



Virtual Escape, Real Consequences: A Systematic Review of Online Gaming Addiction and its Association with Mental Health Outcomes in India

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Abstract

The widespread availability of advanced technology has made online gaming accessible to a vast population. While gaming can offer recreational and social benefits, excessive use may lead to problematic patterns of behavior, including addiction. This systematic review aimed to synthesize and evaluate existing evidence on the association between online gaming addiction and mental health outcomes in the Indian context. The review was conducted in accordance with PRISMA guidelines. A comprehensive search was performed across PubMed, DOAJ, and Dimensions using keywords related to online gaming addiction and mental health. Studies published between January 2015 and March 2026, focusing on the Indian population and reporting quantitative empirical data, were included. The initial search identified 102 papers, and after a thorough screening process, 23 studies were selected for inclusion in the review. The findings indicated consistent associations between online gaming addiction and a range of adverse mental health issues, including depression, anxiety, stress, loneliness, aggression, sleep disturbances, impulsivity and poor psychological well-being. These findings highlight the need for increased awareness and relevant interventions based on a holistic approach to address the potential negative consequences of online gaming addiction in India.



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Introduction

Every human being has an inherent desire for play, and it has always been a vital element of a child's growth and development throughout history. In recent decades, the Internet has become integral to contemporary life, and with advancements in

technology and communication, the landscape of human play has evolved from the physical to the virtual world. Regardless of age or gender, individuals engage in online games driven by a variety of reasons, including developmental stage, cognitive aptitude, the intrinsic appeal of challenges,

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social interactions, leisurely pursuits, and the resonance of game content with their interests (Barnett & Coulson, 2010; Liu *et al.*, 2013). According to the 2025 survey report by the Entertainment Software Association (ESA), the average age of video game players is 41, with 51% identifying as male and 48% as female.

With the advancement and evolution in video games, gaming has progressed from typing-based computers in past decades to high-powered consoles that connect with millions of other players via the Internet and immerse users in virtual environments. There are different kinds of online gaming genres, including action, sports, strategy, role-playing, casual and social, persistent multiplayer universe games, etc. In the current gaming landscape, Massively Multiplayer Online Role-Playing Games (MMORPGs) dominate the online gaming world, captivating players with their dynamic and immersive gameplay. Games like World of Warcraft, PUBG, Fortnite Battle Royale, Apex Legends empower players to craft unique identities, navigate 3D realms and collaborate in realistic environments. These dynamic games offer diverse character choices, challenging missions, and social interactions, shaping player experiences through structural variables like consistency, physicality, avatar-based play, multi-level gameplay, perpetuity, and social interaction (Barnett & Coulson, 2010).

Engaging in games within a balanced and positive framework is widely acknowledged as a recreational pursuit, carrying inherent educational, social, and therapeutic advantages. In this context, games serve as more than mere pastimes, contributing to cognitive development, fostering social interactions, and providing a medium for stress relief and emotional well-being (Griffiths, 2019; Nuyens *et al.*, 2019; Raith *et al.*, 2021). Nevertheless, it is imperative to recognize the potential drawbacks associated with unregulated gaming, as it may give rise to addictive behavior. Excessive indulgence in gaming is implicated in adverse consequences that extend beyond mere entertainment, impacting physical health, mental well-being, and social functioning (Mamun & Griffiths, 2019; Männikkö *et al.*, 2020; Mihara & Higuchi, 2017; Paulus *et al.*, 2018; Pontes *et al.*, 2019). Therefore, while recognizing the merits of gaming, it is essential

to practice moderation to safeguard against the adverse consequences associated with prolonged and obsessive gameplay.

Prevalence of Online Gaming

The rapid expansion of online gaming has transformed it into a pervasive global activity, raising concerns regarding its potential to interfere with daily functioning. Recent estimates indicate a substantial increase in participation, with over 2.1 billion individuals engaging in online gaming worldwide and users spending an average of approximately 7 hours per week on gaming activities (Statista, 2026). Within this global context, India represents one of the most rapidly expanding gaming markets. According to the FICCI-EY report, the number of online gamers in India reached approximately 488 million in 2024, with projections suggesting an increase to around 520 million by 2025 (Ernst & Young, 2025). This growth is largely attributed to structural factors such as increased smartphone penetration, affordable internet access, and the integration of digital payment systems.

The continued growth of the gaming industry reflects increasing accessibility and engagement with online games. However, alongside these technological advancements, concerns have emerged regarding prolonged and unregulated gaming exposure and its association with problematic gaming behaviours and adverse mental health outcomes. Previous literature suggests that any activity capable of providing strong psychological reinforcement may become addictive in nature (Alavi *et al.*, 2012). Consequently, excessive engagement in online gaming may contribute to addiction-like symptoms and other pathological issues.

