

A study on Videogame addiction among professional college students in Kanchipuram district, Tamil Nadu.

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Abstract:

Introduction: Most published studies covering Gaming Disorder (GD) were conducted in western settings covering school students hence there is a dearth of research illustrating the extent, pattern and the dangers associated with GD in Indian college students and especially within Tamil Nadu. The present study was therefore designed to analyse the level and patterns of gaming activity in a group of college students in Tamil Nadu and exploring its direct and indirect relationships with socio-demographic characteristics and psychological effects it can have on the individuals.

Methodology: The descriptive cross-sectional study conducted among 257 students of a private medical college. The prevalence of GD and its psychological effects were assessed by GAS developed by Lemmens et al and DASS-21 respectively. A semi-structured questionnaire was used to determine the socio-demographic profile and gaming activity of the participants. The online questionnaire was prepared using google forms and data analysis was carried out using Microsoft Excel and SPSS version 22.

Results: Among the 257 participants 195 (75.9 %) were gamers and 18 (7 %) of them were classified as 'addicted'. According to DASS-21 the 'addiction' to videogames had a significant association with depression, anxiety and stress and they also faced some economic burden and physical pain due to their gaming habits.

Conclusion: GD is an emerging condition that among college students in India and it is imperative to raise awareness among college students, teachers and parents about the dangers caused by excessive gaming and the several risk factors involved with GD. The observations further reinforce the need to improve programs to combat behavioural addiction.

Keywords: addiction, depression, anxiety, stress, gaming.

1. INTRODUCTION:

In recent years, the major surge in the usage of video games has introduced health issues that are not well understood. Importantly, the World Health Organization listed "gaming disorders" in the list of mental health conditions in the 11th Revision of the International Classification of Diseases (ICD-11). According to WHO Gaming Disorder (GD) is defined as pattern of gaming behaviour ("digital-gaming" or "video-gaming") characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences. For GD to be diagnosed, the behaviour pattern must be of enough severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning and would normally have been evident for at least 12 months [1].

A study conducted in Hong Kong found that 15.7% of the students met the criteria for probable gaming addiction [2] suggesting that GD can become an important threat in the future as India becomes increasingly tech-savvy. Breakthroughs in technology, as well as the videogame industry; the emergence of high-tech gaming devices such as smartphones, gaming consoles or tablets; and the improved popularity of the internet, which is readily available at more and more economical prices, have made gaming more enticing, addictive, convenient and cheaper than ever before. [3]

A report published in 2017 inferred that India was ranked fifth in the list of top countries for mobile game downloads worldwide [3]. India is also one of the fastest growing countries as far as the tech industry is concerned with the second-largest online population globally and the most rapidly growing smart phone user base in the world. In the immediate future, India is projected to leapfrog other nations' economies and become one of the world's biggest gaming industries. Hence the population of India, chiefly the younger people and teenagers are at a high risk to the perils of excessive gaming such as disrupted sleep schedules, impaired academic success, and defective or lacking interpersonal interactions and neglected work-related responsibilities. Several researches showcase converging results that demonstrate the shared neurobiological mechanisms between substance use disorders and behavioural addictions such as gaming disorders [4].

Most published studies covering GD were conducted in western settings covering school students hence there is a dearth of research illustrating the extent, pattern and the dangers associated with GD in Indian college students and especially within Tamil Nadu. The present study was therefore designed to analyse the level and patterns of gaming activity in a group of college students in Tamil Nadu and exploring its direct and indirect relationships with socio-demographic characteristics and psychological effects on a less studied demographic.

2. MATERIALS AND METHODS:

This was a descriptive cross-sectional study done among medical students studying in the first and second year in a medical college in Kancheepuram district, Tamil Nadu. Universal Sampling technique was used in which all the students from the 1st and 2nd year of the course were included in the study. The students were explained about the objectives of the study and the voluntary nature of their participation. They were also assured regarding the

maintenance of confidentiality and anonymity of the information provided by them during the study. Those consenting to enrol in the research were encouraged to fill out the questionnaire. A total of 257 students participated on the study.

