

## **Electroencephalography-detected neurophysiology of internet addiction disorder and internet gaming disorder in adolescents- A review**

### **ABSTRACT**

**Introduction:** Internet Addiction Disorder (IAD) is an umbrella term for various types of Internet-based behavioural addiction, whereas Internet Gaming Disorder (IGD) addresses a specific type of IAD that is postulated to be due to a lack of control in impulse inhibition. IGD is an area of concern in the Diagnostic and Statistics Manual of Mental Disorders (DSM-5), which can be objectively assessed by dysfunctional behaviour and the increasing time of being online, particularly during the COVID-19 pandemic. Electroencephalography (EEG) identifies amplitude changes in the evoked response potential (ERP) among IGDs, correlated with underlying comorbidities. **Materials and methods:** A scoping review was performed to elaborate on the research regarding resting-state EEG and task-based EEG, particularly for Go/No-go paradigms pertaining to subjects with IAD or specifically IGD. The role of EEG was identified in its diagnostic capability to identify the salient changes that occurred in the response to reward network and the executive control network, using restingstate and task-based EEG. The implication of using EEG in monitoring the therapy for IAD and IGD was also reviewed. **Results:** EEG generally revealed reduced beta waves and increased theta waves in addicts. IGD with depression demonstrated increased theta and decreased alpha waves. Whereas increased P300, a late cognitive ERP component, was frequently associated with impaired excessive allocation of attentional resources of the IAD towards addiction-specific cues. IGD had increased whole brain delta waves at baseline, which showed significant reduction post therapy. **Conclusion:** EEG can identify distinct neurophysiological changes among Internet Addiction Disorder and Internet Gaming Disorder that are akin to substance abuse disorders.

**Keyword:** EEG; ERP amplitude; Impulsivity; Inhibitory control; P300; Restingstate EEG