Various longitudinal and cross-sectional epidemiological studies on Online Gaming Addiction (OGA) have reported prevalence rates ranging from 0.7%–15.6% (Feng *et al.*, 2017), 0.3%–17.7% (Kim *et al.*, 2022), 0.7%–27.5% (Mihara & Higuchi, 2017), and 0.6%–50.0% (Paulus *et al.*, 2018). Indian studies included in this review similarly reported prevalence rates ranging from 0.8% to 40.3% (Singh *et al.*, 2020a; Thakur *et al.*, 2023). The substantial variation in prevalence rates across studies has been attributed to differences in study populations, diagnostic criteria, and

assessment procedures. Moreover, several studies have reported that the structural characteristics of MMORPGs make them more addictive than other online gaming genres (Lemmens & Hendriks, 2016; Mamun & Griffiths, 2019; Paulus *et al.*, 2018; Pv & Kanwar, 2024; Rehbein *et al.*, 2021). A recent meta-analysis reported a pooled prevalence of OGA of 6.7%, while also highlighting the significant influence of varying diagnostic criteria and assessment scales on prevalence estimates (Zhou *et al.*, 2024). These findings underscore the need for adopting standardized assessment methods to ensure accurate identification and guide effective public health interventions.

Online Gaming Addiction and its Classification under DSM5 and ICD11

Traditional definitions of addiction typically include compulsive substance-seeking behavior characterized by tolerance, withdrawal symptoms, and persistent cravings. However, behavioral specialists diverge in their perspective, asserting that addiction can develop from any source that has the capacity to stimulate an individual, contrary to the common notion that it is limited to dependence on certain drugs and chemical substances. There is growing recognition that engagement in excessive play can give rise to a distinct set of adverse symptoms reminiscent of substance abuse (Kuss & Griffiths, 2012) or behavioral addictions like pathological gambling (Alavi *et al.*, 2012). Excessive internet gaming appears to have neurological bases similar to those identified in substance use disorders, indicating shared underlying mechanisms between the two phenomena (Arima & Latino, 2023; Kuss, 2013; Weinstein & Lejoyeux, 2020).

Recognizing the recent conceptual and diagnostic advancements in the field, the "American Psychiatric Association" (APA) added "Internet Gaming Disorder" (IGD) to the fifth edition of the "Diagnostic and Statistical Manual of Mental Disorders" (DSM) as a tentative addictive disorder that needs further research. IGD is "a new form of behavioral addiction characterized as recurrent and persistent internet gaming that results in considerable impairment of psychosocial functioning" (American Psychiatric Association, 2013). The APA has also introduced a diagnostic framework defining IGD as "a condition characterized by disordered gaming behavior leading

to significant clinical impairments over a period of 12 months". This is indicated by the endorsement of five out of the following nine diagnostic criteria: "preoccupation with games, withdrawal symptoms, increased tolerance, loss of control and relapse, giving up other daily activities, continued excessive gaming, deceiving loved ones about the amount of gaming, using gaming as an escape or for mood modification, and experiencing related negative consequences in daily life functioning." In a more recent development, further advancements in the field resulted in the formal recognition of "Gaming Disorder" (GD) as a behavioral addiction by the "World Health Organization" (WHO) in the eleventh revised edition of the "International Classification of Diseases" in May 2019 (Griffiths & Pontes, 2019; World Health Organization, 2022).

Aside from that, several studies, evaluations, and publications employ a variety of terminology to describe maladaptive or excessive gaming behaviours, including Online Gaming Addiction (Griffiths *et al.*, 2022), Internet Gaming Addiction (Kuss, 2013), Internet Gaming Disorder (Lemmens & Hendriks, 2016), Problematic Gaming Behavior (Männikkö *et al.*, 2020), Video Game Addiction (Griffiths & Pontes, 2019), and Problematic Online Gaming (Chandra *et al.*, 2022). Although certain theoretical distinctions exist among these terms, they are frequently used interchangeably in the literature to describe problematic patterns of gaming. For the purpose of consistency, the present review primarily uses the term "Online Gaming Addiction (OGA)" as an umbrella term while also referring to "Internet Gaming Disorder (IGD)" and "Gaming Disorder (GD)" in the context of DSM-5 and ICD-11 classifications, respectively.

Risk Factors for Online Gaming Addiction in the Indian Context

In the Indian context, vulnerability to OGA appears to be influenced by an amalgamation of demographic, psychosocial, behavioural, and sociocultural factors. Several studies have identified male gender as a significant risk factor for problematic gaming behaviour (Patel *et al.*, 2024; Savanthe & Savolu, 2019; Shah *et al.*, 2023). Other demographic and contextual factors, including younger age, unemployment, and living away from home, have also been associated with greater susceptibility to OGA (Pv & Kanwar, 2024; Shah *et al.*, 2023).

