PREVALENCE AND DETERMINANTS OF INTERNET GAME ADDICTION AND PSYCHOLOGICAL EFFECTS AMONG MALE STUDENTS IN HEALTH SCIENCE PROGRAMS AT JAZAN UNIVERSITY, SAUDI ARABIA

Adam Dawria[1], Bader Hassan Yahya Alhazmi[2], Ali Mohieldin[1], Amna Hamid Imam Babeker[3], Ibrahim Ismail Mohammed Abu[4], Ahmed Salih[5], Mazahir EA Mohammed[1], Haroon Ali[1], Abdelsalam Mohamed Daoud Yahya[6] and Omar Yousof M Ali[7]

[1]Department of Public Health, College of Applied Medical Sciences, Khamis Mushait, King Khalid University, Abha, Saudi Arabia; [2]Jazan specialist hospital, Jazan Health Cluster, Jazan, Saudi Arabia; [3]Department of Basic Medical Sciences, College of Applied Medical Sciences, Khamis Mushait, King Khalid University, Abha, Saudi Arabia; [4]Department of Community Medicine, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia; [5]Department of Public Health, College of Health Sciences, Saudi Electronic University, Dammam, Saudi Arabia; [6]Department of public health, College of Nursing and Health Sciences, Jazan University, Jazan, Saudi Arabia; [7]Department of Public Health, Faculty of Applied Medical Sciences, Al Baha University, Al Baha, Saudi Arabia

Abstract. The internet has become a common means of communication, education, research, business, entertainment, and games. An excessive use of the latter has led to a disorder termed Internet Gaming Addiction (IGA). A cross-sectional study assessed the prevalence of IGA based on the Internet Gaming Disorder-20 test among male health science students (*n* = 486), 18-35 years of age, enrolled at Jazan University, Saudi Arabia, in 2023. Data were collected via a Google Form of a validated Arabic version of a close-ended self-answered questionnaire on the students' sociodemographic background, academic discipline and performance, mental health, lifestyle, and recreational activity. Using univariate statistics followed by multiple logistic regression modeling, two independent risk factors were identified associated with IGA, namely, prior psychological diagnosis and internet gaming as a recreational activity. The study findings should prompt educators, health providers and administrators at colleges and universities in Saudi Arabia to implement educational programs promoting responsible gaming behavior.

Correspondence: Adam Dawria, Department of Public Health, College of Applied Medical Sciences, Khamis Mushait Campus, King Khalid University (KKU), Abha 62561, Saudi Arabia
Tel: +966 534189322; Fax: +966 172417564
E-mail: aabdelqader@kku.edu.sa

INTRODUCTION

Internet gaming has become a prominent feature and aspect of a student's life, offering entertainment, social engagement and escapism. However, growing concerns have emerged regarding Internet Gaming Addiction (IGA), a condition marked by excessive and compulsive gaming behavior with adverse consequences (King and Delfabbro, 2016 Engelstätter and Ward, 2022; Anonymous, 2024).

This condition has prompted empirical inquiry into its prevalence and contributing factors within the student population. The rise of IGA among college students is particularly concerning, as it can have significant impacts on academic performance, mental health and overall well-being. Gaming disorder is characterized in the International Classification of Diseases, 11th version ICD-11 (WHO, 2025) as a form of gaming behavior. The global prevalence of gaming disorder is approximately 3% among the public and about 6% among medical students in various nations (Chen *et al*, 2018; Stevens *et al*, 2020; WHO, n.d.). An early survey by the Pew Research Center revealed that 72% of American teenagers play video games regularly, highlighting widespread engagement with this medium (Wittek *et al*, 2016).