The survey questionnaire consisted of the following three parts: a semi-structured questionnaire to determine the socio-demographic profile and had questions related to the gaming activity of the participants. The semi-structured questionnaire contained details regarding the sociodemographic information including age, substance abuse, structure of family, family income etc. Questions regarding their gaming habits such as average time spent playing games, mode of purchase of videogames, favoured genre etc. were selected to evaluate the gaming patterns of the participants.

The prevalence and degree of gaming addiction among the participants was assessed by the Gaming Addiction Scale (GAS) scale. The scale measures 7 criteria of gaming addiction: Salience, tolerance, mood modification, withdrawal, relapse, conflict and problems. There is one question for each criterion, and each is measured on a 5-point Likert scale and the mid-point is used as a cut-off point. If 4 or more criteria are met this way, one is addicted according to the polythetic format (as used by the DSM in the section on gambling) [5].

The psychological effects of GD are evaluated by DASS-21 scale which is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic nonspecific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score. According to this score depression, anxiety and stress are categorised into normal, mild, moderate, severe and extremely severe. [6,7]

Data was entered in Microsoft Excel and analysed using SPSS version 22. Descriptive statistics was used to present the data in the form of tables and graphs. Chi square was used to find the association between Gaming Disorder and related variables.

Ethical Approval was obtained from Institutional Ethics Committee of Saveetha Medical College and informed consent was obtained from each of the study participants before enrolling them in the study.

3. RESULTS:

TABLE 1: Socio-demographic variables of the study participants:

S.No	Study Variable	Frequency	Percentage
1	Gender of the participant		
	Male	175	68

	Female	82	32
2	Family structure		
	Nuclear	209 (81.3)	81.3
	Joint	22 (8.6)	8.6
	Three generation	26 (10.1)	10.1
3	Are both of your parents employed?		
	Yes	190	74
	No	67	26

The study sample comprised of 257 medical students pursuing their undergraduate course in private medical college, out of which 195 (75.9 %) were gamers while the remaining 62 (24.1 %) did not play videogames. Around 68% were males, 81.3% belonged to nuclear families, 74% of the participants had both of their parents employed with little time to supervise them. (Table 1)

Table 2: Variables related to gaming pattern among the study participants:

S.No	Variable	Frequency (n = 195)	Percentage
1	Modes of playing videogames (Multiple Responses)		
	Mobile Phones	193	99
	Computer Videogames	73	37%
	Home Gaming Consoles	61	31%
	Handheld Gaming Consoles	11	5.6%
2	Preferred Genre of Videogames (Multiple Responses)		
	Action/Adventure	170	87.2
	Online Games	138	70.8
	Open world Games	98	50.3
	Role Playing Games	82	42.1
3	Age at which they started to play videogames		
	Less than 5 years	22	11.3
	6 to 10 years	85	43.6
	11 to 15 years	69	35.4
	More than 15 years	18	9.7
4	Do you spend money on buying videogames? (In-app purchases/digital/physical games)		
	Yes	110	56.4
	No	85	43.5
5	Source of money for spending on videogames (n = 110)		
	Pocket Money	129	66.4
	Money given by parents to buy games	44	22.7
	Lied to get money from parents	21	10.9

	to buy games		
6	Neck pain / back pain due to long gaming hours		
	Yes	54	27.7
	No	141	72.3
7	Do they play without their parent's knowledge? 127 (65.1) 68 (34.9)		
	Yes	127	65.1
	No	68	34.9
8	Lack of sleep due to video games		
	Yes	47	24.1
	No	148	75.9
9	Gaming Addiction		
	Yes	18	9.2
	No	177	90.7

