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Pattern and correlates of Internet gaming disorder among medical students – A cross-sectional study from a tertiary care health institute, Rajasthan

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Abstract:

BACKGROUND: Internet gaming disorder (IGD) is a global problem associated with several psychological complications, such as insomnia, poor academic performance, and aggression. The present study aimed to explore the pattern and correlates of gaming disorder among a sample of medical college students from India and determine the motivational basis for it.

MATERIALS AND METHODS: An analytical cross-sectional study was conducted at a medical college in Rajasthan from January 2021 to June 2021 after obtaining approval from the Institutional Ethical Committee. The study participants were all medical undergraduate students of age 18 years or more, who were engaged in Internet gaming during the past year (i.e., the last 12 months). It was a web-based online survey in which a pre-designed, semi-structured questionnaire was used to collect information on the socio-demographic profile of the respondents, Internet Gaming Disorder Scale–Short-Form (IGDS9-SF) and Motives for Online Gaming Questionnaire (MOGQ) scale. Multivariate regression analysis was performed for the prediction of dependent variables on the basis of several independent variables like gender, substance abuse, relationship status, and weekly time and money spent on gaming.

RESULTS: The study included 864 undergraduate students, out of which 675 were engaged in Internet gaming during the last 12 months, so analyses were made on 675 students to assess the severity of IGD. The proportion of disordered gamers was 2.1%. Substance abuse [odds ratio (OR) = 7.026], owning a game console or other dedicated gaming devices (OR = 10.099), and weekly time spent on gaming (OR = 7.026) were significantly associated with higher odds of being a disordered gamer. Similarly, the weekly amount of money spent on gaming and the age of initiation of gaming were also significant predictors for IGD.

CONCLUSIONS: Substance abuse, owning a game console or other dedicated gaming devices, weekly time spent on gaming, weekly money spent on gaming, and age of initiation of gaming were independent predictors for disordered gamers. Restricting gaming activities and engaging and training in other activities can help overcome the problem.

Keywords:

Disordered gamers, Internet gaming disorder, motives, prevalence, Rajasthan

Introduction

In recent years, due to explosive growth in technology and Internet usage, online

games have become an integral part of daily life for many young individuals, who often indulge in playing such games during their leisure time. Although gaming is a harmless spare-time activity for most players, at least

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a subgroup of them experiences one of the adverse consequences of engaging in this behavior. The sales of computers and video games have increased due to the popularity of this medium among adolescents and adults, which has created a sense of concern among policy makers, scholars, and the general public that some users may present with pathological patterns of video game usage that may interfere with life functioning. Identifying the reasons for digital game addiction is as important as its consequences.^[1] The published literature has documented physical, psychological, social, and work-related problems such as disturbed sleep patterns, dehydration, pressure sores, increased irritability and aggression, depressive and/or anxiety symptoms, poor academic performance, and neglect of interpersonal relationships and work-related commitments among persons with excessive and problematic gaming.^[2] Loneliness, as perceived by the individual, is one of the significant factors regarding game addiction. Lemmens *et al.*^[3] expressed that loneliness is both the reason and the result of game addiction. Several studies recognized that gaming disorder (GD) is a global problem associated with several psychological complications. GD has many serious consequences on the psychophysical health of an individual. Among these majors are “poor sleep quality, insomnia, decreased work output or academic performance, decreased cognitive functions, difficulties in interpersonal relationships, increased negative affect, stress, aggression, and hostility.”^[4,5]

Internet gaming disorder (IGD) was recently included as a tentative disorder in the latest (fifth) edition of the American Psychiatric Association’s (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM-5).^[6] Likewise, “Gaming Disorder” has recently been included in the beta version of the International Classification of Diseases of the World Health Organization.^[7] The problem of GD has been defined as “a pattern of persistent or recurrent gaming behavior (“digital gaming” or “video-gaming”), which may be online (i.e., over the Internet) or offline, manifested by (1) impaired control over gaming (e.g., onset, frequency, intensity, duration, termination, context); (2) increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities; and (3) continuation or escalation of gaming despite the occurrence of negative consequences.

While GD has been recognized as a public health problem, it is essential to note that most people who engage in gaming do not fulfill the criteria for gaming disorder. The last few years have seen a rise in the number of studies focusing on the negative impact of gaming along with the problematic use of other online applications,^[8] but still, available reliable data on exact patterns of IGD and the various socio demographic, clinical, and

other risk factors to identify at-risk individuals of this disorder, in developing countries like India, is lacking. The published literature on the pattern and correlates of gaming behavior among medical students remains scarce.^[1] The present study aimed to explore the pattern and correlates of gaming among a sample of medical college students from India. The presence of GD among medical students could have a deleterious effect on their academic performance and professional career. This is the reason why this population was chosen for this study. Further, the study shall be helpful in adding valuable information to the limited pool of published literature on this subject.

