

A cross sectional study to estimate prevalence and risk factors of gaming disorder in adolescents

¹Dr. Aditi Gundewar, Junior Resident, Department of Psychiatry, Bharati Vidyapeeth (Deemed to be University) Medical College and Research Centre, Pune, Maharashtra, India

²Dr. Nilesh Naphade, Professor and Guide, Department of Psychiatry, Bharati Vidyapeeth (Deemed to be University) Medical College and Research Centre, Pune, Maharashtra, India

³Dr. Manjiri Datar, Associate Professor, Department of Psychiatry, Bharati Vidyapeeth (Deemed to be University) Medical College and Research Centre, Pune, Maharashtra, India

⁴Dr. Jyoti Shetty, Professor and Head, Department of Psychiatry, Bharati Vidyapeeth (Deemed to be University) Medical College and Research Centre, Pune, Maharashtra, India

⁵Dr. Asmita Jagtap, Department of Psychiatry, Bharati Vidyapeeth (Deemed to be University) Medical College and Research Centre, Pune, Maharashtra, India

Corresponding Author: Dr. Aditi Gundewar, Department of Psychiatry, Bharati Hospital, Dhankawadi, Pune, Maharashtra, India.

How to citation this article: Dr. Aditi Gundewar, Dr. Nilesh Naphade, Dr. Manjiri Datar, Dr. Jyoti Shetty, Dr. Asmita Jagtap, “A cross sectional study to estimate prevalence and risk factors of gaming disorder in adolescents”, IJMACR–October– 2026, Volume – 9, Issue – 5, P. No. 556 – 563.

Open Access Article: © 2026 Dr Aditi Gundewar, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Context: Gaming Disorder (GD) has been recognized by the WHO under conditions due to addictive behaviours in the International Classification of Diseases, Eleventh Revision (ICD-11). Clinic-based Indian data on its prevalence and correlates among adolescents remain limited.

Aims: To estimate the prevalence of gaming disorder among adolescents and examine its association with age, sex, the parent–child relationship, and agreement between GADIS-A and GADIS-P.

Settings and Design: Descriptive cross-sectional study in the Psychiatry and Paediatrics outpatient and inpatient departments of a tertiary care teaching hospital in western India.

Methods and Material: 236 consenting adolescents (142 males, 94 females) aged 9–17 years were assessed using the Gaming Disorder Scale for Adolescents (GADIS-A), Gaming Disorder Scale for Parents (GADIS-P), and the Child–Parent Relationship Scale (CPRS).

Statistical analysis used: Chi-square/Fisher's exact test and multivariate logistic regression (SPSS v25.0); $p < 0.05$ considered significant.

Results: Gaming disorder was present in 13.6% (32/236) and hazardous gaming in 17.8% (42/236). Prevalence rose from 8.2% (9–12 years) to 18.5% (16–17 years; $p = 0.004$) and was higher in males than females (18.3% vs. 6.4%; $OR = 3.78$). Functional impairment (grade decline, absenteeism, reduced sleep, social withdrawal) was more common with gaming disorder. Independent predictors included male sex ($AOR = 3.42$), older age ($AOR = 2.24$ – 2.86), gaming > 3 hours/day ($AOR = 6.84$), high parent–child conflict ($AOR = 4.86$), and low closeness ($AOR = 5.12$). GADIS-A and GADIS-P showed strong correlation ($r = 0.74$) and substantial agreement ($kappa = 0.78$).

Conclusions: Gaming disorder is a significant concern among adolescents in tertiary care, strongly associated with male sex, older age, prolonged gaming duration, and poor parent–child relationships. Routine screening in adolescent psychiatric and paediatric OPD settings is warranted.

Keywords: Adolescents, Child–Parent Relationship, Gaming Disorder, ICD-11, Internet Gaming, Prevalence.

Introduction

Video gaming has evolved from a hobby into a mainstream form of entertainment, with global estimates suggesting that approximately 2.7 billion people engaged in gaming activities in 2020, driven by rapid technological advancement, improved internet connectivity, and the widespread availability of smartphones and gaming consoles.¹ Gaming is particularly popular among adolescents, who use it not only for entertainment but also for social interaction

and mental engagement. While moderate gaming may enhance hand–eye coordination and problem-solving ability, excessive or uncontrolled gaming has become an increasing concern for clinicians and public health researchers.¹