The most common mode of usage of videogames among the participants who played games was mobile phones with a whopping 99 % (193/195) of the gamers playing mobile games. The second most common was PC with 37 % (73/195) followed by consoles with 31 % (61/195) Among the various genres in gaming the most commonly played were action/adventure games (87.2%), online games (70.8%), open world games (50.3%), RPGs (42.1%) and simulation games (39 %). Among the participants, the most common ages at which the gamers started playing games were the ages between 6 and 10 years (43.6%), followed by 11 to 15 years (35.4%) and less than 5 years (11.3%). The most common reasons for gaming among the gamers surveyed were to avoid boredom (95.9%), playing with peers (48.7%), as diversion during stressful periods (34.9%) and the least common reason was to avoid socializing (7.7%). Interestingly the gamers participating in the study were divided on the topic of using in-app purchases/ micro transactions/ buying digital/physical games and it was found that 52.8 % did spend money while the rest (47.2 %) were against such purchases. Among the people who spent money on videogames (110), the most common source of money was pocket money (66.4%), followed by money given by parents to be spent on videogames (22.7%) and money acquired dishonestly from parents (10.9%).

Out of the gamers surveyed in the study, 87.2% played video games alone, while 55.4% played with their friends, 49.7% played with online strangers and another 10.3% played in the company of family members. Out of the 195 who played videogames, 18 were classified as “addicted” according to Game Addiction Scale (GAS) by Lemmens et al therefore the prevalence of gaming addiction was found to be 7 % (18/257) of the study sample. (Table 2)

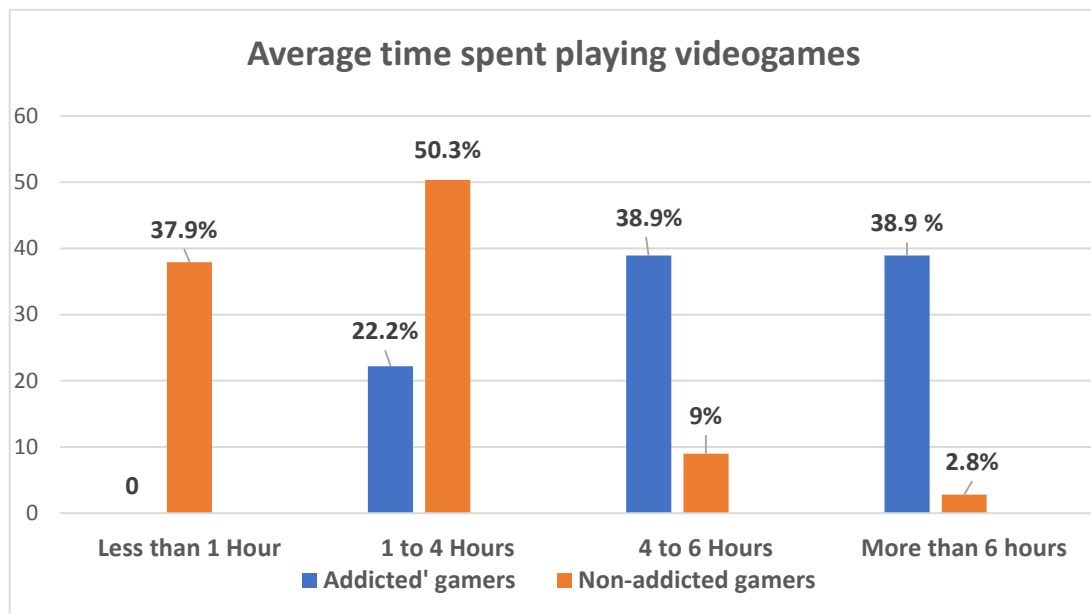
Table 3: Severity of Depression, Anxiety and Stress among the study participants:

S.No	Variable	Addicted Gamers n = 18		Non-addicted Gamers n = 177		Non – Gamers n = 62	
		n	%	n	%	n	%
1	Depression						
	Normal	4	22.2	117	66.1	42	67.7

