

# Effect of video game addiction on the physical and mental wellbeing of adolescents of Karachi

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## ABSTRACT

**Background:** Playing video games is a prevalent leisure-time activity of not less than two billion player users globally. Due to the high use of video games among adolescents, it is debatable that video gaming among adolescents is prevalent, and the effect of video gaming on adolescents' physical and mental health is identified. The current study aimed to determine the effect of video games among the Non-Video-Game Addicted (NVGA) and Video Game Addicted (VGA) in terms of mental health and physical activity among adolescents from Karachi.

**Subjects and methods:** A cross-sectional study was conducted at public sector schools and colleges of different socioeconomic status of Karachi, Pakistan, from Jan-March 2020, after ethical approval from the concerned education department. Total of 321 students, adolescents, aged from 15-19 years, from both genders and who used to play video games but were considered as non-video game addicts (using less than four hours per day on video games) and video game addicts (using more than 5 hours per day). Questionnaires were used to collect data based on DSM-5 to find gaming addiction in adolescents with 21 questions. "General Health Questionnaire (GHQ)," with 14 questions on mental health. "International Physical Activity Questionnaire," for physical activity status. Students were divided into two groups: non-video game addicted (NVGA) and video game addicted (VGA). Data analysis was performed by using IBM SPSS.

**Results:** Out of 321, 233 (72.6%) were VGA, and 88 (27.4%) were NVGA students. There were 184 (57.3%) males and 137 (42.7%) females. The mean addiction score was  $2.221 \pm 0.49$  and  $3.34 \pm 0.35$  in the VGA group and NVGA group, respectively. 19.0% males and 8.4% females were VGA. Variables used for video game addiction in the study were salience, tolerance to play the game, mood modification, relapse, withdrawal, conflict, problems (such as sleep deprivation, etc.). The mean score for all these variables was higher in the VGA group ( $p < 0.001$ ). The mean score of MHQ responses was significantly higher in the VGA group, indicating the high intensity of distress.

**Conclusion:** It has been concluded from the study that a very high frequency of video game addiction in adolescents (VGA group) caused mental and physical health problems in the study population.

**Keywords:**

Video game addiction, DSM-5, Psychological gaming, Internet gaming addiction

## INTRODUCTION

Video games' origin is not new, but the penetration of video games in adolescents' lives is relatively recent. Video gaming is becoming prevalent because of easy access through smartphones. Computer video gaming is ranked top five applications based on the frequency of use in adolescents.<sup>1</sup> Gaming computers, gaming laptops, and online games themselves have been in high demand in the market for the last ten years.<sup>2</sup> The reported mean age of gamers is 30 years while, 32% of players are below 18 years.<sup>3</sup> An adolescent will be labeled a game addict if they score four or more when assessed through the gaming addiction scale.<sup>4</sup> Multiple reasons have been described for player's choice to play games, such as for

fun, recreational reasons, to cope with stress, sociability (online gaming), and gaining gaming status and for some to escape from real life.<sup>5</sup> Studies on this subject showed mixed findings that video gaming has both positive and negative effects on the players' mental, physical health, and living style. Video games improve visual and motor abilities and foster a relationship with friends outside the school premises.<sup>6</sup> Furthermore, video gaming might be a source of releasing stress. Contrary to this, the most common adverse effect of gaming is to become video game addicted, which is now declared a psychological disorder.<sup>7</sup> A positive correlation exists between video gaming and smoking, drug addiction, depression, false self-esteem, social fear, loneliness, withdrawal, and reduced emotional intelligence.<sup>8</sup> Additionally, studies have also shown a correlation between video gaming and behavioral traits, especially regarding aggression.<sup>9,10</sup> Around 15 to 20% of adolescents have been reported to be habitual to

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video gaming; however, it is deduced by other researchers that video games craving is much more prevalent in adolescents than its reported percentage in literature.<sup>11</sup> It has also been reported that gamers might play games to escape from their outside world, negatively affecting mentality. In contrast, online gaming increases interaction between the players; hence, socializing decreases the negative gaming effects.<sup>12</sup> Whatever adverse effects are observed in gamers, all are due to excessive gaming habits that make them psychologically addicted to games; these effects could be regarded as "computer game addiction" and mentioned as a psychological disorder in the "DSM-5, Diagnostic and Statistical Manual of Mental Disorders".<sup>13,14</sup> Nonetheless, some issues persist concerning a consensus of the definition, criterion, and measurements of video gaming addiction among different studies.<sup>15,16</sup> However, a few crucial indicators of VGA included difficulty to stop playing games, dawdling responsibilities, and preferring computer games over other activities.<sup>17</sup>

