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EXPLORING THE RELATIONSHIP BETWEEN ONLINE GAMING AND TEEN MENTAL HEALTH: A STATISTICAL ANALYSIS

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Abstract
In the digital age, online gaming has become a widespread activity among teenagers, offering entertainment, stress relief, and social interaction. However, excessive gaming may negatively impact mental health. This study investigates the effects of online gaming on teenagers' mental well-being, focusing on issues such as depression, aggression, addiction, and loneliness. A quantitative research design was employed, with data collected from 75 teenagers aged 10 to 20 enrolled in private schools in Sargodha. Participants completed a close-ended questionnaire assessing their gaming habits and related mental health experiences. Statistical analysis was conducted using SPSS, with Chi-square tests applied to examine associations between gaming behavior and psychological outcomes. The findings revealed that a significant proportion of teenagers experienced increased aggression (66.7%), emotional disturbance, and persistent thoughts about gaming, indicating signs of addiction. The results suggest a strong correlation between excessive gaming and mental health challenges, particularly among frequent users. While online gaming can offer cognitive and social benefits, its overuse poses serious risks to adolescents' emotional and psychological health. The study recommends that parents, educators, and mental health professionals actively promote balanced gaming habits. Future research should incorporate diverse populations and qualitative methods to gain deeper insights into the emotional effects of gaming on youth.

Keywords
Online Gaming, Teenagers, Mental Health, Gaming Addiction, Depression, Aggression.

Introduction

Online gaming has become a global phenomenon, with significant implications for the psychological well-being of young people. In the digital age, teenagers increasingly turn to online games for entertainment, relaxation, and social interaction. These games often include immersive, competitive, and engaging features that attract adolescent users, making gaming a routine part of their everyday lives. The interactive nature of these games can stimulate cognitive development and foster skills such as decision-making and strategic thinking. However, the growing popularity of online gaming has also raised serious concerns regarding its potential effects on teenagers' mental health.

In Pakistan, the trend of online gaming has witnessed a sharp rise over the past decade due to the widespread availability of smartphones, internet services, and affordable digital devices. Particularly in urban areas like Sargodha, young individuals increasingly participate in virtual environments that offer instant gratification, anonymity, and community belongingness. While some teenagers benefit from the educational and social aspects of gaming, others face challenges such as addiction, social isolation, depression, anxiety, and academic decline.

The purpose of this research is to investigate how online gaming affects the mental health of teenagers, with particular emphasis on the psychological, emotional, and behavioral consequences.

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The study also seeks to identify the social dynamics, familial involvement, and educational contexts that influence gaming habits among adolescents. Previous research has indicated that problematic gaming behaviors are associated with various mental health issues, including gaming addiction, aggressive behavior, emotional disturbances, and disrupted social relationships.

Online gaming has rapidly grown in popularity among teenagers, becoming a widespread cultural trend with potential implications for their mental health and well-being (Granic et al., 2014). Technological advancements have broadened access to various gaming formats, such as MMOs and mobile games (Ferguson et al., 2017), leading adolescents to spend more time in immersive digital environments. While gaming can enhance social interaction, skill development, and stress relief (Kowert et al., 2014), excessive or problematic use has been linked to increased stress, anxiety, depression, and poorer academic outcomes (Mentzoni et al., 2011).

Online gaming has emerged as a central form of entertainment and interaction for today's teenagers. With the global spread of smartphones and gaming platforms, teenagers are spending increasing hours immersed in virtual worlds. While online games offer entertainment, social engagement, and cognitive stimulation, they also raise concerns about adverse psychological effects. This study investigates the impact of online gaming on teenagers' mental health, focusing on stress, anxiety, depression, aggression, loneliness, and the role of parental and school environments. With excessive gaming habits becoming more common, understanding their psychological impact is crucial.

Literature Review

Online gaming is one of the most popular activities among teenagers worldwide. Newzoo (2017) reported that over two billion people play online games, often seeking entertainment and mental engagement. However, studies suggest that excessive gaming can lead to mental and social problems. Charlton and Danforth (2010) indicated that online gaming may foster addiction-like behaviors, which Wan and Chiou (2006) described as the most addictive form of internet use.