Behavioural factors such as preference for MMORPGs, substance use, and poor academic performance have also been identified as potential risk factors for problematic gaming (Bansal & Kranti, 2022; Pv & Kanwar, 2024; Shah *et al.*, 2023; Savanthe & Savolu, 2019; VM *et al.*, 2024). In addition, psychosocial and familial factors, including poor self-esteem, peer influence, interpersonal conflicts, strained parental relationships, and nuclear family settings, may further increase the risk of OGA (Bansal & Kranti, 2022; Shah *et al.*, 2023; Thakur *et al.*, 2023). Collectively, these findings suggest that OGA is shaped not only by individual characteristics but also by broader social and contextual influences within the Indian sociocultural environment.

Aim and Objective of the Current Study

With online gaming becoming a significant influence on players' personalities and behaviors, it's imperative to acknowledge the potential risks, including lifestyle disruptions and serious health consequences. This systematic review seeks to offer a thorough understanding of the impact of online gaming addiction on mental health within the Indian context. Despite the growing global discourse on the topic, a significant gap remains in understanding how these phenomena manifest specifically in India, given its unique socio-cultural and technological landscape. By synthesizing and critically evaluating available Indian studies, this review aims to address that gap, providing insights into the prevalence and psychological effects and contributing to culturally relevant strategies for prevention, assessment, and intervention.

Materials and Methods

The systematic review was carried out and reported following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Page *et al.*, 2021). A comprehensive literature search was performed across three electronic databases: PubMed, DOAJ, and Dimensions. The search strategy included combinations of the following keywords ("online gaming addiction" OR "internet gaming addiction" OR "online gaming disorder" OR "internet gaming disorder" OR "internet gaming" OR

"online gaming" OR "digital gaming" OR "problematic gaming behavior") AND ("mental health" OR "depression" OR "anxiety" OR "stress" OR "loneliness" OR "social isolation" OR "psychological well-being" OR "suicide" OR "cyber-harassment") AND ("Indian population" OR "Indian adults" OR "Indian adolescents" OR "Indian young adults" OR "India").

A systematic exclusion process was followed, whereby studies were initially reviewed based on their titles, keywords, and abstracts, followed by a comprehensive full-text assessment. Duplicate records were removed prior to screening. The inclusion criteria were as follows: (i) studies with quantitative empirical data; (ii) studies addressing the relationship between Internet or online gaming addiction and mental health outcomes; (iii) studies conducted within the Indian context; (iv) articles published between January 2015 and March 2026; and (v) peer-reviewed, full-text articles available in English. The exclusion criteria included: (i) studies focused on general technology use (including the Internet and social media) without specific reference to gaming; (ii) review articles, conference abstracts, and case studies; and (iii) studies primarily examining the impact on physical health or domains other than mental health.

Results

Figure 1 presents the PRISMA flow diagram summarizing the study selection process. A total of 102 records were identified through database searches across PubMed, DOAJ, and Dimensions. After the removal of 18 duplicate records, 84 studies remained for screening. During the initial screening of titles, keywords, and abstracts, 48 studies were excluded as they did not specifically focus on online gaming addiction. Subsequently, 5 studies were excluded due to the unavailability of their full-text versions. Of the 31 full-text articles assessed, 23 studies conducted in India met the inclusion criteria and were identified as suitable for the systematic review.

A comprehensive summary of the included studies is presented in Tables 1a and 1b. Table 1a outlines the main study characteristics, while Table 1b summarizes OGA prevalence and key mental health findings.