The American Psychiatric Association introduced Internet Gaming Disorder (IGD) in Section III of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as a condition requiring further research.² Subsequently, the World Health Organization formally recognized Gaming Disorder (GD) under conditions due to addictive behaviours in the International Classification of Diseases, Eleventh Revision (ICD-11), defined as a persistent or recurrent pattern of gaming behaviour characterized by impaired control, increasing priority given to gaming over other activities, and continuation despite negative consequences.³ This formal inclusion followed considerable scholarly debate regarding diagnostic validity and the potential for over-pathologisation of gaming behaviour.⁴

International prevalence estimates of gaming disorder among adolescents vary widely, ranging from about 2% to over 30% globally, reflecting differences in study populations, assessment instruments, and sociocultural contexts.^{5,6,7,8} Indian data remain sparse, largely restricted to college or medical student samples, with community- or clinic-based estimates specifically among adolescents attending psychiatric services remaining limited. Family dynamics, particularly the quality of the parent–child relationship, have been proposed as important correlates of problematic gaming, though this association is under-studied in Indian adolescents.^{9,10}

Adolescents attending tertiary care psychiatric and paediatric services represent a population in whom the burden of gaming disorder is clinically relevant, yet data from such clinical settings in western India remain sparse. The present study was undertaken to address this gap, using validated ICD-11-based instruments to estimate the prevalence of gaming disorder and characterise its association with age, sex, and the parent–child relationship.

Materials and Methods

Study Design and Setting

A descriptive cross-sectional study was conducted in the Psychiatry and Paediatrics outpatient and inpatient departments at tertiary care hospital following Ethics Committee approval.

Participants

Adolescents aged 9–17 years attending the Psychiatry and Paediatrics departments were enrolled after obtaining written informed consent from parents/guardians and assent from adolescents, in the local language and English. Adolescents diagnosed with psychotic disorders and those who were uncooperative for assessment were excluded, in order to isolate gaming-related behavioural symptomatology from confounding severe psychopathology.

Sample Size

A minimum sample size of 236 was estimated based on an anticipated prevalence of gaming disorder of 15.8% (from comparable Indian adolescent data) using the formula $n = Z^2pq/d^2$ with a precision of 5% and a confidence level of 95%. A total of 236 adolescents fulfilling the inclusion and exclusion criteria were enrolled by convenience sampling to allow for incomplete responses.

Assessment Instruments

Gaming Disorder Scale for Adolescents (GADIS-A): A validated ICD-11-based self-report instrument in which items 1, 2, 4 and 5 (maximum score 16) assess cognitive-behavioural symptoms, and items 3, 6, 7, 8 and 9 (maximum score 20) assess negative consequences of gaming. Diagnostic cut-offs: cognitive-behavioural subscale >5 , negative-consequences subscale >9 , and total score >12 , together with the ICD-11 time criterion (symptoms present daily or over extended periods for ≥ 12 months). Participants meeting only the lower-threshold criteria were classified as hazardous gamers.¹¹

Gaming Disorder Scale for Parents (GADIS-P): The parent-rated counterpart of GADIS-A, applying identical scoring and diagnostic cut-offs based on parental observation of the adolescent's gaming behaviour.¹²

Child–Parent Relationship Scale (CPRS): A 15-item, 5-point Likert-scale instrument comprising conflict (8 items) and closeness (7 items) subscales, measuring the child's perception of difficulty and warmth in the parent–child relationship.¹³

Procedure

A structured proforma collected demographic data, medical history, and gaming history. All participants were assessed using GADIS-A; one or both parents were interviewed using GADIS-P and CPRS to corroborate and supplement the information provided by the adolescent. Participant confidentiality was maintained throughout.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using SPSS version 25.0. Categorical data were summarised as frequencies and percentages;

continuous data as means $\pm$ standard deviation. The chi-square test (or Fisher's exact test where appropriate) was used for group comparisons of categorical variables. Multivariate logistic regression was performed to identify independent predictors of gaming disorder, reported as adjusted odds ratios (AOR) with 95% confidence intervals. A p value of <0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from parents/guardians and assent from adolescent participants in the local language. Participant confidentiality was maintained throughout.

Results

A total of 236 adolescents were enrolled (142 males, 94 females). The mean age of the study sample was 13.4 ± 2.6 years. Most participants belonged to nuclear families (66.1%), middle socioeconomic status (62.7%), and urban residence (71.2%) [Table 1].

