

Prevalence of Digital Gaming Addiction in Adolescents and Its Relationship with Sleep Quality, Self-Esteem, and Psychological Well-Being: A School Based Survey

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Abstract

Introduction: In the digital era, game addiction is an emerging health problem. Digital game addiction leads to several health problems and indirectly affects the quality of life. There is a paucity of research on the association between gaming addiction and psychological factors.

Aim: To estimate the prevalence of gaming addiction in adolescents and study its relationship with sleep quality, self-esteem, and psychological well-being.

Settings and Design: This cross-sectional observational study was conducted for 18 months, from July 2023 to December 2024. Participants were selected using convenience sampling.

Methods: Adolescents aged 12–18 years were assessed using the Lemmens Game Addiction Scale, Pittsburgh Sleep Quality Index, Rosenberg Self-Esteem Scale, and Psychological Well-Being Index.

Statistical analysis used: Data entry was conducted using Epi-Data software, and analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25.

Results: Out of 385 adolescents, 68 were found to have gaming addiction. The prevalence of digital gaming addiction was 17.7%. There was a statistically significant relationship between gaming addiction and age, sex, siblings, mother's educational attainment, family type, time spent on games, and type of games played. However, no significant association was found between the types of gadget usage and gaming addiction. Gaming addiction was also associated with overall sleep quality, self-esteem, and psychological well-being.

Conclusion: Digital gaming addiction has a significant association with poor sleep quality, poor self-esteem, and poor psychological well-being. In treating children with digital gaming addiction, a multifaceted approach should be included, involving the school healthcare providers, parents, and policymakers.

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Introduction

Adolescence is one of the critical phases in an individual's life. This phase is very vulnerable, characterized by distinct health and developmental requirements and entitlements. [1]. Thus, this phase signifies the evolution from childhood to adulthood. This is the phase during which an individual faces health issues, including addictions, aggression, mental health disorders, substance abuse, sexually transmitted illnesses, early pregnancy and childbirth, undernutrition, and obesity. A major health problem faced by adolescents during this period is the emergence of digital gaming disorders. [2].

Recent studies have found that the incidence of Internet gaming addiction has been increasing in both developing and developed countries, mostly due to the increased and rampant utilization of electronic gadgets such as smartphones, tablets, and

personal and desktop computers [3]. Moreover, the misuse of the Internet has been characterized in various ways, including problematic Internet use, excessive Internet use, and Internet addiction, with some researchers regarding it as an impulsive condition. [4]. Digital game addiction is referred to as Internet gaming disorder (IGD), which is closely associated with difficulties in motivational management and is occasionally likened to gambling.

Currently, according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), video game addiction is defined by continuing and repeated participation in online gaming with multiple players, which results in the development of clinically significant distress and psychological changes, according to the fulfilment of five or more criteria within a year [5]. In June

2018, the World Health Organization (WHO) included gaming disorder in the section on drug and behavioural addictions in the 11th edition of the International Classification of Diseases and Related Health Problems (ICD-11). [6]. Studies have shown that the prevalence of digital gaming addiction ranges from 0.6% to 15% in different regions of the world. Studies have shown that persons involved in excessive gaming addiction develop physical, psychological, social, and occupational challenges, including disrupted sleep patterns, dehydration, pressure sores, heightened irritability and aggression, symptoms of depression and anxiety, diminished academic performance, and neglect of personal relationships and professional obligations. [7].

Combined approach therapy includes cognitive behavioural therapy, pharmacotherapy, and family therapy, which help manage the condition and prevent the development of complications. [8]. To date, only a few studies have been conducted in India to determine the prevalence of gaming disorders and their link with sleep and other psychological factors. Therefore, this study was conducted to estimate the prevalence of gaming disorder in adolescents and its relationship with sleep quality, self-esteem, and psychological well-being.

Methods

Study Design: This cross-sectional observational study was conducted among adolescents between 12 and 18 years of age attending selected schools with English-medium instruction in Udaipur, India. This study was conducted for 18 months, from July 2023 to December 2024.

Participants were selected using convenience sampling. Considering the prevalence of digital gaming addiction was 40.3%, with a 95% confidence interval and a 5% margin of error, the total sample size was calculated as 385. The sample size was calculated using Open Epi software version 3.01.

Inclusion and Exclusion Criteria: The study included all adolescent school students aged between 12 and 18 years and those studying in the English medium of instruction. Students aged less than 12 or more than 18 years, with a history of psychiatric illness, and with chronic medical conditions were excluded from the study.