The objectives of this study were to determine the pattern of IGD and assess its correlates among medical students and to determine the motivational basis for the IGD.

Materials and Methods

Study design and setting

The present study utilized an analytical cross-sectional study design. The study was conducted at a medical college in Rajasthan for 6 months from January 2021 to June 2021 after obtaining approval from the institutional ethical committee.

Study participants and sampling

The study population comprised all undergraduate medical students, excluding current interns, pursuing the medical course during the study period.

Inclusion criteria:

1. All undergraduate students aged 18 years or more, who were engaged in Internet gaming during the past year (i.e., last 12 months), and
2. Gave written informed consent.

Exclusion criteria:

1. Students who had any psychiatric disorder or were on medication
2. Incompletely filled questionnaires.

Sample size

We conducted this study with the aim of collecting preliminary data on the above objective; hence, no pre-defined sample size was fixed at the beginning of the study.

Data collection tools and technique

It was a web-based online survey in which each student was contacted and explained about the purpose of the study and the voluntary nature of participation in this online survey via various platforms (Phone/WhatsApp/Email). Those who gave consent for the study were invited to fill out an online questionnaire via a shared link.

We used a pre-designed, semi-structured questionnaire with the following parts:

Part A: Socio-demographic profile of the respondents, including characteristics regarding their gaming activities.

Part B: Internet Gaming Disorder Scale–Short-Form (IGDS9-SF) developed by Pontes and Griffiths in 2015.^[9] The scale used was a brief psychometric tool based on the nine core criteria defining IGD based on the DSM-5 (American Psychiatric Association, 2013). It assessed the severity of IGD and its harmful effects by examining online and/or offline gaming activities over the last 12 months. The response for each question was graded on a 5-point scale: 1 ('Never'), 2 ('Rarely'), 3 ('Sometimes'), 4 ('Often'), and 5 ('Very often'). The final score was calculated after adding the nine items' responses, ranging from 9 to 45. For analysis purposes, the gamers were categorized into two groups (disordered gamers and non-disordered gamers) based on the scores obtained by them with a minimum cut-off score of 36 out of 45 points (i.e. those who answered 'often' and 'very often' to all nine questions).

Part C: Motives for Online Gaming Questionnaire (MOGQ) scale developed by Demetrovics *et al.*^[10] This scale consisted of 7 dimensions and 27 items used to assess motives for online gaming. It consisted of a 5-point Likert scale, ranging from 1 = almost never to 5 = almost always/always.

Ethical consideration

Ethical approval was obtained from the Institutional Ethics Committee before conducting the study. Written informed consent was obtained from the study participants. We assured them that they had the right to refuse to participate at any stage of data collection and that the information obtained from them would be kept entirely confidential.

Statistical analysis

The data were collected and entered into a Microsoft Excel spreadsheet and coded. Data were analyzed IBM SPSS Statistics 23 for generating results and inferences. Descriptive statistics were used, and the Chi-square test as the test of significance with a *P* value of <0.05 was taken as statistically significant. Continuous data were checked for normality using the Kolmogorov–Smirnov test, and non-normally distributed data were summarized in the form of median and interquartile range and analyzed using the Mann–Whitney test. Multivariate regression analysis using the enter method was performed for the prediction of dependent variables on the basis of several independent variables like gender, substance abuse, relationship status, and weekly time and money spent on gaming.

Results

Socio-demographic profile of the respondents, including characteristics regarding their gaming activities

There were a total of 994 undergraduate students in the medical college, and 864 out of 994 undergraduate students had given consent and participated in the present study (response rate 86.9%). Out of 864 students, 675 students were engaged in Internet gaming during the last 12 months, so analyses were made on 675 students to assess the severity of IGD.

The mean age of all participants was 21.85 ± 1.56 years. Almost two-thirds of the participants, that is, 63.9% (431 out of 675 participants), were males. There was a nearly equal distribution of participants across all academic years, with the proportion of first-, second-, third-, and fourth-year participants being 20.3%, 28.9%, 27%, and 23.8%, respectively. Out of a total of 675, 14 (2.1%) participants were found to be disordered gamers. Table 1 depicts the association of GD with different independent variables. It showed that males had a significantly higher proportion of gaming disorders than females (3% vs 0.4%, *P* value < 0.05). Similarly, being married/in a relationship, the presence of substance abuse, a tendency to skip breakfast, and being an owner of a game console were significantly associated with IGD (*P* value < 0.05). Weekly time and amount spent on gaming were also significantly associated with IGD (*P* value < 0.05). The mean age of initiation of Internet gaming was significantly lower in disordered gamers using Students *t*-test (*P* value < 0.05).