Video games are getting popular in adolescents and children also in Pakistan. There are reported cases of suicide attempts among children and adolescents due to failure to achieve the desired results of video games.<sup>18</sup>

In Pakistan, it has been observed that boys are more prone to video games addiction than girls, along with an increased eating habit index.<sup>19</sup> Interestingly, adolescents of low- and middle-income backgrounds in Pakistan are more addicted than upper-class status. Gaming zones have been increased in the past few years and considered as entertainment points among Pakistani adolescents.<sup>20</sup>

In light of the mentioned facts, it is crucial to study the effect of playing video games in NVGA and VGA groups to identify the effect of video game additions in adolescents, adversely affecting their physical and mental health.

## SUBJECTS AND METHODS

This cross-sectional study was conducted in public and private schools and colleges of Karachi, Pakistan, from Jan-March 2020, after ethical approval from the competent authority. Total 321 adolescents were included in the study, calculated through Epi Info software at 50% prevalence, 95% confidence level, and bound of error of 5%. The schools and students were selected through a multistage random sampling technique. In the first stage, two schools, one private and one public were selected randomly from the Directorate of High Schools lists. In the second stage,

students were selected from grades 8 to 11 through a systematic sampling technique. Those who were included in this study were adolescents, aged from 15-19 years, from both genders. However, those who had not played video games in the last month were excluded from the study. Data was collected through group administration. The data collecting tool comprised three different portions explained to the students by the principal investigator after taking consent from parents/school administration and students. It took approximately 15-20 minutes to fill the questionnaire. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria of computer gaming addiction were used to study adolescents' computer gaming addiction. We included 21 questions with answers marked as 1 =never, 2=rarely, 3=sometime, 4=often, and 5=very often. Answers given as often (4) and extremely often (5) will be classified as positively addicted and rest as negative.

Additionally, the General Health Questionnaire (GHQ), comprising 14 questions, was used to collect information about mental health. Higher scores indicated that their mental condition is poor. Furthermore, an "International Physical Activity Questionnaire" to give information of the last seven days with the self-administered format was used to assess the physical activity status (both vigorous and moderate activity) in game addicted and non-addicted adolescents. Data analysis was performed by using IBM SPSS v22. The results are presented as frequency and percentages for qualitative variables, while quantitative variables were presented as mean and standard deviation. Inferential analysis was performed by using an independent t-test between addicted and non-addicted groups. A  $p\text{-value} \leq 0.05$  was taken as statistically significant.

## RESULTS

The total number of study participants was 321, 184 (57.32%) were male, and 137 (42.67%) were female students. Mean age was  $15.06 \pm 5.3$  and  $15.2 \pm 2.3$  in VGA groups ( $p=0.811$ ), students with a total score of more than three were taken as video game addicts as per DSM-5 criteria for gaming addiction. Total 233 (72.6%) were video game (VGA) addicted with mean score  $2.22 \pm 0.49$  and 88 (27.4%) were non-video game (NVGA) addicted with mean score  $3.34 \pm 0.35$  (Table-1).

Mean score was found statistically ( $p<0.05$ ) high in the video game addicted (VGA) group. Based on DSM-5, seven variables were considered to decide student being NVGA or VGA; these are salience, tolerance,

Table 1. Video game addicted and non-addicted adolescent mean score, mean age, and frequency distribution

Variables		Addicted n=233, 72.6%	Non-addicted n= 88, 27.4%	p-value
Mean addiction score	$\bar{x} \pm \sigma$	2.221 $\pm$ 0.49	3.34 $\pm$ 0.35	<0.01
Mean age (years)	$\bar{x} \pm \sigma$	15.06 $\pm$ 5.3	15.2 $\pm$ 2.3	0.811
Male n=184 (57.3%)	n (%)	123 (38.3%)	61 (19.0%)	
	$\bar{x} \pm \sigma$	2.33 $\pm$ 0.42	3.45 $\pm$ 0.39	<0.01
Female n=137 (42.7%)	n (%)	110 (34.3%)	27 (8.4%)	
	$\bar{x} \pm \sigma$	2.09 $\pm$ 0.53	3.36 $\pm$ 0.23	<0.01

Table 2. Comparative analysis of variables associated with video games addiction in adolescents