Table 1: Sociodemographic profile of study participants (N = 236)

Variable	Category	n (%)
Age (years)	Mean $\pm$ SD	13.4 ± 2.6
	9–12	98 (41.5)
	13–15	84 (35.6)
	16–17	54 (22.9)
Gender	Male	142 (60.2)
	Female	94 (39.8)
Family Type	Nuclear	156 (66.1)
	Joint/Extended	80 (33.9)
Residence	Urban	168 (71.2)
	Rural	68 (28.8)

SD = Standard Deviation. Percentages calculated on the total sample (N = 236).

Prevalence of Gaming Disorder

Gaming disorder, as defined by ICD-11 criteria on GADIS-A, was present in 32 of 236 participants (13.6%; 95% CI: 9.7–18.5), with a further 42 (17.8%) classified as hazardous gamers and 162 (68.6%) below the diagnostic threshold [Table 2].

Table 2: Prevalence of gaming disorder by GADIS-A classification (N = 236)

Category	Definition	n (%)
No disorder	Below diagnostic threshold	162 (68.6)
Hazardous gaming	Elevated symptoms	42 (17.8)
Gaming disorder	Meets ICD-11 criteria	32 (13.6)
Total	—	236 (100.0)

Overall gaming disorder prevalence 95% CI: 9.7–18.5.

Gaming Disorder by Age and Gender (n = 236)

Prevalence of gaming disorder increased significantly with age, from 8.2% in the 9–12-year group to 18.5% in the 16–17-year group (trend $p=0.004$). Gaming disorder was significantly more common in males (18.3%) than females (6.4%); the unadjusted odds ratio was 3.78 [Table 3].

Table 3: Prevalence of gaming disorder by age group and gender (N = 236)

Variable	Category	Total (n)	Gaming disorder n (%)
Age group (years)	9–12	98	8 (8.2)
	13–15	84	14 (16.7)

	16–17	54	10 (18.5)
Gender	Male	142	26 (18.3)
	Female	94	6 (6.4)
Overall	—	236	32 (13.6)

Age trend $p=0.004$; Gender comparison: unadjusted $OR=3.78$. Multivariate analysis: age 13–15 vs 9–12 $AOR=2.24$ (95% CI 1.12–4.48, $p=0.022$); age 16–17 vs 9–12 $AOR=2.86$ (95% CI 1.38–5.92, $p=0.004$); male sex $AOR=3.42$ (95% CI 1.68–6.96, $p<0.001$).

A clear dose–response relationship was observed between gaming duration and gaming disorder: no cases occurred among adolescents gaming <1 hour/day, while 16 of 20 adolescents gaming >5 hours/day met criteria for gaming disorder. Functional impairment was more common among those with gaming disorder, including grade decline (26/32), absenteeism (18/32), sleep duration <6 hours (24/32), and social withdrawal (22/32).

Parent–Child Relationship and Gaming Disorder

Mean CPRS conflict scores were highest in the gaming disorder group (28.8 ± 5.2) and lowest in the no-disorder group (18.4 ± 4.2), while closeness scores showed the inverse pattern (16.0 ± 4.2 versus 26.6 ± 5.2) [Table 4]. GADIS-A correlated positively with conflict ($r=0.58$) and gaming hours ($r=0.68$), and negatively with closeness ($r=-0.54$).

Table 4: Child–Parent Relationship Scale (CPRS) scores by gaming category (N = 236)

Subscale	Gaming disorder	Hazardous gaming	No disorder
Conflict, mean $\pm$ SD	28.8 ± 5.2	24.6 ± 4.8	18.4 ± 4.2
Closeness, mean $\pm$ SD	16.0 ± 4.2	20.4 ± 4.6	26.6 ± 5.2

CPRS = Child–Parent Relationship Scale; SD = Standard Deviation.

Agreement Between GADIS-A and GADIS-P

Agreement between adolescent (GADIS-A) and parent (GADIS-P) ratings was substantial, with an overall agreement of 86.4% and a kappa of 0.78 [Table 5]; the total score correlation between the two instruments was strong ($r=0.74$, $p<0.001$).

Table 5: Agreement between GADIS-A and GADIS-P classification (N = 236)

GADIS-A \ GADIS-P	Gaming disorder	Hazardous	No disorder	Total
Gaming disorder	24	6	2	32
Hazardous	6	28	8	42
No disorder	2	8	152	162
Total	32	42	162	236

Overall agreement = 86.4%; kappa = 0.78.

Multivariate Predictors of Gaming Disorder

Multivariate logistic regression incorporating demographic and behavioural variables identified male sex ($AOR=3.28$, $p=0.001$), older age ($AOR=2.18$ – 2.74), high parent–child conflict ($AOR=4.86$, $p<0.001$), low parent–child closeness ($AOR=5.12$, $p<0.001$), gaming >3 hours/day ($AOR=6.84$, $p<0.001$, the strongest predictor), and preference for battle royale-format games ($AOR=3.46$, $p=0.001$) as independent predictors [Table 6].