Mental health concerns such as depression, anxiety, and stress have been increasingly associated with problematic gaming. Liu et al. (2018) and Wang et al. (2019) found a positive link between gaming addiction and depression. Similarly, Yen et al. (2008) associated internet addiction with depression across large adolescent samples. Jeong and Kim (2011) argued that teens turn to online games to escape reality, increasing their isolation and susceptibility to mental health issues.

Social anxiety is another growing concern. Griffiths et al. (2016) noted that online gaming can reduce real-life social interactions, increasing social discomfort. Young et al. (1999) categorized internet addiction into five types, including gaming and cyber-relationship addiction, which may heighten anxiety when offline.

Loneliness can also be amplified by excessive gaming. Hojjati et al. (2012) and Salehi & Seyf (2012) described how individuals lacking fulfilling relationships turn to virtual alternatives. Lemmens et al. (2010) and Ream et al. (2013) linked loneliness with gaming addiction, where virtual interaction replaces real-world connections. Aggression has similarly been linked to frequent online gaming. Studies like Ko et al. (2009) found that adolescents engaged in violent video games reported more aggressive behaviors. Multiple regression analyses (Cao et al., 2007) confirmed this association.

Family and school environments significantly influence teenagers' gaming behaviors. Siomos et al. (2012) noted that parental care and support reduce internet addiction. Lin et al. (2009) found that supervised outdoor activities lower the risk. Conversely, conflict at home (Ko et al., 2008) and school stress (Wang et al., 2011) exacerbate problematic gaming. Poor academic performance and

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deviant peer influence also increase the likelihood of gaming-related mental issues (Skoric et al., 2009).

Research Objectives

- To examine the prevalence of online gaming among teenagers and the patterns of gaming behavior, including frequency, duration, and types of games played.
- To assess the impact of online gaming on various aspects of adolescent mental health, including stress, anxiety, depression, aggression and addiction.
- To explore the relationship between online gaming and adolescent social dynamics, including socialization, relationship development, and social skills.

Methodology

This study employed a **quantitative research** design to explore the relationship between online gaming and mental health among teenagers in Sargodha. The population included students from private schools, **aged 10-20**, and with a total sample **of 75** respondents selected using purposive sampling techniques. Mainly, we considered the descriptive statistics and graphical display and chi square test of independence. A structured, close-ended questionnaire was used for data collection. It included sections on demographic details, gaming behaviors, and mental health experiences such as depression, anxiety, aggression, and addiction. The data were collected physically, with voluntary and informed consent obtained from all participants.

Analysis

The variables of interest included online gaming as the independent variable and mental health (e.g., anxiety, stress, depression, loneliness) as the dependent variable. Data were analyzed using SPSS software, applying frequency distributions and chi-square tests to explore relationships.

Table 01: Socio demographic profile of the variables

Sr. #	Variables	Categories	Frequency	Percentage
1	Gender	Male Female Transgender	66 8 1	88.0 10.7 1.3
2	Age	10-12 13-15 16-20 Above 20	4 58 12 1	5.3 77.3 16.0 1.3
3	Educational level	Middle school High school Intermediate Bachelors	19 54 1 1	25.3 72.0 1.3 1.3
4	Class / Status	Lower Lower middle Middle Upper middle Elite	2 4 56 8 5	2.7 5.3 74.7 10.7 6.7
5	Approximate Family Income level	Less than 20k 21k-50k 51k-70k 71k-90k	11 11 25 14	14.7 14.7 33.3 18.7

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		Above 90k	14	18.7
6	Lifestyle	Active Sedentary	18 57	24.0 76.0
7	Residential area	Rural Urban	10 65	13.3 86.7