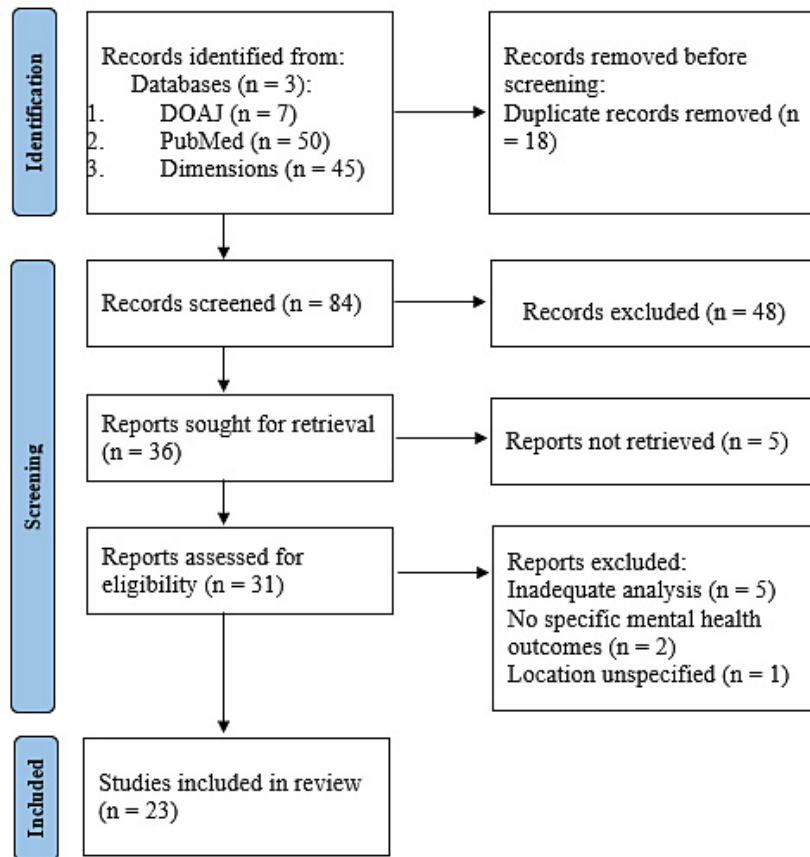


Fig. 1: Flow diagram of records assessed

The studies included in this review involved participants aged 8 to 60 years, with sample sizes ranging from 60 to 2,200, reflecting substantial heterogeneity in sample characteristics. As shown in Table 1b, a considerable number of studies reported associations between Online Gaming Addiction (OGA) and mental health problems, particularly depression and anxiety. Specifically, 12 of the 23 studies found a positive association between OGA and depressive symptoms (Barot *et al.*, 2025;

Bicholkar *et al.*, 2019; Borkar *et al.*, 2026; Chandra *et al.*, 2022; Mukherjee *et al.*, 2021; Patel *et al.*, 2024; Pv & Kanwar, 2024; Rajan *et al.*, 2024; Singh *et al.*, 2019; Shah *et al.*, 2023; Sharma *et al.*, 2019; VM *et al.*, 2024), while 7 studies reported associations between OGA and anxiety symptoms (Barot *et al.*, 2025; Mukherjee *et al.*, 2021; Pv & Kanwar, 2024; Rajan *et al.*, 2024; Sharma *et al.*, 2019; Shah *et al.*, 2023; VM *et al.*, 2024).

Table 1a: Main characteristics of reviewed studies (N = 23)

Sr. No.	References	Variables	Location	Participants' Characteristics	Study Design	OGA Tool
1	Borkar et al. (2026)	IA, IGD, Sleep Quality, Depression	Konkan Region	402 medical college students (180 females and 222 males)	Mixed-method approach	"IGDS9-SF by Pontes and Griffiths (2015)"
2	Barot et al. (2025)	IGD, Depression, stress, Sleep quality	Ahmedabad	2200 high school students (grades 9 to 12)	Correlational	"IGDS9-SF by Pontes and Griffiths (2015)"
3	Chakravarthy et al. (2025)	IGD, Sleep Quality	Tamil Nadu	484 medical college students (236 males and 248 females)	Cross-sectional	"Internet Gaming Disorder Scale (Lemmens et al., 2015)"
4	Singh et al. (2025)	IGD, Decision-Making, Impulsivity, Sensation Seeking, Aggression	Chandigarh	90 college-going students equally categorized in 3 groups: Normal, At-risk and Disordered gamers	Cross-sectional	"Internet Gaming Disorder Scale (Lemmens et al., 2015)"
5	Murugan et al. (2024)	IA, IGD, Cognitive Disengagement Syndrome	Gujarat	303 medical students (67% male, 33% female); mean age = 20 years	Cross-sectional	"Internet Gaming Disorder Scale (Lemmens et al., 2015)"
6	Patel et al. (2024)	IGD, Anxiety, Depression	Gujarat and Himachal Pradesh	845 medical students aged 17–25; 57% males	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
7	Pv & Kanwar (2024)	IGD, Psychosocial Impairment Anxiety, Depression	Mangalore, Karnataka	160 adolescents (16–19 years); 80 with IGD and 80 without IGD; 65% males	Cross-sectional	"IGD-20 Test by Pontes et al. (2014)"
8	VM et al. (2024)	IGD, Depression, Anxiety	Tamil Nadu	930 medical students (18–22 years); 63% were females	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
9	Rajan et al. (2024)	IGD, Depression, Anxiety	Salem, Tamil Nadu	780 school-going children aged 8–12 years	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
10	Garg et al. (2023)	IGD, Sleep Quality, Perceived Stress, Suicidal Behavior	Haryana	348 medical students (18–33 years) who played online games; 294 females and 54 males	Cross-sectional	"Gaming Disorder and Hazardous Gaming Scale (Balhara et al., 2020)"
11	Shah et al. (2023)	IGD, Depression, Anxiety	Bathinda, Punjab	125 participants (82 males and 43 females) from general population	Cross-sectional	"Internet Gaming Disorder Scale (Lemmens et al., 2015)"
12	Thakur et al. (2023)	IGD, Emotional Symptoms, Conduct Issues, Self-esteem, Sensation-seeking	Bangalore	707 female adolescent students (12–19 years)	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
13	Ansari et al. (2022)	IGD, Psychological Wellbeing	Anand, Gujarat	239 college-going students; 50% non-gamers, 26% violent gamers, and 24% non-violent gamers	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"