A common hazard associated with internet gaming is prolonged length of gaming without breaks, which leads to physical health

issues, such as eyestrain, exhaustion, dehydration, muscle loss, fat gain, poor sleep habit, posture-related problems and even carpal tunnel syndrome; and to mental health issues, such as depression, social anxiety, lack of motivation, and poor emotional self-control (De Pasquale *et al*, 2020; Adair, n.d.). Another effect is the adoption of a lifestyle that contributes to a sedentary habit, leading to the above-mentioned issues. IGA can lead to neglect of real-life responsibilities, strained relationships and adverse psychological effects (Pontes and Griffiths, 2015). Studies from diverse regions such as Asia, Europe and the Middle East report similar patterns, although cultural and academic environments may influence the degree of severity (Alzahrani and Griffiths, 2024). Some studies have highlighted violence and aggression linked to violent internet/video games, especially in children (Shao and Wang, 2019; Borrego-Ruiz and Borrego, 2025); however, evidence on this topic is still debated (Adair, n.d.).

IGA disproportionately affects adolescents and young adults, particularly those 8-18 years of age, who exhibit heightened vulnerability to compulsive gaming behavior (Piccininno and Perrotta, 2024). Socio-economic status plays a significant role, with individuals from low-affluence backgrounds showing a higher risk of addiction due to limited recreational alternatives and increased psychosocial stress (Roh *et al*, 2024). These factors increase the likelihood of psychological outcomes.

Among college student populations, extreme gaming has been related to reduced psychological well-being, increased stress, and lower academic motivation and performance (Chen *et al*, 2024). These effects underscore the need for targeted research within specific student groups, such as those in health-related programs, to better understand what particular factors lead to IGA. A study used social cognitive and interpersonal theory to predict how much undergraduate

students spend playing internet/ video games (Li *et al*, 2024).

Various treatments have been proposed for IGA, including cognitive-behavioral therapy, family therapy and pharmacological interventions (Kuss *et al*, 2017). Understanding the risk factors and the consequences of IGA can help to develop effective prevention and treatment interventions to address this issue (Király *et al*, 2015). However, more research is needed to determine the most effective treatment approaches for IGA (King *et al*, 2012).

Our research paper aimed to estimate the prevalence of IGA and identify its associated risk factors among male health science students in Jazan University. A cross-sectional design was used, employing a validated Arabic questionnaire and the IGD-20 test. Statistical analysis included univariate and multivariate logistic regression to determine significant predictors. Educational institutions, health authorities, and parents are expected to utilize these findings to promote the health of the targeted Age groups and to support the development of future research in this area.

MATERIALS AND METHODS

Study design and setting

A cross-sectional investigation was carried out among male students enrolled in the health science faculties at Jazan University, Jazan, southwestern Saudi Arabia, during 2023.

Study population

Inclusion criteria were male students, both full- and part-time, 18-35 years of age. Exclusion criteria were students with physical or mental incapacity to answer the online questionnaire, or who were on extended leave or temporarily assigned to other institutions. The inclusion and exclusion criteria were formulated accordance to the study's objective and the age range (18-35 years) reflects the typical

university demographic targeted by the IGD-20 test. Exclusion criteria were conducted to ensure data validity and reliability by omitting individuals unable to complete the self-administered questionnaire or not actively participating in university life during the study period.

IGA among Saudi adolescents was estimated at 29.3% (Alfaifi *et al*, 2022). Using a standard sample size formula with a 95% confidence level and 5% margin of error (Daniel, 1999), the minimum sample size was estimated to be 323. After adjusting for a 10% non-response rate, the target sample size was increased to 355, and the final study consisted of 486 participants.

Sample design and instrument

A multi-stage cluster sampling technique was employed to ensure a representative and methodologically sound selection of participants (Bhandari, 2023). In the first stage, four health-related faculties were selected based on enrollment size and program relevance. In the second stage, two academic levels were randomly chosen from each selected faculty. To maintain proportional representation across groups, the probability proportional to size (PPS) method was applied (Latpate *et al*, 2021) to allow balanced inclusion of students from various disciplines and academic years.

Study instrument and data collection method

The Internet Gaming Disorder test (IGD-20 test) (Pontes *et al*, 2014) was employed as it is widely adopted by other researchers. In this study, we used a verified Arabic version of the IGD-20 test (Hawi and Samaha, 2017). The test items were scored using a 5-point Likert scale, where 1 = "Strongly disagree" and 5 = "Strongly agree", with a maximum score of 100. A score of ≥71 indicates having IGD.