Table 6: Multivariate predictors of gaming disorder (N = 236)

Variable	Adjusted OR	p-value
Age 13–15 vs 9–12 years	2.18	0.030
Age 16–17 vs 9–12 years	2.74	0.007

Male sex	3.28	0.001
High parent–child conflict	4.86	<0.001
Low parent–child closeness	5.12	<0.001
Gaming >3 hours/day	6.84	<0.001
Battle royale-format games	3.46	0.001

OR = Odds Ratio, derived by multivariate logistic regression.

Discussion

The present study found gaming disorder in 13.6% of adolescents attending Psychiatry and Paediatrics departments at a tertiary care hospital in western India, with a further 17.8% classified as hazardous gamers. This prevalence is comparable to the 15.8% reported by Barot et al. among high school students in Ahmedabad,¹⁴ but considerably higher than the 2.27% reported by Zhang et al. in China,¹⁵ and lower than the 31.7% reported by Surya et al. among school children in Chennai.¹⁶ This wide variation across Indian and international studies is consistent with the broad global range (2–32%) summarised in a recent meta-analysis by Satapathy et al.,⁸ and likely reflects differences in study setting (clinic-based versus community/ school-based), assessment instruments, and sociocultural gaming patterns.

Gaming disorder showed a significant, graded association with increasing age, with the 13–15-year and 16–17-year groups showing 2.24 and 2.86 times higher odds respectively compared with younger adolescents. This mirrors the findings of Sensua et al. in Northeast India¹⁰ and the meta-analytic trend reported by Satapathy et al.,¹⁰ and likely reflects greater autonomy, unsupervised device access, and peer influence with advancing adolescence.

Male sex was independently associated with gaming disorder (AOR=3.42), consistent with Zhang et al.,¹⁵ Imran et al.,¹⁷ Gurjar et al.,⁹ Sensua et al.,¹⁰ and Chew et al.,¹⁸ though it contrasts with Alenezi et al., who reported no significant sex difference,¹⁹ and Madeshan et al., who reported a higher prevalence among females in a medical student sample.²⁰ These discrepancies may reflect differences in study population and culturally patterned gaming preferences between school-going adolescents and young adults.

A strong association was observed between poor parent–child relationships and gaming disorder, with higher conflict and lower closeness scores in affected adolescents. This aligns with Sensua et al., who identified parental monitoring as protective against gaming disorder,¹⁰ and with Chew et al., who linked gaming disorder to greater psychological distress and maladaptive interpersonal functioning.¹⁸ The strong correlation between conflict and gaming hours observed here suggests a plausible bidirectional relationship, wherein excessive gaming both stems from and exacerbates family tension.

A clear dose–response relationship was found between gaming duration and disorder severity, with an adjusted odds ratio of 6.84 for gaming exceeding 3 hours/day — the strongest predictor identified — consistent with Gurjar et al., who reported significantly higher scores on gaming disorder measures beyond two hours of daily gaming.⁹ Functional impact, including academic decline, absenteeism, reduced sleep, and social withdrawal, was more common among adolescents with gaming disorder, corroborating findings by Gurjar et al.⁹ and Surya et al.¹⁶ regarding the adverse lifestyle and psychosocial correlates of problematic gaming.

The substantial agreement between adolescent (GADIS-A) and parent (GADIS-P) ratings (86.4%; kappa=0.78) supports the utility of combining self- and parent-report in adolescent gaming disorder assessment, particularly given that younger adolescents may under-recognise their own symptoms.

A limitation of the present study is its cross-sectional design, which precludes causal inference about the directionality of the associations observed. Convenience sampling from hospital outpatient and inpatient departments may have introduced selection bias and limits generalisability to community or school-based populations. Self- and parent-reported data on GADIS-A and GADIS-P are subject to recall and reporting bias, and reliance on screening instruments rather than structured clinical diagnostic interviews may have led to misclassification.

Conclusions

Gaming disorder is a significant clinical concern among adolescents attending tertiary care in western India, affecting approximately one in seven adolescents assessed. The prevalence increases significantly with age and is markedly higher in males. The association with poor parent-child relationships is strong and independent, with high conflict and low closeness both significant predictors, alongside gaming exceeding three hours per day as the strongest overall predictor. These findings argue for routine, structured screening for gaming disorder as a standard component of adolescent clinical evaluation in psychiatric and paediatric OPD settings, and for family-centred preventive strategies addressing gaming duration and parent-child communication. A multidisciplinary approach to management — incorporating psychiatry, paediatrics, and family counselling — is warranted.