14	Bansal & Kranti (2022)	OGD, Self-esteem, Perceived Stress, Sleep Quality	Mumbai	347 college students (18–25 years); final analysis included 184 online gamers	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
15	Chandra et al. (2022)	POG, Mental Well-Being, Depression	Rishikesh, Uttrakhand	453 college-going students (18–24 years); 71% females; 73% from nuclear families	Cross-sectional	"POGQ-SF (Papay et al., 2013)"
16	Singh et al. (2021)	Perceived Stress, Coping Strategies, IGD	Across India	1027 participants between 13 and 60 years of age; 42% males and 58% females	Cross-sectional	"Internet Gaming Disorder Scale by Lemmens et al. (2015)"
17	Mukherjee et al. (2021)	IGA, Depression, Anxiety, Stress, Social Relationship	Kolkata	150 gamers and 150 non-gamers (aged 15-24 years)	Cross-sectional	"Gaming Addiction Questionnaire (D'Souza et al., 2019)"
18	Singh et al. (2020a)	OGA, Emotional Symptoms, Conduct Issues, Hyperactivity, Peer Problems	Assam	409 students (Classes 8–10); 64% males, 68% from urban areas, and 73% from nuclear families	Cross-sectional	"Online Gaming Addiction Scale (Lemmens et al., 2009)"
19	Bicholkar et al. (2019)	POG, Psychological Well-being, Self-Esteem, Depression	Goa	250 undergraduate students and interns (17–27 years); 57% females	Cross-sectional	"POGQ-SF (Papay et al., 2013)"
20	Kochuchakkalackal & Reyes (2019)	IGD, Psychological Well-being	Across India	456 adolescent students (13-18 years); 313 males and 143 females	Correlational	"IGDS9-SF by Pontes and Griffiths (2015)"
21	Savanthe & Savolu (2019)	IGD, Socio-behavioral Changes	Andhra Pradesh	200 1st and 2nd year medical students (17-22 years); 102 males and 98 females	Cross-sectional	"IGD-20 Test (Pontes et al., 2014)"
22	Singh et al. (2019)	Internet Gaming Disorder, Depression, Socio-demographic Characteristics	Across India	306 medical college students (227 UG students and 79 PG students); 143 males and 163 females	Cross-sectional	"IGDS9-SF by Pontes and Griffiths (2015)"
23	Sharma et al. (2019)	Internet Gaming Disorder, Depression, Stress, Anxiety	Bangalore	60 users (16–18 years); 58 males and 2 females; screened using the IGD test	Correlational	"IGD-20 Test (Pontes et al., 2014)"

Note. IGD=Internet Gaming Disorder; IGA=Internet Gaming Addiction; POG=Problematic Online Gaming; OGD=Online Gaming Disorder; OGA=Online Gaming Addiction; IA=Internet Addiction.

Table 1b: Key mental health findings and OGA prevalence (N = 23)