Through a website link, a Google Form questionnaire with closed-ended questions was used to collect data. The questionnaire was adapted from previous studies

(Alrahili *et al*, 2023). It included a self-administered questionnaire with 20 items (statements). The Google link questionnaire was sent to the class leaders, who were requested to distribute it among their health science colleagues only. The data were monitored by the researchers and regularly checked after considering the inclusion and exclusion criteria of the participants. The questionnaire contained two sections: the first part concerned the participants' demographics, *eg*, age, marital status, history of smoking and other related items (Tables 1 and 2), and the second part consisted of the IGD-20 questions (Table 3).

Data analysis

The presentation of categorical variables is expressed in frequencies and proportions. Descriptive statistics are presented as numbers and percentages for categorical variables. Mean and standard deviation (SD) are reported as numerical variables. Chi-square test was used to determine the association between gaming addiction and participants' characteristics, and multiple logistic regression analysis was used to study the variables associated with gaming addiction while controlling for the other variables. An odds ratio (OR) was calculated with a 95% confidence interval (CI). Statistical significance is accepted when the *p*-value <0.05. Calculations were performed using the Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM, Armonk, NY).

Ethical considerations

The study protocols received ethical approvals from the Scientific Research Committees of King Khalid University (ECM#20231302, 09 May 2023) and Jazan University (REC-44/11/686, 31 May 2023). Prior written consent was obtained from each participant via a digital consent form. Participants could withdraw from the study at any time. Data were anonymized prior to analysis.

RESULTS

Of the 486 participating male students from the health science programs at Jazan University, 15.8, 23.7 and 60.5% were 18-20, >23 and 21-23 years of age, respectively, drawn from the colleges of Applied Medical Sciences (35.2%), Dentistry (6.2%), Medicine (19.1%), Pharmacy (15.6%), Public Health and Tropical Medicine (13.8%), and Nursing (10.1%) (Table 1). The highest proportion (46.7%) of the students reported a GPA of 3.75-4.49, followed by 30.5% with a GPA of 4.50-5.00, then 21.6% with a GPA of 2.50-3.74, and 1.2% with a GPA <2.50. The vast majority of the participants were single (91.8%) and lived with their families (94.2%), while a smaller proportion lived alone (4.3%) or with friends (1.5%) (Table 1).

Among the participants, 11.5% reported having been diagnosed with a mental illness [anxiety (21.4%), depression (39.2%), insomnia (8.9%), social anxiety (12.5%), and other unspecified disorders (17.8%)], while 88.5% had not (Table 2). Most (81.3%) of the students were non-smokers, 11.7% were current smokers and 7.0% were previous smokers. As a primary leisure activity, 28.8% of the participants reported internet/video gaming, followed by reading (19.8%) and traveling (17.5%), while 34.0% took part in other activities, *eg*, football, gym workouts and/or swimming.

Based on the IGD-20 test, the mean score across ranged from 2.00 to 2.40 on a Likert 5-point scale, reflecting low-to-moderate IGD, suggesting that while internet/video gaming was reported by nearly 30% of the students, disordered patterns were not widespread in this population (Table 3). Most participants disagreed or strongly disagreed with statements suggesting emotional reliance on gaming, such as playing to feel better (17.3% agreement), or forgetting what's bothering them (19.1% agreement), while only 14.2% strongly agreed (Table 3). Similarly, only 15.4 % reported

Table 1

Sociodemographic characteristics of male students in health-related programs at
Jazan University, Saudi Arabia, 2023 (N = 486)

Variable	Frequency n (%)
Age	
18 - 20 years	77 (15.8)
>20 - 23 years	294 (60.5)
>23 years	115 (23.7)
Marital status	
Single	446 (91.8)
Married	40 (8.2)
Living arrangement	
Alone	21 (4.3)
With family	458 (94.2)
With friends	7 (1.5)
College attended	
Nursing	49 (10.1)
Public Health and Tropical Medicine	67 (13.8)
Pharmacy	76 (15.6)
Applied Medical Science	171 (35.2)
Dentistry	30 (6.2)
Medicine	93(19.1)
GPA	
<2.50	6 (1.2)
2.50 - 3.74	105 (21.6)
3.75- 4.49	227 (46.7)
4.50 - 5.00	148 (30.5)