Variables of video games addiction	Non-addicted (mean score $\pm$ SD)	Addicted (mean score $\pm$ SD)	p-value
Saliency	2.568 $\pm$ 0.87	3.875 $\pm$ 0.76	<0.001
Tolerance	2.637 $\pm$ 1	3.909 $\pm$ 0.97	<0.001
Mood modification	2.519 $\pm$ 1.07	3.746 $\pm$ 0.92	<0.001
Relapse	2.276 $\pm$ 0.86	3.325 $\pm$ 0.78	<0.001
Withdrawal	1.925 $\pm$ 0.79	3.215 $\pm$ 1.04	<0.001
Conflict	1.653 $\pm$ 0.62	2.852 $\pm$ 0.89	<0.001
Problems	1.971 $\pm$ 0.71	3.094 $\pm$ 0.99	<0.001

mood-modification, relapse, withdrawal, conflict, and problems. Mean scores of these pathological variables for VGA addiction are given in Table 2.

The mean score of all seven variables is statistically significantly high in the VGA group ( $p < 0.001$ ). Similarly, Table 3 showed mean scores of mental wellness responses in NVGA and VGA groups ( $p < 0.001$ ). The total mean score was significantly higher in the VGA group ( $p < 0.001$ ). However, the VGA group responded that they feel more useful, can handle problems in a congenial manner, and are optimistic for their future. The response mean score was statistically different and high in the VGA group ( $p < 0.05$ ). However, the mean score for most responses was not significantly different but was found higher in the VGA group. This was observed that the majority of the students (97.8%) had high psychological distress (GHQ score  $\geq 24$ ). The frequency of high distress was more in the VGA group (71%) than in the NVGA groups (26.8%).

Table 4 displays the physical activity status of NVGA and VGA students. Vigorous physical activity duration was insignificantly higher per day ( $p > 0.05$ ) in the VGA group than NVGA group. Whereas moderate physical activity and 10 minutes walking duration were higher in the NVGA group and that the duration per day was significantly higher in the NVGA group than the VGA group ( $p < 0.05$ ). Showing NVGA students are more active than VGA group students.

## DISCUSSION

With lifestyle modification, video games are now a source of entertainment among school and college-going students. Intensive video gaming and the

associated outcome have become increasingly prevalent in all social backgrounds around the world.<sup>21</sup> Researchers are curious to understand the consequences of excessive use of video games and to characterize video game addiction in adolescents.<sup>22,23</sup> Video game addiction is an "internet gaming disorder," lacking mutual consensus on assessment and diagnosis. According to American Psychiatric Association, this disorder has been persistent due to repeated use of the internet for gaming purposes, often online players, which ultimately lead to distress.<sup>24</sup> Preoccupation with game-playing, withdrawal indications, tolerance (i.e., playing games for a more extended period), lack of control, and playing despite poor consequences, deception, mood swings, and leaving behind social responsibilities or essential aspects of life; are among adverse effects of gaming.<sup>25</sup> This study included saliency, tolerance, mood modification, Relapse, withdrawal, conflict, and problems as pathologic characteristics with 21 questions of video game addiction based on DSM-5 criteria. Their mean value was significantly higher in the VGA group than NVGA. This study revealed that 27.4% of the adolescents were categorized into addicted videogames. The frequency of game addiction in this study was very high as compared to previously published work.<sup>26-29</sup> In a study conducted in Saudi Arabia on Indian and Pakistani school students, it was depicted that 16% of study participants were found addicted to video gaming.<sup>26</sup> However, this percentage may range from 8–12% globally.<sup>27-29</sup> The difference in prevalence might be due to the difference in assessment tools, progressive increase in video gaming habits, and population. In the past, various assessment tools have been used by researchers.<sup>28</sup>

Table 3. Mean score of mental wellness responses in video game non-addicted and addicted adolescents

Feelings and thoughts over the last two weeks	Non-addicted (mean score $\pm$ SD)	Addicted (mean score $\pm$ SD)	p-value
I have been feeling useful	2.92 $\pm$ 1.12	3.20 $\pm$ 1.07	0.047
I have been feeling relaxed	3.18 $\pm$ 1.19	3.37 $\pm$ 1.17	0.201
I have been feeling interested in other people	2.84 $\pm$ 1.37	3.04 $\pm$ 1.24	0.232
I had the energy to spare	3.07 $\pm$ 1.19	3.37 $\pm$ 1.17	0.044
I have been dealing with problems well	3.15 $\pm$ 1.20	3.43 $\pm$ 1.13	0.050
I have been feeling optimistic about the future	3.09 $\pm$ 1.32	3.47 $\pm$ 1.27	0.021
I have thought clearly	3.36 $\pm$ 1.13	3.36 $\pm$ 1.17	1.000
I have felt good about myself	3.30 $\pm$ 1.17	3.36 $\pm$ 1.24	0.770
I have been feeling close to other people	3.25 $\pm$ 1.27	3.23 $\pm$ 1.25	0.899
I have been feeling confident	3.26 $\pm$ 1.23	3.39 $\pm$ 1.16	0.368
I have been able to mind about things	3.34 $\pm$ 1.15	3.60 $\pm$ 1.06	0.066
I have been feeling loved	3.09 $\pm$ 1.36	3.06 $\pm$ 1.36	0.860
I have been interested in new things	3.48 $\pm$ 1.16	3.48 $\pm$ 1.27	1.000
I have been feeling cheerful	3.28 $\pm$ 1.24	3.37 $\pm$ 1.28	0.566
Total mean score	2.22 $\pm$ 0.49	3.43 $\pm$ 0.35	<0.001