Data Collection: The study was initiated after approval from the Institute Ethics Committee. After explaining the aim and objectives of the study, informed written consent was obtained from the students and parents. Every student received a patient information sheet containing the study details and a consent form to obtain parental consent. All students were contacted the following day, and those within the designated age group were invited to complete the questionnaire. Essential sociodemographic information was presented in the first part of the questionnaire. Gaming addiction was assessed using the Lemmens Game Addiction Scale, followed by an assessment of sleep quality using the Pittsburgh Sleep Quality Index. The Rosenberg Self-Esteem Scale and Psychological Well-Being Index were used to measure the participants' self-esteem and well-being, respectively.

Data Analysis: Data entry was conducted using Epi-Data software, and analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25 (IBM Corp., Armonk, NY, USA). The chi-square test was used to assess the associations between categorical variables. Statistical significance was set at $p < 0.05$.

Results

A total of 385 school children participated in this study. Most of the adolescents were between 14 and 15 years of age and accounted for 40.8% of the total study population, and males (66.2%) outnumbered females. Half of the adolescents were from rural areas, 57.9% had two or more siblings, and 67.3% lived in a nuclear family. The most common place for gaming was at home, accounting for 31.1% of the total population (Table 1).

Table 1: Sociodemographic details of the participants

Variable	Frequency (n)	Percentage (%)
Age (in years)		
12-13	121	31.4
14-15	157	40.8
16-18	107	27.8
Sex		
Male	255	66.2
Female	130	33.8
Location		
Rural	201	52.2
Urban	184	47.8
No. of siblings		

One or fewer	162	42.1
Two or more	223	57.9
Mother's Education		
High School	121	31.4
Higher Secondary	101	26.2
Undergraduate	89	23.1
Postgraduate	74	19.2
Family Type		
Nuclear	259	67.3
Joint	126	32.7
Place of gaming		
Home	120	31.1
Hostel	102	26.5
Both	89	23.1
Others	74	19.2

On exploring the distribution of adolescents based on gaming strategy, the most popular game among adolescents was found to be PUBG, accounting for 54.8% of the responses. Approximately 40% of the adolescents played games daily, about 40.2% of the

adolescents usually spent 1–2 hours gaming per day, and 75.3% were found to be playing on mobile phones. Most of the adolescents (44.9%) were found to be playing online multiplayer games (Table 2).

Table 2: Distribution of the participants based on the gaming strategy

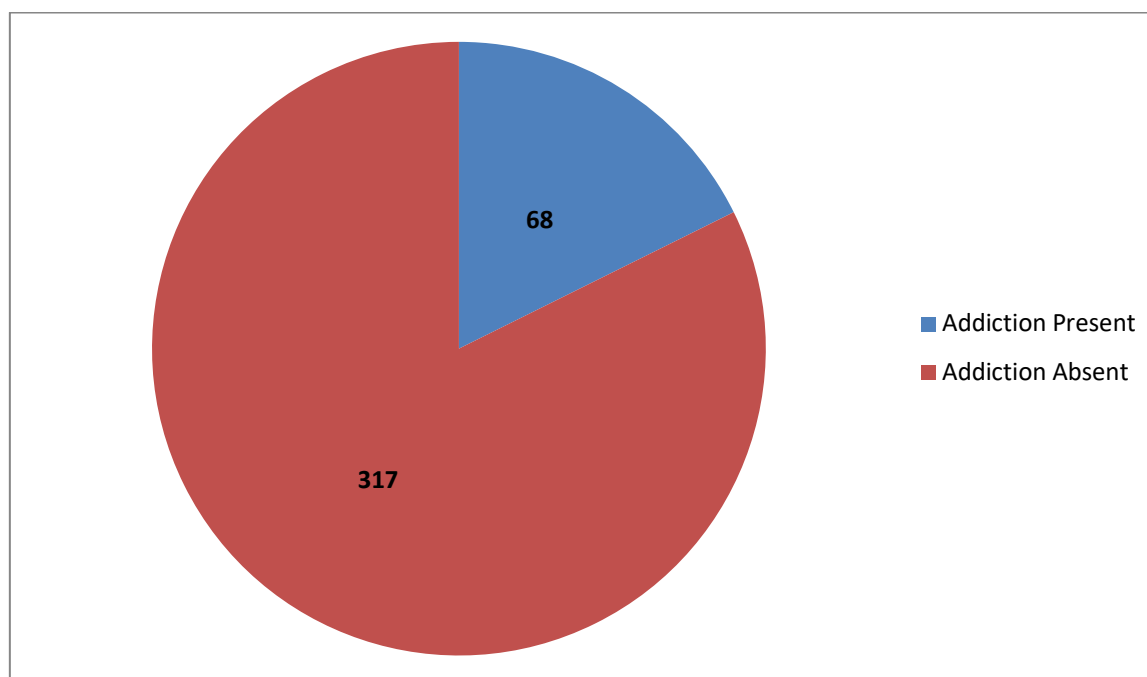
Variable	Frequency (n)	Percentage (%)
Favourite online game		
PUBG	211	54.8
Battlefield	73	18.9
Racing game	53	13.7
Others	48	12.4
Frequency of Gaming		
Daily	158	41.1
Alternate Days	121	31.4
Weekly once	65	16.8
Monthly once	41	10.6
Time Spent on games (in hours)		
<1	72	18.7
1-2	155	40.2
3-4	90	23.4
>4	68	17.7
Type of Gadgets		
Mobile	290	75.3
Laptop/Desktop	20	5.2
Tablet	40	10.4
PlayStation	35	9.1
Type of games		
Online multiplayer	173	44.9
Online single player	128	33.2
Offline single player	84	21.9