GPA: Grade Point Average

Table 2

Mental health, lifestyle habits, and behavioral risks among male students in health-related programs at Jazan University, Saudi Arabia, 2023 (N = 486)

Variable	Frequency n (%)*
Mental illness diagnosis	
No	430 (88.5)
Yes	56 (11.5)
Type of mental illness (N = 56)	
Anxiety	12 (21.5)
Depression	22 (39.2)
Insomnia	5 (8.9)
Social anxiety	7 (12.5)
Others (eg, adjustment, somatic symptom, trauma-related disorders)	10 (17.9)
Smoking status	
Non-smoker	395 (81.3)
Current smoker	57 (11.7)
Previous smoker	34 (7.0)
Hobby	
Reading	96 (19.7)
Traveling	85 (17.5)
Video games	140 (28.8)
Others (eg, football, gym workout, swimming)	165 (34.0)

*N = 486, unless otherwise stated

Table 3

Self-reported gaming habits and emotional responses assessed on the Internet Gaming Disorder scale among male students in health-related programs at Jazan University, Saudi Arabia, 2023 (N = 486)

Question	Frequency of responses, n (%)					IGD-20 score (Mean ± SD)*
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
I often fall asleep because of long gaming sessions	139 (28.6)	131 (27.0)	115 (23.7)	78 (16.0)	23 (4.7)	2.41 ± 1.19
I never play games to feel better	160 (32.9)	135 (27.8)	107 (22.0)	56 (11.5)	28 (5.8)	2.29 ± 1.20
I have significantly increased the amount of time I play games over the past year	167 (34.4)	131 (27.0)	76 (15.6)	76 (15.6)	36 (7.4)	2.35 ± 1.29
When I am not gaming, I feel more irritable	217 (44.7)	140 (28.8)	68 (14.0)	36 (7.4)	25 (5.1)	2.00 ± 1.16
I have lost interest in other hobbies because of my gaming	190 (39.1)	125 (25.7)	78 (16.1)	57 (11.7)	36 (7.4)	2.23 ± 1.28
I would like to cut down my gaming time but it is difficult to do	167 (34.4)	119 (24.5)	93 (19.1)	69 (14.2)	38 (7.8)	2.37 ± 1.29
I usually think about my next gaming session when I am not playing	194 (39.9)	142 (29.3)	75 (15.4)	43 (8.8)	32 (6.6)	2.13 ± 1.22
I play games to help me cope with bad feelings	139 (28.6)	95 (19.5)	82 (16.9)	102 (21.0)	68 (14.0)	2.72 ± 1.43
I need to spend increasing amounts of time playing games	170 (35.0)	134 (27.6)	83 (17.1)	68 (14.0)	31 (6.3)	2.29 ± 1.25

Table 3 (cont)

Question	Frequency of responses, n (%)					IGD-20 score (Mean ± SD)*
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
I feel sad if I am not able to play games	198 (40.7)	145 (29.8)	75 (15.4)	39 (8.0)	29 (6.1)	2.09 ± 1.19
I have lied to my family members regarding the amount of gaming I play	229 (47.1)	128 (26.3)	58 (11.9)	39 (8.1)	32 (6.6)	2.01 ± 1.23
I do not think I could stop gaming	191 (39.3)	145 (29.8)	65 (13.4)	50 (10.3)	35 (7.2)	2.16 ± 1.25
Gaming has become the most time-consuming activity in my life	182 (37.4)	119 (24.5)	78 (16.1)	58 (11.9)	49 (10.1)	2.33 ± 1.35
I play games to forget about what is bothering me	138 (28.4)	101 (20.8)	85 (17.5)	93 (19.1)	69 (14.2)	2.70 ± 1.42
I often feel that a whole day is not enough to do everything I need to do to play game	203 (41.8)	129 (26.6)	70 (14.4)	43 (8.8)	41 (8.4)	2.16 ± 1.29
I tend to get anxious if I cannot play games	201 (41.4)	137 (28.2)	73 (15.0)	46 (9.5)	29 (5.9)	2.10 ± 1.21
My gaming has jeopardized my relationship with my partner	232 (47.7)	114 (23.5)	85 (17.5)	30 (6.2)	25 (5.1)	1.98 ± 1.17
I often try to play games less, but find I cannot	184 (37.9)	146 (30.0)	82 (16.9)	44 (9.1)	30 (6.1)	2.16 ± 1.20
My main daily activity has not been negatively affected by gaming	136 (28.0)	108 (22.2)	88 (18.2)	76 (15.6)	78 (16.0)	3.30 ± 1.43
My gaming is negatively impacting important areas of my life	169 (34.8)	117 (24.1)	76 (15.6)	65 (13.4)	59 (12.1)	2.44 ± 1.39