	Mild	0	0	30	16.9	2	3.2
	Moderate	6	33.3	24	13.6	7	11.3
	Severe	6	33.3	5	2.8	4	6.5
	Extremely Severe	2	11.1	1	0.6	7	11.3
2	Anxiety						
	Normal	5	27.7	108	61	43	69.4
	Mild	0	0	18	10.2	1	1.6
	Moderate	1	5.5	31	17.5	8	12.9
	Severe	6	33.3	7	4	3	4.8
	Extremely Severe	6	33.3	13	7.3	7	11.3
3	Stress						
	Normal	6	33.3	156	88.1	49	79
	Mild	5	27.7	12	6.8	3	4.8
	Moderate	7	38.9	8	4.5	8	12.9
	Severe	0	0	0	0	1	1.6
	Extremely Severe	0	0	1	0.6	1	1.6

The DASS 21 scale was used to analyze the psychological effects of gaming on the participants. Though the prevalence of gaming addiction was found to be low among the study participants, more number of addicted gamers tend to suffer from moderate to severe depression (77.7%) and anxiety (72.2%) and mild to moderate stress (66.6%). (Table 3)

Figure 1: Average time spent on videogames per day by Addicted and Non-addicted Gamers



It was found that, addicted gamers tend to play videogames more than 4 hours per day when compared with non-addicted gamers. (Figure 1)

TABLE 4: Reasons for gaming (Multiple responses)

Category	Avoiding boredom	Playing because friends were also playing	As a diversion during stressful times	To avoid socializing
‘Addicted’ gamers	83.3 %	50 %	83.3 %	61.1 %
Non-addicted gamers	97.2 %	48.6 %	29.9 %	2.3 %

Most (97.2%) of the non-addicted gamers played to avoid boredom. Around 83.3 % of ‘addicted’ gamers played videogames as diversion during stressful times and 61.1% played to avoid socializing. When considering these 2 reasons there is a major disparity between the ‘addicted’ and non-addicted gamers as among the non-addicted gamers 29.9 % played videogames as diversion during stressful times and 2.3 % played to avoid socializing. (Table 4)

TABLE 5: Relations between gaming addiction and psychosocial variables

S.No	Characteristic	Addicted participants (n = 18)		Non-addicted participants (n = 239)		Chi Square	P-value
		Frequency	Percentage	Frequency	Percentage		
1	Tobacco Use					32.11	< .00001*
	Yes	9	50	18	7.53		
	No	9	50	221	92.47		
2	Alcohol Use					6.25	.012393*
	Yes	9	50	56	23.43		
	No	9	50	183	76.57		
3	Depression(Any degree)					14.16	.000168*
	Yes	14	77.78	80	33.47		
	No	4	22.22	159	66.53		
4	Anxiety (Any degree)					8.79	.003021*
	Yes	13	72.22	88	36.82		
	No	5	27.78	151	63.18		
5	Stress (Any degree)					34.69	< .00001*
	Yes	12	66.66	34	14.23		
	No	6	33.33	205	85.77		

* P < 0.05, Statistically significant at 95% Confidence Interval

Regarding the association between gaming addiction and related psychosocial factors, it was found that, tobacco use, alcohol use, depression, anxiety and stress were found to have statistically significant association with Gaming Addiction ($P < 0.05$). (Table 5)

TABLE 6: Relations between gaming addiction and related variables

S.No	Variable	Addicted gamers (n = 18)		Non-Addicted gamers (n = 177)		Chi square	P Value
		Frequency	Percentage	Frequency	Percentage		
1	If any neck/back pain was developed due to gaming					30.66	< .00001*
	Yes	15	83.33	39	22.03		
	No	3	16.67	138	77.97		
2	If there was any supervision by the family members of the games being played					1.89	.169758
	Yes	3	16.67	13	7.93		
	No	15	83.33	164	92.67		
3	If they play games without their parents' knowledge					2.89.	.088918
	Yes	15	83.33	112	63.28		
	No	3	16.67	65	36.72		
4	If they had attempted to reduce their gaming hours without success					36.80	< .00001*
	Yes	17	94.44	44	24.86		
	No	1	5.88	133	75.14		
5	If they experienced any economic burden due to their gaming habits					26.10	< .00001*
	Yes	9	50	15	8.47		
	No	9	50	162	91.53		
6	If they had started playing videogames at less than 5 years of age					29.70	< .00001*
	Yes	9	50	13	7.93		
	No	9	50	164	92.67		
7	If they used micro transactions/in-app purchases within games.					4.96	.025993*
	Yes	14	77.77%	89	50.28		
	No	4	22.22	88	49.72		