Predictors of disordered gamers

All independent variables with a significance level of 95% or more were included in multivariate regression analysis (Enter method). The Chi-square test result in the Omnibus test of model coefficients indicated that our model was a significant improvement in fit relative to an intercept-only model, $\chi^2(10) = 82.014$, *P* < .001). Based on our model, the dependent variable's explained variation ranges from 11.4% (Cox and Snell *R*²) to 62.6% (Nagelkerke *R*²). A high *P* value in Hosmer and Lemeshow test indicated that the model adequately fits the data (*P* value = 1.00). The overall successful prediction rate of the model was found to be 98.7%. Results from the multivariate logistic regression analysis [Table 2] indicated that substance abuse (OR = 7.026, 95% CI = 1.062–46.495, *P* = 0.043), owning a game console or other dedicated gaming devices (OR = 10.099, 95% CI = 1.119–91.148, *P* = 0.039), and weekly time spent on gaming (OR = 7.026, 95% CI = 1.062–46.495, *P* = 0.043) were significantly associated with higher odds of being a disordered gamer. Those

Table 1: Association of GD with different variables (univariate analysis)

Variable	Disordered gamer <i>n</i> (%)	Nondisordered gamer <i>n</i> (%)	Chi-square (df)	<i>P</i>
Age	22.14±1.61	21.85±1.56	0.696	0.486
Gender				
Male	13 (3)	418 (97)	5.211 (1)	0.022
Female	1 (0.4)	243 (99.6)		
Relationship status				
Married/in a relationship	5 (5.1)	93 (94.9)	5.175 (1)	0.023
Unmarried	9 (1.6)	568 (98.4)		
Substance abuse				
Present	12 (4.8)	240 (95.2)	14.304 (1)	<0.001
Absent	2 (0.5)	421 (99.5)		
Daily hours of sleep				
<8 h	9 (2.4)	363 (97.6)	0.486 (1)	0.486
≥ 8 h	5 (1.7)	298 (98.3)		
Often skips breakfast				
Yes	12 (3.7)	311 (96.3)	8.213 (1)	0.004
No	2 (0.6)	350 (99.4)		
Owning a mobile phone with an Internet connection				
Yes	13 (2)	649 (98)	2.06 (1)	0.151
No	1 (7.7)	12 (92.3)		
Owning a game console/other dedicated gaming device				
Yes	13 (5.2)	235 (94.8)	19.37 (1)	<0.001
No	1 (0.2)	426 (99.8)		
Weekly time spent on gaming				
<7 h	2 (0.6)	361 (99.4)	19.228 (2)	<0.001
7-14 h	6 (2.5)	237 (97.5)		
≥ 14 h	6 (8.7)	63 (91.3)		
Amount of money spent on gaming				
None	-	368 (100)	33.885 (2)	<0.001
<1000	7 (2.9)	237 (97.1)		
≥ 1000	7 (11.1)	56 (88.9)		
Gaming Platform				
Mobiles	13 (2.4)	534 (97.6)	2.967 (3)	0.397
PC	-	76 (100)		
Console	-	28 (100)		
PC and Console	1 (4.2)	23 (95.8)		
Academic Year				
1	2 (1.5)	135 (98.5)	1.261 (3)	0.738
2	4 (2.1)	191 (97.9)		
3	3 (1.6)	179 (98.4)		
4	5 (3.1)	156 (96.9)		
Age of initiation of internet game	10.79±1.63	14.33±3.85	3.431*	0.001

*Difference in mean age was analysed using Student's *t*-test

who spent less than Rs. 1000 per week had lesser odds of being disordered gamers compared to those spending equal to and more than Rs. 1000. Furthermore, every unit increase in the age of initiation of gaming was associated with 30.5% lesser odds of being a disordered gamer.

Prediction of IGD based on different domains of motives score

[Figure 1] The median motives score of disordered gamers was 101, which was significantly higher than non-disordered gamers (median = 49) using the Mann–Whitney test (*P* value < 0.05). Table 3 depicts

the median motives score of different domains. It was significantly higher for all domains in disordered gamers than in non-disordered gamers using the Mann–Whitney test (*P* value < 0.05).