The table 1 shows the background information of the teenagers who participated in the study. Out of the total respondents, the majority were male (88%), while only 10.7% were female, and 1.3% identified as transgender. Most of the participants (77.3%) were between the ages of 13 to 15, followed by 16% aged 16 to 20, 5.3% aged 10 to 12, and a small portion (1.3%) above 20. In terms of education, the highest number (72%) were high school students, while 25.3% were in middle school. Very few were at intermediate or bachelor levels (1.3% each). Most of the teenagers (74.7%) belonged to middle-class families, while a few were from upper-middle class (10.7%), elite class (6.7%), lower-middle (5.3%), and lower class (2.7%). Regarding family income, one-third (33.3%) of the families earned between 51k–70k, while equal percentages (14.7%) earned either below 20k or between 21k–50k. Around 18.7% each had incomes in the 71k–90k and above 90k ranges. In terms of lifestyle, 76% had a sedentary lifestyle, meaning they spent more time sitting or being inactive, which may relate to gaming habits. Only 24% were physically active. Finally, most of the respondents (86.7%) lived in urban areas, while 13.3% were from rural settings. These demographic details help understand the background of the teenagers and their possible exposure to online gaming and its influence on mental health.

Table 2: Frequency and percentages of the gaming duration

Gaming Duration	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
1–2 hours	48	64.0%	64.0%	64.0%
3–4 hours	16	21.3%	21.3%	85.3%
5–6 hours	5	6.7%	6.7%	92.0%
More than 6 hours	6	8.0%	8.0%	100.0%
Total	**75**	**100.0%**	**100.0%**	**100.0%**

Table 2 shows the frequency and percentage of the number of Hours spend on gaming variable. In view of this data, 48 participants spend 1-2 hours on gaming, amounting to 64% of the sample. There are 16 participants who spend 3-4 hours online, amounting to 21.3% of the total. While, 5 participants are gaming for 5-6 hours, which amounts to 8% of the total. Furthermore, 6 of them are giving more than 6 hours to gaming.

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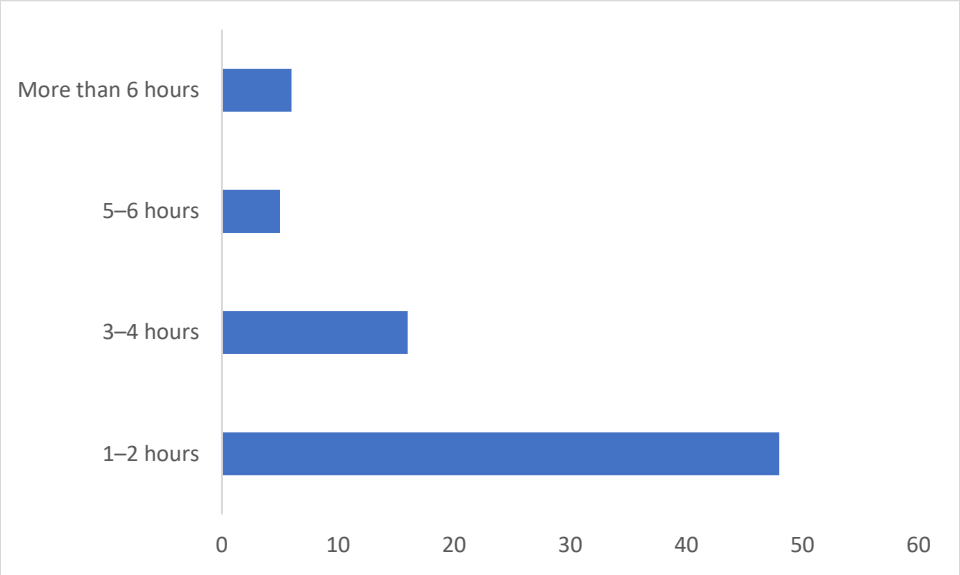

Figure 1: Histogram showing the frequency of the gaming duration

Table 3: Frequency and percentages of the reasons for playing online games

Reason for Playing Online Games	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Entertainment	40	53.3%	53.3%	53.3%
Connecting with friends	19	25.3%	25.3%	78.7%
Escaping reality	4	5.3%	5.3%	84.0%
Competing with others	4	5.3%	5.3%	89.3%
Learning new things	4	5.3%	5.3%	94.7%
Others	4	5.3%	5.3%	100.0%
Total	**75**	**100.0%**	**100.0%**	**100.0%**