The prevalence of addiction to digital games was noted in 17.7% of the adolescents (Figure 1). When assessing the various criterion factors to determine gaming addiction in adolescents, salience was noted in 26.2% of the participants, followed by

tolerance in 31.2% of the participants. Mood modification was noted in 17.7% of the adolescents, relapse in 12.5%, withdrawal in 20%, and conflicts and problems in 20.8% and 10.6% of the adolescents, respectively (Table 3).

Table 3: Distribution of the participants based on the subdomains of the Lemmens Gaming Addiction Scale

Criterion factors	Frequency (n)	Percentage (%)
Salience	101	26.2
Tolerance	120	31.2
Mood modification	68	17.7
Relapse	48	12.5
Withdrawal	77	20
Conflicts	80	20.8
Problems	41	10.6

**Figure 1: Frequency of gaming addiction in the study participants (n=385)**

In exploring the association between the various demographic factors and the presence of gaming addiction, a significant association was found between age ($p=0.024$), gender ($p=0.004$), location ($p<0.001$), siblings ($p=0.009$), mother's education

($p<0.001$), family type ($p<0.001$), time spent on games ($p<0.001$), and type of game ($p=0.001$). However, no significant correlation was found between the type of gadget used ($p=0.752$) and online gaming addiction (Table 4).

Table 4: Association between different demographic variables and gaming addiction

Variable	Gaming Addiction Present		Gaming Addiction absent		p-value
	n	%	n	%	
Age (in years)					
12-13	18	4.7	103	26.7	0.024
14-15	22	5.7	135	35.1	
16-18	28	7.3	79	20.5	
Sex					
Male	55	14.3	200	51.9	0.004
Female	13	3.4	117	30.4	
Location					
Rural	50	12.9	151	39.2	0.001
Urban	18	4.7	166	43.1	
No. of siblings					
One or less	49	12.7	113	29.3	0.009
Two or more	19	4.9	204	52.9	
Mother's education					
High School	35	9.1	86	22.3	0.001

Higher Secondary	15	3.9	86	22.3	
Undergraduate	10	2.6	79	20.5	
Postgraduate	8	2.1	66	17.1	
Family type					
Nuclear	60	15.6	199	51.7	<0.001
Joint	8	2.1	118	30.6	
Time spent on games(in hours)					
<1	1	0.3	71	18.4	<0.001
1-2	5	1.3	150	38.9	
3-4	22	5.7	68	17.7	
>4	40	10.4	28	7.3	
Type of gadgets					
Mobile	50	12.9	240	62.3	0.752
Laptop/Desktop	5	1.3	15	3.9	
Tablet	8	2.1	32	8.3	
PlayStation	5	1.3	30	7.8	
Type of game					
Online multiplayer	45	11.2	128	33.2	0.001
Online single player	18	4.7	110	28.6	
Offline single player	5	1.3	79	20.5	

A significant association was found between gaming addiction and overall sleep quality ($p < 0.001$), self-esteem ($p < 0.001$), and psychological well-being ($p < 0.001$). Approximately 15% of patients with poor sleep quality had a gaming addiction (Table 5).