Sr. No.	References	Prevalence*	Important Findings
1	Borkar et al. (2026)	20.89%	IGD showed a positive association with depression and insomnia ($p < .01$); individuals with IGD had higher levels of both compared to non-IGD participants
2	Barot et al. (2025)	15.8%	IGD was associated with higher perceived stress, insomnia severity, and symptoms of anxiety and depression ($p < .01$)
3	Chakravarthy et al. (2025)	33.1%	IGD was associated with poor sleep quality ($p < .01$); 87.5% of addicted gamers reported poor sleep, and gaming addiction negatively predicted sleep quality
4	Singh et al. (2025)	Not mentioned	Disordered gamers had lower self-esteem and higher motor impulsivity and boredom susceptibility ($p < .01$) than other two groups. IGD severity was positively correlated with impulsivity and boredom and negatively with self-esteem
5	Murugan et al. (2024)	20%	Students with IGD showed significantly higher cognitive disengagement, daydreaming, and sluggishness scores than non-IGD participants ($p < .01$), all positively correlated with IGD severity
6	Patel et al. (2024)	4.2%	IGD was strongly associated ($p < .01$) with various mental health issues, such as depression, negative affectivity, and disturbances in sleeping patterns
7	Pv & Kanwar (2024)	1.14%	Adolescents with IGD showed higher anxiety, depression, and psychosocial impairment compared to their non-IGD peers, all at $p < .05$. Most individuals with gaming disorder resided in PG/Hostel settings and preferred MMORPGs
8	VM et al. (2024)	9.7%	IGD was significantly associated ($p < .05$) with moderate to severe depression and all anxiety levels. Sleep problems and neck/back pain also emerged as key predictors of gaming disorder
9	Rajan et al. (2024)	1.2%	IGD showed a strong positive association ($p < .01$) with anxiety and depression scores, with a bidirectional relationship
10	Garg et al. (2023)	15.23%	IGD scores were positively correlated with suicidal behavior, perceived stress, and sleep quality scores ($p < .01$). Sleep quality inversely mediated ($p < .01$) in the relationship between IGD and both perceived stress and suicidal behavior
11	Shah et al. (2023)	16.8%	IGD was significantly associated with anxiety and depression scores ($p < .01$)
12	Thakur et al. (2023)	0.8%	IGD scores were positively correlated with emotional symptoms, hyperactivity, conduct problems, peer problems, and sensation seeking but negatively correlated with prosocial behavior and self-esteem ($p < .01$)
13	Ansari et al. (2022)	0.8%	Higher IGD scores were significantly associated with lower psychological well-being and increased gaming frequency, with no significant difference in well-being between gamers and non-gamers
14	Bansal & Kranti (2022)	4.6%	IGD was significantly associated with low self-esteem, high stress levels, and poor sleep quality ($p < .01$)
15	Chandra et al. (2022)	27.4%	POGB was significantly ($p < .01$) associated with poor mental well-being and moderate to severe depressive symptoms. Participants with these symptoms had about 3 times higher odds of POGB
16	Singh et al. (2021)	Not mentioned	IGD was positively correlated ($p < .01$) with perceived stress and maladaptive coping strategies, showing poor psychological adjustment.
17	Mukherjee et al. (2021)	Not mentioned	Gamers differed from non-gamers in psychological health and interpersonal relationships; gaming addiction traits were associated with depression, anxiety, stress, and parent–peer attachment
18	Singh et al. (2020a)	40.3%	Online gaming behavior was positively associated with emotional, conduct, hyperactivity, and peer problems ($p < .01$)

19	Bicholkar et al. (2019)	8%	Students with problematic online gaming reported lower well-being ($p < .05$) and self-esteem ($p < .01$), and higher depression scores ($p < .01$)
20	Kochuchakkalackal & Reyes (2019)	Not mentioned	A significant negative relationship between IGD and each dimension of psychological well-being ($p < .01$)
21	Savanthe & Savolu (2019)	10%	Disordered gaming was associated with aggressiveness, irritability, altered eating patterns, and higher prevalence of headaches, watery eyes, and fatigue
22	Singh et al. (2019)	3.6%	Male gender, living alone, and greater daily online time were associated with higher IGD scores; IGD severity correlated positively with depressive symptoms ($p < .01$)
23	Sharma et al. (2019)	Not mentioned	Internet gaming was positively associated with depression ($p < .05$), anxiety ($p < .01$), and stress ($p < .05$); participants also reported sleep disturbances, irregular eating, reduced offline activity, and decreased social interaction.

Note. IGD=Internet Gaming Disorder; POGB=Problematic Online Gaming Behaviour

*Prevalence rates are reported according to the criteria/cut-off of the scale used in each study

These findings suggest that OGA is consistently associated with adverse mental health outcomes, particularly depression and anxiety. One plausible explanation is that excessive engagement in online gaming may reduce participation in offline activities and limit meaningful social interactions, thereby contributing to psychological distress and feelings of emptiness. However, the directionality of this relationship appears to be complex. For instance, a study by Rajan *et al.* (2024) among school-going children aged 8–12 years highlighted a bidirectional association, indicating that higher levels of depression and anxiety may both contribute to and result from problematic gaming behaviors. This association may be explained through maladaptive coping mechanisms, wherein individuals experiencing psychological distress increasingly engage in online gaming as a form of escape, seeking temporary relief from negative emotions. Simultaneously, excessive gaming may contribute to social withdrawal, loneliness, and reduced real-world engagement, thereby worsening depressive and anxiety symptoms. Supporting this interpretation, other studies included in the review also reported associations between problematic gaming, social isolation, and loneliness (Murugan *et al.*, 2024; Sharma *et al.*, 2019), reinforcing the potential for a negative feedback loop. Furthermore, Chandra *et al.* (2022), in a study of college-going students aged 18–24 years, found that individuals with moderate to severe depression had nearly three times higher odds of exhibiting problematic online gaming behavior. This finding suggests that depression may act as a significant risk factor for the development of gaming addiction.