The above-mentioned table 3 shows the frequency and percentage of what are the reasons you play online games variable. The data in the table shows that among participants 40 play for entertainment purposes, contributing 53.3% of the sample. 19 of them connect with friends through online games, contributing 25.3% of total. While, there are 4 teenagers who play online games to escape reality, which contributes 5.3% of the total sample. Same goes for competing with others and learning new things, as a reason to play online games, both contributing 5.3% each. Furthermore, there are 4 other reasons as well, which contributes 5.3% of the total sample.

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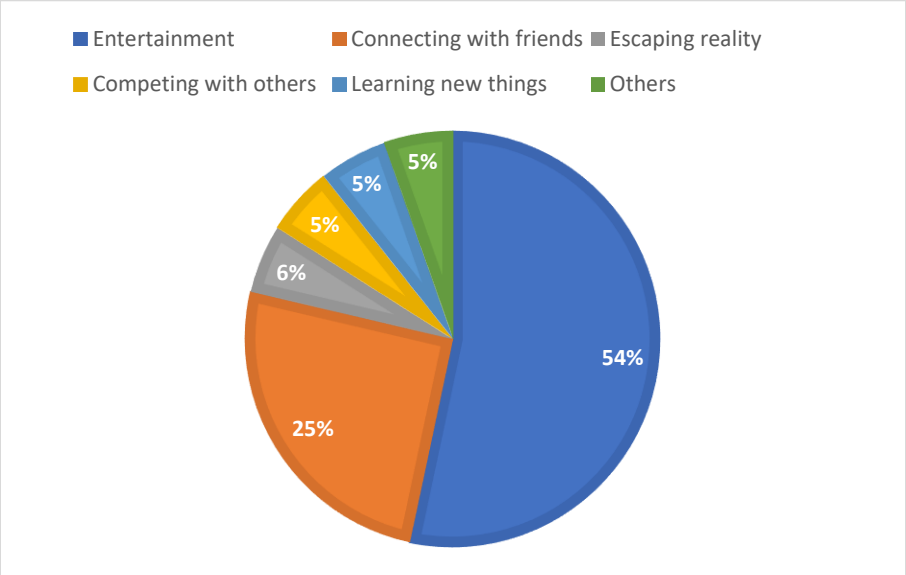

Figure 2: Pie Chart showing the percentages of the responses for the reasons of reasons for playing online games

The table 4 illustrates the distribution of mental health issues experienced by respondents over the past year. Out of a total of 75 participants, the majority **54.7%** reported experiencing **none** of the listed mental health problems, indicating that over half of the respondents did not face major psychological challenges such as depression, anxiety, or stress. However, a considerable portion of the population (**45.3%**) reported experiencing at least one mental health issue. Among these, **depression** was the most commonly reported, affecting **14.7%** of respondents, followed by **stress** and **sleep problems**, each reported by **9.3%**. **Anxiety** was experienced by **8.0%**, while **loneliness** was the least reported at **4.0%**. These findings suggest that although a majority of respondents maintained good mental health, a significant minority dealt with emotional or psychological struggles in the past year. This highlights the importance of mental health awareness and the need for supportive measures and interventions, particularly in settings where students or young individuals are the focus.

