onward within the cell-membrane and reward activation occurs, as a result pleasure occurs. Some dopamine molecules re-enter the sending cell via a special protein called a dopamine transporter on the presynaptic membrane. When there is excess dopamine and as these molecules drop off receptors, they are free in the

synapse again - this is the reward system. The same rewarding stimuli which activated DA from VTA also activate GABA a potent inhibitory neurotransmitter from the same site, which works by sensing the amount of dopamine. When dopamine become excess, GABA down regulate the secretion of DA. Amygdala activation also contribute to this. All these factors together called the anti-reward system also called brain stress system, maintain the level of dopamine in a homeostatic way. Amygdala is also a part of anti-reward system which along with hippocampus help to store the memory of reward.

Diagram 1: Normal Reward and Anti-Reward System



Reward system alteration in IGD

Stages of IGD

Gaming disorder can be divided in to 3 stages - in the first stage, usually someone starts gaming for recreational purpose only. In this stage the normal reward anti-reward system works, but the activation of anti-reward system is not in proportion with reward system i.e., reward system dominates and hence dopamine secretion increases. Hence the game feels fun perhaps fascination with games develop then videogame is played for several hours and have fun. This stage shows resemblance with the first stage of *Mada*.^[10] as per *Acharya Susruta* in which the person is more excited and feeling of immense pleasure occurs. In the 2nd stage, due to this steady surge of dopamine, anti-reward system activated which dominate reward system and as a result a stress response occurs. Due to

continuous indulgence in game the brain become adapted to the steady degree of dopamine release and hence brain need more and more dopamine to maintain the pleasure that is called tolerance. So, the gamer play game for several hours due to this tolerance but he doesn't have that much fun. Activation of HPA axis also produces stress here. So, in this stage, gamer play game to improve the mood by reducing stress. *Susruta* explain a stress component in the *Madhyama Avastha* of *Mada*.^[10]

In the 3rd stage - dopamine exhaustion occurs due to the already discussed tolerance. Due to DA exhaustion - GABA activity will also come down, as a result both reward and antireward system got suppressed, but HPA axis remain functioning and repeated activation of HPA axis increases stress levels, so the gamer continues gaming to neutralize this stress by avoiding all necessary activities. *Susruta* - in the *Uthama Avastha* of *Mada*^[10] indicates the severity of the condition in which the moral codes and conducts are violated, the extent of *Buddhi Vibhrama* is also severe in this condition

Comorbidities

Internet gaming addiction is found to be associated with symptoms of generalized anxiety disorder, depression, social phobia, school phobia, Attention Deficit Hyperactivity Disorder and Obsessive Compulsive Disorder.^[11]

In a recent study it is found that both videogames use and IGD severity increased significantly during the COVID-19 pandemic, especially for young adolescents. More specifically, pre pandemic depressive and anxiety symptoms predicted greater videogame use and IGD severity during the pandemic period.^[12]

Imaging techniques

In researches, two imaging techniques are in use to compare the brain changes in healthy controls and IGD subjects. - resting state fMRI (rsfMRI) and voxel-based morphometry (VBM). rsfMRI is a subtype of fMRI which measures blood oxygen levels (BOLD) to assess brain activity while the subject is in a resting state.

The aim is to inspect whether there are differences in brain function in persons with particular conditions in

contrast to healthy controls. voxel-based morphometry (VBM) involves a voxel-wise comparison (a unit of graphic information that defines a point in 3-dimensional space) of the local concentration of gray matter among two groups of study subjects. It is found that IGD subjects shown smaller GM volume in brain regions compared to control group subjects.^[13]

Negative consequences of gaming

Researchers found that the following negative consequences are occurring at the behavioral and cognitive levels in gaming addict's brain. Gaming addicts have worse response-inhibition which contribute to the impulsivity, impaired cognitive control, poorer working memory and decision-making capabilities, decreased visual and auditory functioning and a deficiency in their neuronal reward system similar to those found in individuals with substance-related addictions.^[14]

Regulatory bodies of gaming

To keep the gaming industry under control, each country is having their own regulatory bodies. They ensure gaming is conducted honestly and free of criminal and corruptive elements. In India the regulatory body is Online gaming commission of India i.e., OGC. OGC is constituted by the central govt. under the ministry of electronics and information technology.

The gaming operators will be required to obtain a license from the gaming commission. The body oversight the functioning of online gaming servers, they are entrusted to give periodical reports to central govt. on any matter pertaining to online gaming. OGC have the power to grant, suspend and revoke licenses for online gaming websites and to determine fee for license applications and license renewal of such websites.

Ayurvedic approach to IGD

Ancient Indian literatures had mentioned addiction at various aspects from its causative factors to complication and treatment. *Bhagavatgita* beautifully explains a sloka which is similar to pathophysiology of addiction.^[15]

If somebody is having an obsessive thought - *Dhyanam* - regarding something he started to indulge in that activity as a compulsion - *Sangam* - Overtime, this activity become out of its threshold leading to *Kama*, a *Mano Vikara / Vega*. *Manovegas* are various emotions one must control. In gaming addiction, the *Dhyana* regarding gaming leads to *Sanga* and *Kama* as intense form of desire and compulsion in gaming. If there is disruption in satisfying this *Vega*, *Krodha* results which is another *Manovega*. Like the anger outbursts, when the gamer is not allowed to play the game or the anger outbursts, during withdrawal period. *Manovikaras* are happening due to *Prajnaparadha*.^[16]

Prajnaparadha

So, in this stage itself *Prajnaparadha* happens because *Manovegas* are intensely involved. So, from here itself, a gamer started to do wrong things, even if he knows what is right. Further he won't be able to distinguish what is right and what is wrong resulting from the involvement of *Moha*. *Mohaavarta Mana* will lead to *Smrtivibhrama*.^[17] *Smrividhrama* in the sense, as discussed earlier the contribution of amygdala and hippocampus in reward mechanism, *Smrti* is that experiential knowledge acquiring from the life experiences. As *Smrti* is a contributor of *Buddhi* or *Dhi* that is the direct knowledge we acquire and our decision-making capacity, the domain of *Dhi* is also afflicted. Hence disruption of these two domains of *Prajna* - wisdom - gets affected, the 3rd component of *Prajna* - the *Drti*, the factor that helps us to control our mind from undesired pleasures become affected and hence *Prajnaparadha* intensifies. So, the gamer keeps gaming despite of the negative consequences. Ultimately overall deterioration in functioning happens.