[Table 4] As all domains have a significance level of 95% or more, we included motive scores of all domains in multivariate regression analysis (Enter method). The Omnibus test of model coefficients was found to be statistically significant, indicating that the model is significantly fit (Chi-square=88.786, *P* value < 0.001, df=7). Based on our model, the dependent variables

Table 2: Predictors of disordered gamers using multivariate logistic regression

Variables	Adjusted OR	Confidence Interval	P
Gender			
Female	1		
Male	5.398	0.317-91.808	0.244
Substance Abuse			
No	1		
Yes	7.026	1.062-46.495	0.043
Relationship status			
Married/In a relationship	1		
Unmarried	0.267	0.041-1.725	0.165
Often skips breakfast			
No	1		
Yes	3.914	0.664-23.089	0.132
Owning a game console			
No	1		
Yes	10.099	1.119-91.148	0.039
Amount of money spent on gaming per week			
None			0.991
<1000	0.142	0.029-0.697	0.016
≥ 1000	1		
Weekly time spent on gaming			
<7 h	1		
7-14 h	15.227	1.605-144.441	0.018
≥ 14 h	14.253	1.556-130.539	0.019
Age of initiation of gaming	0.695	0.499-0.968	0.031

Table 3: Difference in motive scores of all domains between disordered and non-disordered gamers

Domains of Motive score	Disordered gamer (n=14)		Non-disordered gamer (n=661)		P
	Median	IQR	Median	IQR	
Social	11.50	10.75-14	6.00	4-8	<0.001
Escape	17.00	15.5-19	6.00	4-8	<0.001
Competition	17.00	13.75-19	7.00	5-10	<0.001
Coping	16.00	14-18	7.00	6-10	<0.001
Skill development	12.00	10-16.25	8.00	5-10	<0.001
Fantasy	13.00	10-17	5.00	4-8	<0.001
Recreation	13.00	11.75-14	6.00	5-9	<0.001

Table 4: Prediction of IGD based on different domains of motives score using multivariate regression

Variables	Adjusted OR	Confidence Interval	P
Social	0.881	0.615-1.262	0.49
Escape	2.333	1.528-3.561	<0.001
Competition	1.487	1.05-2.106	0.025
Coping	1.02	0.681-1.527	0.923
Skill development	0.732	0.525-1.021	0.066
Fantasy	0.804	0.584-1.106	0.18
Recreation	1.283	0.767-2.147	0.343

explained variation ranges from 12.3% (Cox and Snell R²) to 67.4% (Nagelkerke R²). A high P value in Hosmer and Lemeshow test indicates that the model adequately fits the data (P value = 1.00). The overall successful prediction rate of the model was found to be 98.5%. In the multivariate logistic regression analysis,

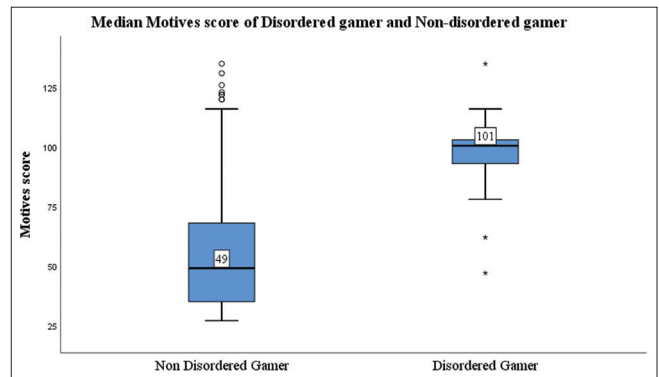


Figure 1: Median motives score of study participants

escape (OR = 2.333, 95% CI = 1.528-3.561, p = <0.001) and competition (OR = 1.487, 95% CI = 1.05-2.106, P = 0.025) were significant predictors of gaming disorder. With an increase in motive score of escape and competition domain, there were higher odds of being disordered gaming. All other domains were found to be insignificant predictors.

Discussion

The term “Internet gaming disorder” refers to the overuse and obsession with playing online games, which substantially negatively impacts several facets of life. A common concern is developing over how common IGD is among college students. The motives score is a metric

that evaluates the primary drivers behind playing video games. Insights into the creation and upkeep of IGD can be gained by comprehending the motivations behind excessive gaming. This preliminary discussion intends to investigate the association between college students' IGD and motivation scores, offering light on probable causes of problematic gaming behavior in this cohort.