Table 4: Frequency and percentages of the mental health issues experienced in past years

Mental Health Issue Experienced (Past Year)	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Depression	11	14.7%	14.7%	14.7%
Anxiety	6	8.0%	8.0%	22.7%
Stress	7	9.3%	9.3%	32.0%
Loneliness	3	4.0%	4.0%	36.0%
Sleep problems	7	9.3%	9.3%	45.3%
None of the above	41	54.7%	54.7%	100.0%
Total	**75**	**100.0%**	**100.0%**	**100.0%**

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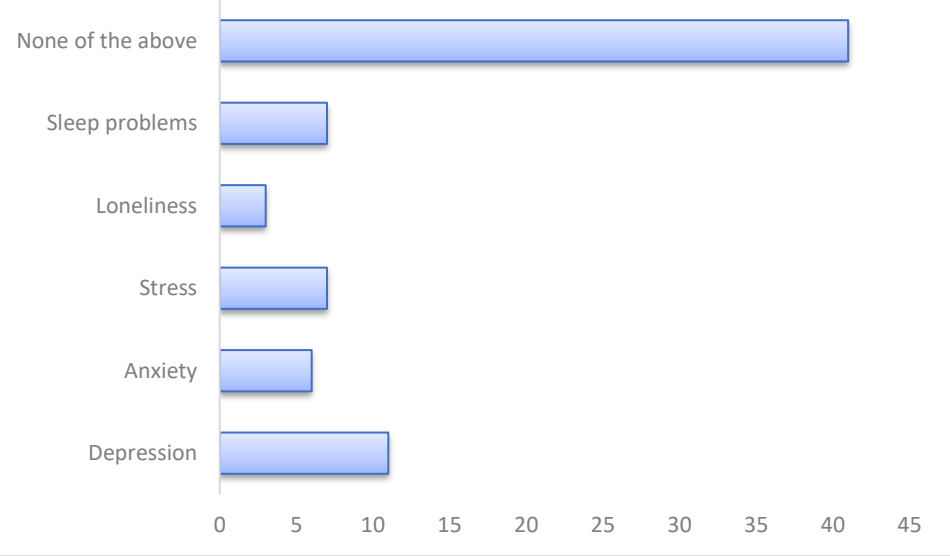

Figure 3: Histogram of the Frequencies of the mental health issues experienced in past years

In this research, following hypothesis was established which was tested through the chi-square test
Null Hypothesis (H0): There is no significant relationship between online gaming among teenagers and their mental health.
Alternative Hypothesis (H1): There is a positive correlation between online gaming among teenagers and their mental health.

Table 5: Results of Chi-Square Test of Independence

Test	**Value**	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	215.345a	165	.005
Likelihood Ratio	130.959	165	.005
Linear-by-Linear Association	7.763	165	.976
Number of Valid Cases	75	–	–

a. 192 cells (100.0%) have expected count less than 5. The minimum expected count is 0.01.
This Table 5 contained the results of hypothesis testing by using non parametric Chi-Square test. Before applying Chi-Square test all the items related to Online Gaming and Mental Health were computed and then calculated through Chi-Square test. From the above result, we reject our Null Hypothesis on the basis of P value (0.005) as it is greater than the level of significance. Null Hypothesis can also be rejected through test statistics (215.345) because it is greater than tabulated value. Hence, we can conclude that both Online Gaming and Mental Health of teenagers were strongly associated. Online Gaming does effect Mental Health of teenagers

Discussion

The data analysis of the responses collected from 75 respondents has been done by utilizing bivariate analysis. The findings indicate that excessive online gaming correlates with several mental health issues among teenagers. These results align with earlier studies, such as Liu et al.

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(2018), who found that gaming addiction leads to depression, and Ko et al. (2009), who connected gaming with aggression. In this study, 66.7% of participants reported increased aggression during or after gaming, supporting Ko et al.'s findings. The mental health aspects considered included five key variables: depression, social isolation, loneliness, addiction, and aggression. The analysis showed a clear relationship between online gaming and various mental health challenges among teenagers, confirming the initial hypothesis.

To measure the impact of online gaming (OG), 12 related questions were combined to form one variable and compared with the mental health (MH) variable. The results revealed that many teenagers are facing psychological issues at different levels. These findings are consistent with earlier studies, such as Choi et al. (2014), which highlighted that excessive gaming can lead to issues like depression, fatigue, and low self-esteem. Depression was the first mental health issue analyzed. While most teenagers said they had not experienced depression recently, many believed online gaming could lead to mental health problems. Studies by Liu et al. (2018) and Wang et al. (2019) also found that online gaming addiction increases the risk of depression. Several international studies support this, showing a consistent link between internet addiction and depression across countries, including Taiwan, South Korea, China, the US, and the UK.