Additionally, 6 studies reported a positive association between higher perceived stress levels and OGA (Bansal & Kranti, 2022; Barot *et al.*, 2025; Garg *et al.*, 2023; Mukherjee *et al.*, 2021; Sharma *et al.*, 2019; Singh *et al.*, 2021). These studies included participants from diverse age groups (12–60 years), including school students, college students, and general adult populations. The consistency of findings suggests that excessive engagement in online gaming may contribute to increased stress levels irrespective of age or population subgroup. Unregulated gaming behavior may disrupt daily routines and interfere with academic, occupational, and social responsibilities, thereby increasing perceived stress. Furthermore, four studies reported a significant negative association between OGA and self-esteem (Bansal & Kranti, 2022; Bicholkar *et al.*, 2019; Singh *et al.*, 2025; Thakur *et al.*, 2023), indicating that individuals with lower self-esteem may be more vulnerable to problematic gaming behaviors. Virtual gaming environments often provide recognition and admiration from other players, temporarily enhancing perceived self-worth. However, such externally reinforced validation may not translate into real-world competence or confidence, leading to maladaptive coping mechanisms. This discrepancy between virtual achievements and real-life challenges may further lower self-esteem, creating a vicious cycle in which individuals increasingly rely on online gaming as an escape from reality, thereby reinforcing addictive behaviors.

Beyond the aforementioned mental health outcomes, several studies, primarily involving school and college

student populations, have highlighted a range of emotional and behavioural difficulties associated with OGA. These include increased irritability, peer relationship difficulties, hyperactivity, aggressive behaviour, and conduct-related problems (Savanthe & Savolu, 2019; Singh *et al.*, 2025; Singh *et al.*, 2020a; Thakur *et al.*, 2023). Excessive engagement in online gaming may reduce real-life social interaction and impair emotional regulation, contributing to interpersonal conflicts and maladaptive behaviours.

In addition to that, 6 studies reported significant associations between OGA and disturbed sleep quality. Prolonged gaming duration, particularly during nighttime hours, along with extended exposure to screen light, may delay sleep onset, worsen insomnia, and contribute to poorer sleep quality (Bansal & Kranti, 2022; Barot *et al.*, 2025; Chakravarthy *et al.*, 2025; Garg *et al.*, 2023; Patel *et al.*, 2024; Sharma *et al.*, 2019). These effects may result from disruptions in the body's natural sleep-wake cycle and circadian rhythm regulation. Sleep disturbances also appear to mediate the relationship between OGA and adverse psychological outcomes. For instance, Garg *et al.* (2023), in a study conducted among medical students, found that OGA significantly increased the risk of suicidal behaviour. The study further demonstrated that sleep quality mediated the association between OGA severity and both perceived stress and suicidal behaviour, indicating that greater gaming addiction may contribute to poor sleep, which in turn elevates stress and suicide risk.

These findings collectively highlight that online gaming addiction is associated with a wide range of adverse mental health outcomes, affecting individuals' emotional well-being, personal growth, interpersonal functioning, and overall quality of life (Ansari *et al.*, 2022; Bicholkar *et al.*, 2019; Chandra *et al.*, 2022; Kochuchakkalackal & Reyes, 2019; Singh *et al.*, 2021).

Discussion

Mental disorders affect millions of people worldwide, with anxiety and depressive disorders being among the most prevalent and often associated with poor quality of life (GBD 2019 Mental Disorders Collaborators, 2022). Since 1990, the prevalence of mental disorders in India has nearly doubled, affecting approximately one in seven individuals (India State-Level Disease Burden Initiative Mental Disorders Collaborators, 2020). This growing burden

is reflected in the substantial impact on public health, with mental health conditions accounting for 2,443 disability-adjusted life years (DALYs) per 100,000 population and a suicide rate of 21.1 per 100,000 (World Health Organization, 2019). These alarming numbers highlight the urgent need for comprehensive mental health interventions, greater awareness, and improved access to mental healthcare services.

In recent years, the landscape of mental health concerns has evolved, with behavioral addictions gaining recognition as emerging public health challenges. Among these, online gaming addiction (OGA) has become an increasing concern due to its potential long-term impact on daily functioning, highlighting the need for timely awareness, intervention, and support for at-risk individuals. In this context, the primary aim of the present systematic review was to synthesize and evaluate existing evidence on the association between OGA and mental health outcomes in the Indian population. Although online gaming is often perceived as a fun and recreational activity, excessive or unhealthy engagement can have detrimental effects on mental health (Männikkö *et al.*, 2020). The findings of the present review indicate that individuals addicted to online gaming are more vulnerable to a wide range of psychological difficulties, including depression, anxiety, stress, loneliness, hyperactivity, conduct-related problems, low self-esteem, irritability, aggressive behaviour, suicidal tendencies, poor sleep quality, and diminished psychological well-being. Overall, this review provides strong evidence of a significant negative association between OGA and multiple mental health outcomes, consistent with findings from previous reviews conducted in different contexts (Das & Pandey, 2023; González-Bueso *et al.*, 2018; Männikkö *et al.*, 2020; Mihara & Higuchi, 2017; Paulus *et al.*, 2018).