In our study, 2.1% of participants were disordered gamers. This is similar to the finding reported by Singh S *et al.*^[12] and Bansal H *et al.*^[11] They mentioned that the prevalence of IGD was 3.6% and 4.9%, respectively, using the IGDS9-SF criteria. In another study conducted by Kim NR *et al.*^[12] in Korea, the proportion of adults with risk behavior toward Internet gaming using DSM-5 was found to be 13.8%. This difference may be because of geographical and sociocultural differences in the study population. In a study conducted by Bhaskar R *et al.*,^[13] the proportion of gaming disorders using the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) scale was 6.98%. This variation in the prevalence of IGD was likely to be because of methodological differences like the use of different tools and cut-off scores. Internet use and gaming in Kerala may offer a way to escape into a fictional setting where students can escape the pressure of academic competition. The proportion of disordered gamers was significantly higher in males compared to females (3% vs 0.4%). Similar findings were reported by Mihara S *et al.*^[14] and Stevens MW *et al.*^[15] showed that there was also a predominance of males for disordered gamers. It indicates that males are more addicted to gaming compared to females. Since video games are targeted more toward boys than girls, men tend to play more games than women do. In our study, students who are married or in a relationship have a higher proportion of IGD than single students (5.1% vs 1.6%). This finding is in concordance with the finding reported by Liao Z *et al.*,^[16] who reported a higher predisposition of IGD among couples compared to single students. In our study, among substance abusers, there was a higher prevalence of disordered gamers. It indicates that students who are engaged in one type of addiction are more prone to have other addictions also. Students who skip breakfast have a higher prevalence of IGD; this might be because these students are lost in their virtual world and often skip real-life activities. Students who own a gaming console or some dedicated gaming device had a significantly higher proportion of IGD. Similar results were reported by Singh YM *et al.*,^[17] where it was shown that the proportion of IGD was significantly higher in students who had their own electronic gadgets for gaming. It demonstrated that the accessibility of smart devices may present an additional danger for addiction. Students who were spending more time and money on gaming were found to be significantly more disordered than those who were spending less time and money. Similarly, Liao Z

et al.^[16] reported that the median time and money spent on disordered students was significantly higher. Alsunni AA *et al.*^[18] also reported that gaming time was higher in disordered gamers. The median age of initiation of gaming among disordered gamers was 10.79 years, and it was significantly lower than non-disordered gamers. Several studies also reported a similar result; that is, the early age of initiation of gaming was positively associated with disordered gamers.^[19,20]

The median score of the total and individual seven domains of gaming motives was significantly higher in disordered gamers than in non-disordered gamers. Gaming motives are a strong predictor of gaming disorder. Laconi S *et al.*^[21] also reported that the motive score was higher in disordered gamers compared to non-disordered gamers. Among the various domains of the motive score, only escape and competition were significantly associated with IGD in our study. This was in agreement with the findings of other studies.^[16,22-24] Manchanayake MM *et al.*^[25] found that while the escape and fantasy motives were positively predictive, the competition motive score was associated with a negative effect on IGD. Gamers who like role-playing types of games are often engaged in gaming to relax and temporarily escape from other real-life problems.

Limitations and recommendation

The study had several limitations. The research was conducted online, and all information was self-reported. The respondents were supposed to answer about their gaming behavior over a period of 1 year, so there is a possibility of inaccurate answers or recall bias. Second, the study being cross-sectional in nature, the causal association cannot be established between disordered gaming and other predictors. Also, there is limited generalizability of our findings since it was a nonprobability convenient sampling and solely restricted to only one medical college.

The adolescent phase of life is a period in which one experiences major changes in terms of social, mental, and physiological; therefore, it needs effective education and intervention programs that can help adolescents successfully transition into adulthood overcoming all obstacles. The present study has highlighted a few correlated factors, which emphasize the importance of family-targeted and medical college-based prevention programs. Restricting the use of gaming consoles by peer groups like parents, relatives, and medical faculties and engaging such adolescents in activities other than academics like outdoor/indoor games and physical training may help them to overcome their dependency on online gaming. Although adolescents usually spend money on gaming just for recreational purposes, persistent expenditure on gaming may

become a predictor of addiction like online gambling among adults. Such adolescents need self-realization which can be achieved through one-to-one counseling or focused group discussion by a dedicated counselor or psychologist, which is an unmet need in terms of students' welfare at a medical institution. Further research is needed to understand the underlying mechanisms of video and Internet gaming addiction and to explore effective preventative or interventional strategies.

Conclusion

Although more than two-thirds of the respondents (78%) were involved in some or other forms of Internet gaming over a period of 12 months; the proportion of disordered gamers is insubstantial in our study. Substance abuse, owning a game console or other dedicated gaming devices, weekly time spent on gaming, weekly money spent on gaming, and age of initiation of gaming were significant predictors for disordered gamers.

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Conflicts of interest

There are no conflicts of interest.

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