* $P < 0.05$, Statistically significant at 95% Confidence Interval

Gaming addiction was found to have a statistical significant association with factors like developing back pain due to prolonged gaming hours, attempting to reduce gaming hours

without success, among those who started gaming before 5 years and those who spend money on videogames with micro transactions and buying physical/digital games ($P < 0.05$).

4. DISCUSSION:

From the results it is clear that playing videogames is a very popular activity among the participants as 75.9 % (195/257) are gamers and 9.7% (18/195) of the gamers were found to be 'addicted' according to GAS scale. Hence, out of the 257 participants 7 % (18/257) were found to be 'addicted'. A previous study on gaming disorder among medical students in India by Singh S et al [8] had found the prevalence of GD to be 3.6 %. Such an increase in the prevalence of GD in the present study could be attributed to an increase in the free time spent indoors due to the COVID-19 pandemic as according to a study by Amin KP et al [9] there has been a substantial increase in gaming all over India due to the pandemic.

Out of the 22 participants who had started playing games at an early age (less than 5 years) 9 (40.9%) were classified as 'addicted' according to GAS in our study. Also 50% (9/18) of the 'addicted' gamers had started playing videogames when they were less than 5 years old. These findings suggest that the likelihood of being 'addicted' to videogames increases when the gamers start playing at a young age. The most popular genre among 'addicted' gamers was online games (88.9%), which usually allow you to connect with both friends and strangers virtually thus creating a social environment virtually within the game. This social aspect of online games keeps players engaged with these games for prolonged periods of time and can also compensate for the lack of social interactions in the real world that can be caused by excessive gaming.

Among the 'addicted' gamers 77.7% (14/18) thought that their sleep got affected due to their long gaming hours whereas only 8.5% of the non-addicted thought the same. This finding could be explained by the fact that 66.7% of the 'addicted' gamers' usual playing time was before sleeping whereas only 23.7% of the non-addicted gamers usually played before sleeping hence we can infer that with an increase in gaming hours, gamers play later into the night which in turn affects their sleep.

Both alcohol and tobacco use among gamers were more common among the 'addicted' gamers (Both 50%) than among the non-addicted gamers (26.6% for alcohol and 8.5% for tobacco). Interestingly the participants who did not play videogames at all had a lower number who used alcohol (14.5%) and tobacco (4.8%). This seems to indicate that people who are more susceptible to substance use are also more susceptible to becoming 'addicted' to gaming. Many reasons are given for the increased substance use seen amongst gamers. A study conducted by Leeman RF et al [10] suggests that it may be due to the involvement of a genetic factor that causes these people to be more prone to all kinds of addiction. Another study by Cranwell J et al [11], suggests that it could be due to the portrayal of alcohol and tobacco use in videogames that influences gamers to take up these habits.

Unsurprisingly 83.3% of the 'addicted' gamers reported that they had developed neck/back pain due to gaming whereas only 22% of the non-addicted gamers had reported the same. This highlights the bodily harm caused to the body by excessive gaming.

Around 94.4% of the addicted gamers had tried to reduce their gaming time without success whereas only 24.9% of the non-addicted gamers had done the same. This observation illustrates that even after realizing the harms of excessive gaming and trying to reduce the time spent playing videogames, they couldn't succeed i.e. they had 'relapsed'.