Table 5: Association between the overall sleep, self-esteem and psychological well-being quality and the gaming addiction

Variable	Gaming Addiction Present		Gaming Addiction absent		p-value
	n	%	n	%	
Overall Sleep Quality					
Good (<5)	12	3.1	290	75.3	<0.001
Poor (>5)	56	14.5	27	7.1	
Self-Esteem					
Good (>15)	28	7.3	300	77.9	<0.001
Low (<15)	40	10.4	17	4.4	
Psychological well-being					
Low	35	9.1	17	4.4	<0.001
Moderate	20	5.2	22	5.7	
High	13	3.4	278	72.2	

Discussion

In today's world, computers and smartphones have become integral components of life, significantly influencing daily activities. Therefore, there is a greater chance of people becoming addicted to smartphones in terms of the Internet and games. [9] Games can significantly influence an individual's life in several ways; since antiquity, engaging in games has been deemed essential.

The rising popularity of digital gaming in recent years has transformed gameplay and the methodologies employed in its studies. Therefore, addressing digital gaming addiction is a necessary research area to prevent society from becoming a game-addict society. [10]. Our study found a significant association between various demographic factors and the development of

gaming addiction. Age is one of the factors. Studies have shown that the majority of people who were found to be addicted to digital or Internet gaming were between 14 and 15 years old. [11]. Similar to our study, Su et al. [12] showed a sex-related difference in the development of Internet gaming disorders. Our study found that approximately 12.9% of adolescents with gaming addiction were from rural areas. Pawlowska et al.[13] found that Internet gaming addiction was more common among people living in rural areas (2.9%) than among those living in urban areas (0.45%). However, the study by Saiful et al. [14] showed that adolescent people living in urban areas were found to be more commonly associated with digital gaming addiction (37.9%) than people from rural areas (30.3%). This may be because more people have access to devices and the internet, social

gaming is more prevalent, people use technology more frequently overall, and there are gaps in parental supervision in urban areas. Schneider et al. [15] showed that adolescents from single-parent or blended families were found to be associated with a greater risk for problematic gaming addiction than adolescents with two or more siblings, which is similar to our study results. In our study, adolescents with longer hours of play were found to be associated with gaming addiction. This was further supported in the study by Buren et al. [16] and Limone et al. [17], where children with Internet gaming addiction were found to have longer screen time.

On assessing the various factors to determine gaming addiction in adolescents, in the engagement section, tolerance was the most common factor, which was observed in approximately 31.2% of the children, followed by salience in 26.2% of the school children. Similar to our study, Praveen et al. [18] showed that, upon analysing the various factors that determine gaming addiction, salience was noted in 18.6% of the patients, followed by tolerance in 26.4% and mood modification in 34.5% of the patients. The prevalence of digital gaming addiction among adolescent children was found to be 17.7% in this study, and another study by Undavalli et al. [19] The study showed that the prevalence of internet gaming addiction was found to be 3.5% among the school children of Andhra Pradesh (India), and the study also mentioned that the prevalence of internet gaming addiction among adolescents ranged from 1.3% to 19.9% in different regions of the country. Another study conducted in New Delhi [20] showed that the prevalence of Internet gaming addiction was 3.6%. A study in the Kanchipuram District of Tamil Nadu (India) [21] found that Internet gaming addiction was approximately 4.25%. Our findings confirm that gaming addiction is of public health concern, especially among adolescents.

Our study found that adolescents with gaming addiction exhibited poor sleep quality, low self-esteem, and low psychological well-being. Zaman et al. [22] also showed that addicted gamers were found to be significantly associated with poor sleep quality when compared to regular patients in the study, which is consistent with our findings. Similarly, Bicholkar et al. [23] found that patients with gaming addiction had a low self-esteem score compared to patients without gaming addiction, which is further supported by the findings of previous studies [24-25], where gaming addiction was found to be associated with low self-esteem. Praveen et al. [18] also showed that patients with online gaming addiction had a low level of psychological well-being compared to patients without gaming addiction. A previous study on adolescents found that nomophobia is associated

with depression, anxiety, and poor quality of life. [26]. It is plausible that these factors are linked to psychological well-being and self-esteem, which require further research. The cross-sectional study design, the higher number of male adolescents, and self-report bias limit the generalizability of the study findings. However, despite these limitations, the adequate sample size and assessment using validated instruments are relative merits of the present study.

Conclusion

In the digital era, digital game addiction is an emerging health concern among adolescents. In our study, the prevalence of online gaming addiction in adolescents was 17.7%, and it was found to be associated with poor sleep quality, low self-esteem, and poor psychological well-being. Therefore, attempts should be made among adolescents in the earlier stages to prevent mental health problems. Further prospective multicentre research is needed to elucidate the relationship between gaming addiction and mental health.

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