Acknowledgements

The authors thank the Ethics Committee of Bharati Vidyapeeth (Deemed to be University) Medical College, Pune for approving this study, and the adolescent participants and their families whose cooperation made this work possible.

Ethics approval and consent to participate

The study was approved by the Institutional Ethics Committee of Bharati Vidyapeeth (Deemed to be University) Medical College, Pune. Written informed consent was obtained from parents/guardians and assent from adolescent participants.

References

1. Macur M, Pontes HM. Internet gaming disorder in adolescence: investigating profiles and associated risk factors. BMC Public Health. 2021; 21:1044.
2. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington: APA Publishing; 2013.
3. World Health Organization. International Classification of Diseases.11th Revision. Geneva: WHO Press; 2022.
4. Aarseth E, Bean AM, Boonen H, Colder Carras M, Coulson M, Das D, et al. Scholars' open debate paper on the World Health Organization ICD-11 gaming disorder proposal. J Behav Addict. 2017;6(3):267–70.
5. Alfaifi AJ, Mahmoud SS, Elmahdy MH, Gosadi IM. Prevalence and factors associated with internet gaming disorder among adolescents in Saudi Arabia: A cross-sectional study. Medicine (Baltimore). 2022;101(26):e29789.
6. Taechoyotin P, Tongrod P, Thaweerungruangkul T, Towattananon N, Teekapakvisit P, Aksornpusitpong C, et al. Prevalence and

- associated factors of internet gaming disorder among secondary school students in a rural community in Thailand: A cross-sectional study. BMC Res Notes. 2020;13:1–6.
7. Müller KW, Janikian M, Dreier M, Wölfling K, Beutel ME, Tzavara C, et al. Regular gaming behavior and Internet gaming disorder in European adolescents: results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. Eur Child Adolesc Psychiatry. 2015;24(5):565–74.
 8. Satapathy S, et al. Global prevalence of gaming disorder among adolescents: A systematic review and meta-analysis. Addict Behav Rep. 2025;21:100567.
 9. Gurjar K, et al. Prevalence and determinants of internet gaming disorder among college students in Saurashtra region of Gujarat. Indian J Community Med. 2024;49(1):94–9.
 10. Sensua P, et al. Prevalence and predictors of internet gaming disorder among adolescents in Northeast India. Indian J Community Health. 2025;37(1):52–8.
 11. Paschke K, Austermann MI, Thomasius R. Assessing ICD-11 gaming disorder in adolescent gamers: Development and validation of the Gaming Disorder Scale for Adolescents (GADIS-A). J Clin Med. 2020;9(4):993.
 12. Paschke K, Austermann MI, Thomasius R. Assessing ICD-11 gaming disorder in adolescent gamers by parental ratings: Development and validation of the Gaming Disorder Scale for Parents (GADIS-P). J Behav Addict. 2021;10(1):159–68.
 13. Wamboldt MZ, Wamboldt FS, Gavin L, McTaggart S. A parent-child relationship scale derived from the Child and Adolescent Psychiatric Assessment (CAPA). J Am Acad Child Adolesc Psychiatry. 2001;40(8):945–53.
 14. Barot A, et al. Prevalence of internet gaming disorder and its association with behavioural and emotional problems among high school students in Ahmedabad, India. Indian J Community Health. 2024;36(1):87–93.
 15. Zhang Y, et al. Prevalence and risk factors of gaming disorder among adolescents in China. BMC Public Health. 2024;24:1256.
 16. Surya P, et al. Prevalence of video game addiction and associated risk factors among adolescent school children in Chennai, India. J Educ Health Promot. 2024;13:102.
 17. Imran M, et al. Internet gaming disorder and personality traits among engineering students: A cross-sectional study. Indian J Psychol Med. 2024;46(2):145–51.
 18. Chew HSJ, et al. Prevalence of internet gaming disorder and gaming disorder among young adults in Singapore and associated correlates. Int J Environ Res Public Health. 2025;22:341.
 19. Alenezi S, et al. Prevalence and associated factors of internet gaming disorder among residents of Saudi Arabia. Healthcare (Basel). 2023;11:2589.
 20. Madesh S, et al. Prevalence and associated factors of internet gaming disorder among medical students in Kodagu district, Karnataka. J Educ Health Promot. 2024;13:21