Asathmyendriyarth Samyoga

In addition to *Prajnaparadha* the other concept is *Asathmyendriyarth Samyoga*.^[18] A substance which is not conducive to the body is regarded as *Asathmya*, that is unwholesome. In case of IGD it can be *Atiyoga* and even *Mithya Yoga*. *Atiyoga* includes the excessive indulgence in gaming and *Mithyayoga* can be playing

games with high contrast and brightness (*Atibhasura*) or games with horror content (*Atibhairava*). *Asthmyendriyarth* is a contributing factor to *Buddhi Vibhrama* and subsequent to *Prajnaparadha*.

Ayurvedic management of IGD

Like any other mental disorder, IGD also need appropriate approaches of management. The management of IGD can be categorised as – preventive, curative and rehabilitative.

Preventive aspect

Sadvrta and *Acara Rasayana* can be included as the moral codes and conducts. These should be imparted from childhood onwards because children are promises for a better tomorrow. *Sadvrta* and *Acara Rasayana* can be practically implemented in modern era in terms of value based educational system and proper parenting techniques. Value based educational system include awareness against gaming which should be given from the schools itself, programmes such as PDHPE (personality development health and physical education) in primary school level. PDHPE helps to identify principles of diversity, social justice and supportive environments. In addition to these, Awareness of cyber hygiene and curriculum restructuring play a vital role. Practical aspect of cyber hygiene should be taught by the parents.

Role of Parent

Proper parenting starts from parenting style modification and parent education. There should be some quality family time with a positive relationship among family members. Imparting social and emotional competence by using moral stories/ metaphors help the child adapt to adverse life situations. Catch them young strategy, that is making the childhood uneventful- is having a crucial role in this area.

Curative and rehabilitative management

In Ayurveda, like managing any other disease, we have to consider the dosha predominance in each stage of gaming disorder, and plan the treatment also considering the age and general condition of the

individual. Since the stages are comparable with stages of *Mada*, principles of management of *Mada*^[19] is to be adopted.

- In the initial stage, *Satvavajaya* modalities are to be incorporated to provide an insight and also direct the gamer to other recreational activities.
- In the second stage, approach should be highlighted to reduce stress and craving, Inpatient or outpatient treatments based on the severity of condition can be adopted. Along with the same, *Yoga* and *Pranayama* techniques are to be advised.
- In the 3rd stage strict Inpatient treatments should be employed aimed to manage the symptoms and for rehabilitation.
- *Dosha* status is to be assessed based on the clinical presentation.
- Getting rid of the causative factor is the prime strategy in all the stages.
- In India, the game rehab centres are mostly at private sector (teen video game rehab) and the Kerala govt. recently decided to start digital de addiction centres under police department. TRC is a method to implement videogame detox.

Role of Yoga in IGD

Yogasanas effective in IGD include - *Ushtrasana*, *Vrkshasana*, *Sheershasana*, *Makarasana*, *Paschimothanasana*, *Shavasana* and *Ardhamatsyendrasana*.^[20] The effects of *Asana* are in the order of somatopsychic, which includes the release of endorphins that induce a sense of relaxation, ease, and well-being in the practitioner.^[21] *Asanas* also helps in the release of GABA. So, it may be helpful in normal reward antireward regulation. Induced stress levels were rescinded with *Shavasana* compared to supine postures and resting in a chair.^[22] Techniques using a combination of stimulation followed by relaxation had reduced oxygen consumption, energy expenditure, and physiological arousal compared to other relaxation techniques.^[23]

Strategies to minimize IGD

In addition to these management techniques, we can also adopt strategies to minimize IGD -Finding a social

group in real life, eat healthily and maintain a personal hygiene, regulate the amount of time paid for gaming. In case of children, parents have to set the time limit and cut the internet connection if the child is reluctant to give the gadget back and grow other interests including a physical activity. In addition to removing idleness, outdoor games cause physical exhaustion and induce sleep so child won't get enough time for gaming.

Teach children about how to use internet safely and to be vigilant, maintain a proper sleep routine, set clear rules about screen usage, activate parental control features including google family link and family safety in windows. Also allow the child to play game only under the supervision of parents, in order to make this approach smooth and handy arrange the gadget in living rooms or places where parents can have an easy access, sit up straight, stretch often, keep hydrated, give your eyes a break, all this regulate the HPA axis functioning.

CONCLUSION

IGD is included as a disorder in DSM 5. It causes impact in physiological as well as psychological wellbeing. IGD alters brain reward mechanism resembling substance use disorders. It is bound with *Prajnaparadha* and *Asathmyaindriyartha Samyoga* concept of *Ayurveda*. Analysing the clinical presentation and framing a management protocol, based on the principles of Ayurvedic clinical examination, is definitely beneficial in managing such conditions. There is a scope to conduct further studies to develop a combined stage wise management approach incorporating the *Satvavajaya*, *Sadvrta*, *Acara Rasayana* and *Mada Chikitsa* in conditions such as IGD.

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