According to a study by Plante CN et al [12] assessing a gamer's main motivation to play can be key in coming up with preventive measures and treatment for GD. When considering the findings from this study, it is safe to assume that the 'addicted' gamers rely on videogames far more than non-addicted gamers to battle stress. This reliance on videogames to escape real life events is unhealthy and creates a vicious cycle where they play videogames (instead of solving the real life problems that stress them) to avoid stress in real life which then causes more stress (as the problems remain unsolved) in real life leading to even more gaming. Using videogames to avoid socializing harms their social life but this absence of social life in the real world is not felt as it is compensated by the virtual world's social life. Ultimately, the motives selected by 'addicted' gamers make them more dependent on playing games than the motives selected by the non-addicted gamers which explains their excessive gaming habits.

There still exists a debate on whether violent videogames influence the gamers to be more aggressive or not with conflicting reports from both sides. According to a study conducted by Shao R et al [13] exposure to violent video games is positively related to adolescent aggression. Another study by Hollingdale J et al [12] suggests that increases in aggression were not more pronounced after playing violent videogames.

Variables such as alcohol use, tobacco use, depression, anxiety and stress were found to have a significant association with gaming addiction. Variables such as neck/ back pain, attempt to reduce gaming time (without success), economic burden, beginning at an early age (less than 5 years) and usage of micro transactions were found to be having a significant association with gaming addiction. More 'addicted' gamers reported that they had experienced some degree of economic burden due to their gaming habits compared to non-addicted gamers this may be explained in part by their higher tendency to use microtransactions/ in-app purchases within games. They also spent more time and money on videogames when compared to non-addicted gamers. A study conducted by Wang HZ et al [15] found that there were higher levels of self-reported depression, loneliness, social anxiety among addicted mobile gamers. When assessing the psychological impacts of addiction to gaming, with respect to depression we found that the people who did not play videogames and non-addicted gamers had a similar number of people in the 'normal' category whereas 'addicted' gamers had a lower number in the 'normal' category. On the topic of anxiety, the people who did not play games had a higher number in the 'normal' category than the non-addicted whereas the 'addicted' gamers had the lowest numbers in the 'normal' category. When considering stress non-addicted gamers had a higher number in the 'normal' category than people who did not play games and again 'addicted' gamers had the lowest number in the 'normal' category.

Several studies such as one conducted by Von Der Haiden et al [16] found that in addition to depression, anxiety and social phobias poorer school performances was also a common outcome of gaming addiction. This shows that playing videogames is by itself not a danger and might even be beneficial in reducing stress but moderation is key and that playing

videogames for prolonged periods of time definitely causes harmful psychological effects. In fact, Ghosh P et al [15] reported an unusual case of a 26-year-old man with internet gaming addiction presenting with withdrawal psychosis, although such an extreme case is not the norm it demonstrates the kind of threat GD can pose if not prevented. On the other hand, a study conducted by Pine R et al [18] suggests that playing simple, easy-to-use casual videogames (CVGs) may be useful in treating anxiety, depression, stress, and low mood. Another study conducted by Primack BA et al [19] further shows the beneficial effects of therapeutic use of videogames. Our findings conform to the findings of Ahmadi J et al [20] which also demonstrate this relationship between depression, anxiety and videogames.

5. CONCLUSION:

The analysis of the pattern of gaming behavior among students of Private medical college showed that 7% of the participants were 'addicted' to This study also found that the excessive gaming habits of the 'addicted' participants was causing noticeable psychological impacts on their lives as evaluated by DASS-21. Besides the psychological effects, the 'addicted' participants had to deal with some amount of physical discomfort and were affected financially too. It is imperative to raise awareness among college students, teachers and parents about the dangers caused by excessive gaming and the several risk factors involved with GD. The observations further reinforce the need to improve programs to combat behavioural addiction. Factors like concurrent substance use, early exposure to videogames etc. were found to be associated with developing GD and by screening for gamers with these determinants we can reduce the impact of GD through early detection and management.

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Conflict of Interest - Nil.

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