The second issue discussed was social isolation. Responses were split, with half of the teenagers feeling socially disconnected due to gaming. This finding supports studies by Maldonado et al. (2016), which linked online gaming addiction to social anxiety. Similarly, Griffiths (2005) and others have shown that internet and smartphone addictions are associated with anxiety and feelings of loneliness. Addiction was the third variable examined. Although nearly half of the participants denied being addicted, indirect questioning revealed that over 60% thought about gaming even when away from their devices. This shows that gaming can create psychological dependency. Stetina (2011) and Yen (2007) found a positive link between gaming addiction and emotional distress. Over time, frequent gaming can reduce real-life social interaction, leading to long-term issues like depression.

The final variable analyzed was aggression. A large majority (66.7%) admitted to feeling more aggressive during or after gaming. This aligns with studies by Lemmens et al. (2011) and Holtz & Appel (2011), which found that aggression and delinquent behavior increase with excessive gaming. A Taiwanese study with over 9,000 adolescents also confirmed that internet addiction is linked to aggression.

Family dynamics played a significant role. The 80% parental involvement in limiting gaming correlates with Siomos et al.'s (2012) claim that supportive monitoring helps mitigate addiction. Yet, 38.7% of students still reported academic or relational disruptions, highlighting a gap between parental efforts and outcomes. Participants shared various reasons for gaming: 53.3% cited entertainment, 25.3% to connect with friends, 5.3% to escape reality, and others for learning or competition. Regarding positive effects, 14.7% noted improved problem-solving, 16% enhanced creativity, and 21.3% increased social connections, though 25.3% reported no positive impacts.

These findings paint a complex picture of how online gaming intersects with teenagers' psychological and social lives. The data suggest that while gaming can offer some benefits, a significant proportion of teenagers are experiencing negative mental health consequences. These include signs of addiction, anxiety, depression, social withdrawal, and difficulty balancing responsibilities. The findings call for immediate attention from parents, educators, and health professionals to develop preventive strategies and support systems tailored to youth needs. Overall, the study concludes that online gaming has a significant impact on teenagers' mental health. While

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not all gamers are negatively affected, a large portion shows signs of depression, social isolation, addiction, and aggression. These results are supported by existing global research. However, the direction of causality remains uncertain it is possible that teenagers with mental health problems are more drawn to gaming. Still, the findings emphasize the need for awareness and preventive strategies.

Conclusion

This study confirms a significant relationship between online gaming and teenagers' mental health in Sargodha. While gaming offers recreational and cognitive benefits, it can also lead to addiction, stress, aggression, and social isolation when used excessively. The research supports previous findings and emphasizes the need for awareness, parental monitoring, and structured interventions. It is essential to balance the advantages of gaming with protective strategies to ensure teenagers' mental well-being.

Limitations of the Study

This study faced several limitations. First, the sample size was limited to 75 students from private schools in one city, which may not fully represent all Pakistani teenagers. Second, self-reported data might contain biases, as participants may underreport mental health issues or gaming behavior. Third, the cross-sectional nature of the study limits causal interpretations. Fourth, the study did not explore the types of games in detail, which could affect outcomes. Lastly, the study focused on quantitative analysis and did not include in-depth interviews or qualitative insights, which might provide richer data on emotional and social consequences.

Future Recommendations

Future research should include a larger and more diverse sample, including students from public schools and rural areas. Qualitative methods such as interviews or focus groups should be used to explore deeper emotional and psychological impacts. More emphasis should be placed on types of games played, as violent and cooperative games may have different psychological effects. Schools and parents should collaborate to promote awareness programs that teach responsible gaming habits. Policymakers should consider incorporating digital well-being education into school curricula. Future studies could track teenagers over time to identify long-term effects of gaming. Mental health professionals should develop targeted interventions for gaming-related stress, anxiety, and addiction.

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