Table 4. Physical activity status of video games addicted and non-addicted adolescent

Physical activity status	Non-addicted (mean score $\pm$ SD)	Addicted (mean score $\pm$ SD)	p-value
<b>Vigorous physical activity during last seven days</b>			
Days per week	1.97 $\pm$ 2.29	2.14 $\pm$ 2.38	0.565
Hours per day	0.97 $\pm$ 2.57	0.63 $\pm$ 1.26	0.115
Minutes per day	41.97 $\pm$ 70.8	43.87 $\pm$ 66.70	0.823
<b>Moderate physical activity</b>			
Days per week	2.20 $\pm$ 2.3	2.22 $\pm$ 2.2	0.944
Hours per day	0.72 $\pm$ 1.27	0.65 $\pm$ 0.95	0.593
Minutes per day	9.83 $\pm$ 18.5	5.29 $\pm$ 11.2	<0.05
<b>At least 10 minute walk during last seven days</b>			
Days per week	4.31 $\pm$ 3.68	4.0 $\pm$ 2.7	0.409
Hours per day	0.98 $\pm$ 2.67	0.78 $\pm$ 1.56	0.407
Minutes per day	13.26 $\pm$ 21.67	9.33 $\pm$ 12.6	<0.05

However, we used a validated scale DSM-5 for calculation, which may be one of the reasons for high prevalence compared to other adolescent studies.<sup>27</sup>

In this study, it was found that the majority of the students (97.8%) had high psychological distress (GHQ score  $\geq$  24). These results are comparable with a previous study, where 54% of students were shown to have high psychological distress (GHQ score  $\geq$  24).<sup>25,30,31</sup> Other researchers also found a high prevalence of psychological distress among adolescents and considered it inherited within this stage of life.<sup>30-32</sup> This adolescent distress may exaggerate with behavioral changes such as internet-addicted; people have more chances to suffer from psychological distress than those without it.<sup>33</sup> Frequency of high distress was more in the NVGA group (71%) than the VGA groups (26.8%), showing that gamers may release their stress by playing games. As also mentioned in the literature, video game playing reduces stress on the academic performance of students. A study from Bahawalpur, Pakistan, also showed that video game playing was a source for releasing aggression and decreasing physiological arousals thereby, reducing daily life aggression.<sup>34</sup>

However, the current study also observed that the VGA group has a significantly higher mean score of psychological distress than that of the NVGA group (P-value <0.001) (Table 3). The results of this study are comparable with the results of the studies mentioned above because we observed that although the frequency of high distress was higher in the NVGA group, the intensity of distress was higher in the VGA group.

A relation was found between VGA and physical activity in this study. It was observed that the mean duration of vigorous activity per day was insignificantly higher in the VGA group. However, the duration of moderate physical activity and 10 minutes' walk per day was significantly higher in the NVGA group. Hence, we observed that NVGA students were more active than VGA students. A few researchers from Pakistan showed concern about gaming addiction and its associated reasons.<sup>35,36</sup> They observed that intensive game playing leads to aggression and behavioral changes in adolescents. This study identified a positive association between gaming addiction and mental distress and a negative association with physical activity. There is a need for future studies with large sample size

and factors affecting distress symptoms and excessive video gaming. It was an observational study and selection bias due to the non-probability sampling technique. Further studies with probability sampling techniques will be helpful to generalize the results to a larger population.

## CONCLUSIONS

It has been concluded that adolescents are at high risk of being video game addicted. VGA has a significant effect on their behavior as well as on their school performance. Video gaming has consequences; however, intensive and persistent gaming will negatively impact mental and physical health. Future research on VGA and its association to psychological distress must also be considered an additional risk.

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