*Based on the Internet Gaming Disorder test scale (Pontes et al, 2014)

frequent thoughts about gaming when not playing, and just 11.9% agreed and 10.1% strongly agreed that internet gaming was the most time-consuming activity in their lives. These findings suggest that, for most students, gaming did not dominate their emotional or cognitive behavior.

However, a minority of students endorsed behaviors that may signal problematic internet gaming tendencies (Table 3). Notably, 14.7 % admitted to sometimes lying to family members about their gaming habits, and 17.5% felt they were unable to stop gaming even if they wanted to. In addition, 11.3% reported experiencing conflicts with others due to their internet gaming activity, and 12.1% and 13.4% strongly agreed or agreed that they had missed important responsibilities due to internet gaming. While these proportions are relatively low, they highlight the existence of IGA among the student population.

The prevalence of IGA across demographic characteristics and academic groups was analyzed (Table 4). Age, marital status, living arrangement, smoking habit, type of health science studies, or GPA showed no statistically significant association with IGA (p-value ≥0.05). However, participants with a diagnosed mental illness (11.6%) reported a significantly higher proportion of IGA (p-value = 0.006). Hobbies also had a strong association with IGA (p-value <0.001), particularly among those who indicated internet/video gaming as a hobby (22.6% of the participants) with 6.2% of IGA subjects; however, reading or traveling were less associated with IGA (1.0% in each group) as well as those with other hobbies (*eg*, football, gym workout, swimming) (31.5% of the participants) with 2.5% associated with IGA.

To identify independent factors associated with IGA, a multiple logistic regression analysis was carried out (Table 5). As expected, only those factors previously identified by univariate statistics as having significant associations

Table 4

Association between participant characteristics and addiction to internet gaming among male students in health science programs at Jazan University, Saudi Arabia, 2023 (N = 486)

Variable	Frequency, n (%)		p-value*
	Not addicted	Addicted	
Age			0.788
18 - 20 years	70 (14.4)	7 (1.4)	
<20 - 23 years	263 (54.1)	31 (6.4)	
>23 years	101 (20.8)	14 (2.9)	
Marital status			0.999
Single	398 (81.9)	48 (9.9)	
Married	36 (7.4)	4 (0.8)	
Living arrangement			0.383
Alone	17 (3.5)	4 (0.8)	
With family	411 (84.7)	47 (9.8)	
With friends	5 (1.0)	1 (0.2)	
College attended			0.820
Nursing	43 (8.8)	6 (1.2)	
Public Health and Tropical Medicine	60 (12.3)	7 (1.4)	
Pharmacy	65 (13.4)	11 (2.3)	
Applied Medical Science	153 (31.6)	18 (3.7)	
Dentistry	28 (5.8)	2 (0.4)	
Medicine	85 (17.5)	8 (1.6)	

Table 4 (cont)