Moreover, evidence from recent Indian studies suggests that excessive gaming not only affects psychological well-being but also poses significant physical health risks, including frequent headaches, eye strain, numbness in the hands, pain in the neck, wrist, and back, as well as persistent fatigue (Gurjar *et al.*, 2024; Savanthe & Savolu, 2019; Sebastian *et al.*, 2021; VM *et al.*, 2024). Beyond these health consequences, excessive gaming may disrupt daily functioning by promoting a sedentary lifestyle, cognitive disengagement, and unhealthy eating

patterns, making it difficult to maintain a balanced routine (Bicholkar *et al.*, 2019; Chandra *et al.*, 2022; Murugan *et al.*, 2024; Savanthe & Savolu, 2019; Thakur *et al.*, 2023). However, when engaged in responsibly and in moderation, online gaming may also offer several potential benefits. Emerging evidence suggests that gaming can facilitate learning, enhance social connectedness, and even provide therapeutic benefits (Griffiths, 2019; Nuyens *et al.*, 2019; Raith *et al.*, 2021). It has also been associated with improvements in hand-eye coordination, reaction time, visuospatial abilities, memory, and multitasking skills (Benoit *et al.*, 2020; Singh *et al.*, 2020b). Thus, while unregulated gaming is associated with considerable risks, balanced and mindful engagement may contribute to cognitive development and positive behavioural outcomes. Recent research has increasingly focused on identifying effective interventions for this prevailing critical issue. For instance, a meta-analysis by Chang *et al.* (2022), synthesizing evidence from 124 studies across Western and Eastern contexts, examined the efficacy of various pharmacological and psychosocial approaches. The results suggested that combined interventions, particularly pharmacotherapy integrated with cognitive behavioural therapy (CBT) or multi-level counselling (MLC), were most effective in reducing OGA symptoms. In the Indian context, emerging evidence also supports the usefulness of integrative and culturally relevant approaches. A recent study by Tadpatrikar *et al.* (2024) demonstrated that incorporating yoga alongside psychotherapy significantly reduced both the symptoms and severity of technology addiction. Similarly, Rao *et al.* (2026) reported that yoga-based interventions significantly reduced OGA symptoms, anxiety, depression, and loneliness, while improving overall quality of life among adolescents. These findings highlight the importance of a holistic and multi-dimensional approach in addressing OGA, recognizing that no single intervention is universally effective. Alongside treatment-focused interventions, preventive strategies remain equally important, highlighting the need to address risk factors early before problematic gaming behaviors become more severe (Tadpatrikar *et al.*, 2025).

Despite the valuable insights provided by this review, it is important to acknowledge certain limitations. First, the majority of the included studies employed

correlational and cross-sectional designs, limiting the ability to establish causal relationships between OGA and mental health outcomes. Consequently, the directionality of these associations remains unclear. Second, considerable variation existed in the assessment of OGA and mental health outcomes across studies. All included studies relied on self-report measures, which may be influenced by response bias and socially desirable reporting. Although most studies used instruments based on DSM-5 IGD criteria, these tools primarily function as screening measures rather than diagnostic instruments and therefore identify individuals at risk rather than confirming clinical diagnoses. In addition, variations in assessment scales and cut-off criteria reduce the comparability and consistency of findings. Given these limitations, future research should prioritize longitudinal and experimental designs to better establish causal relationships. Moreover, adopting a more comprehensive and multidimensional approach - considering individual, familial, cultural, and societal factors - would provide a more thorough understanding of the development and impact of OGA.

Conclusion

The present systematic review included 23 studies examining the association between OGA and mental health outcomes in the Indian context. The findings consistently indicate that OGA is associated with a wide range of mental health problems, highlighting the need for targeted prevention and intervention strategies. Promoting healthy digital habits - such as setting screen time limits, increasing physical activity, encouraging meaningful social engagement and alternative leisure activities, and, importantly, seeking professional support when necessary - is essential to reduce the adverse consequences of excessive gaming.

Preventive strategies should emphasize the early identification of risk factors and greater awareness among key stakeholders, including students, educators, healthcare professionals, and policymakers. Public health initiatives focusing on digital literacy, responsible gaming practices, and behavioural addiction awareness may play an important role in reducing problematic gaming, particularly among children and adolescents. In this regard, family environment and parental involvement remain

critical, with open communication and appropriate parental guidance serving as important protective factors. At a broader level, community-based educational and self-help initiatives may further strengthen these efforts. However, large-scale, longitudinal, and methodologically rigorous studies are needed to strengthen the evidence base regarding the prevalence, underlying causes, and long-term consequences of OGA in India.

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