Variable	Frequency, *n* (%)		*p*-value*
	Not addicted	Addicted	
GPA			0.162
<2.50	1 (0.2)	5 (1.0)	
2.50-3.74	84 (17.3)	21 (4.3)	
3.75-4.49	211 (43.4)	16 (3.3)	
4.50-5.00	138 (28.4)	10 (2.1)	
Mental illness diagnosis			0.006
No	390 (80.2)	40 (8.2)	
Yes	44 (9.1)	12 (2.5)	
Smoking status			0.932
Non-smoker	352 (72.4)	43 (8.9)	
Smoker	51 (10.5)	6 (1.2)	
Previous smoker	31 (6.4)	3 (0.6)	
Hobby			<0.001
Reading	91 (18.7)	5 (1.0)	
Traveling	80 (16.5)	5 (1.0)	
Video games	110 (22.6)	30 (6.2)	
Others (*eg*, football, gym workout, swimming)	153 (31.5)	12 (2.5)	

*Statistical significance at *p*-value <0.05, using Chi-square test

GPA: Grade Point Average

Table 5

Multiple logistic regression for factors associated with gaming addiction among male students (N = 486) in health-related programs at Jazan University, Saudi Arabia, 2023

Variable	OR (95% CI)	p-value*
Age		
18 - 20 years	Reference	
<20 - 23 years	1.36 (0.54-3.47)	0.514
>23 years	2.33 (0.78-6.98)	0.132
Marital status		
Single	Reference	
Married	0.99 (0.31-3.21)	0.986
Living arrangement		
Alone	Reference	
With family	0.40 (0.11-1.39)	0.148
With friends	0.33 (0.02-5.15)	0.426
College attended		
Nursing	Reference	
Public Health and Tropical Medicine	0.65 (0.18-2.38)	0.514
Pharmacy	1.09 (0.33-3.53)	0.889
Applied Medical Science	0.87 (0.30-2.54)	0.796
Dentistry	0.19 (0.03-1.21)	0.079
Medicine	0.44 (0.13-1.50)	0.190
GPA		
<3.74	Reference	
3.75-4.49	0.57 (0.26-1.25)	0.161
4.50-5.00	1.08 (0.46-2.50)	0.865

Table 5 (cont)

Variable	OR (95% CI)	p-value*
Mental illness diagnosis		
No	Reference	
Yes	3.55 (1.56-8.06)	0.002
Smoking status		
Non-smoker	Reference	
Smoker	0.59 (0.22-1.64)	0.314
Previous smoker	0.40 (0.11-1.52)	0.178
Hobby		
Internet/video games	Reference	
Reading	0.13 (0.04-0.40)	<0.001
Traveling	0.22 (0.08-0.62)	0.004
Others (*eg*, football, gym workout, swimming)	0.26 (0.12-0.56)	<0.001

*Statistical significance at p-value <0.05, using Chi-square test

CI: confidence interval; GPA: Grade Point Average; OR: odds ratio

with IGA, namely prior diagnosis of mental illness (OR = 3.55, 95% CI = 1.56-8.86, p-value = 0.002) and playing internet/video games as a recreational hobby vs. reading (OR = 0.13, 95% CI = 0.04-0.40, p-value <0.001), traveling (OR = 0.22, 95% CI = 0.08-0.62, p-value = 0.004) or other hobbies (OR = 0.26, 95% CI = 0.12-0.56, p-value <0.001), were confirmed as the two most reliable independent risk factors. Overall, the multiple logistic regression model highlights mental health and internet/video game playing as key correlates of IGA.

DISCUSSION

The prevalence of Internet Gaming Disorder (IGD) (10.8%) in our study was consistent with global estimates. For instance,

Männikkö *et al* (2015) reported a slightly lower prevalence in their European cohort, while figures from the United Kingdom were moderately higher. However, there are geographical variations. A large-scale study in China reported 17.0% of adolescents and young adults meet the criteria for IGD (Liao *et al*, 2020), whereas a smaller Brazilian study revealed that 38.2% of participants were affected, with a significant portion considered at risk (Severo *et al*, 2020).

In Saudi Arabia, IGA prevalence varies considerably across regions and populations. Alsunni and Latif (2022) noted that 20.6% of university students were affected, while Al Asqah *et al* (2020) reported a lower rate of 14.3% in a population with a similar demographic background. Among high school students in Dammam, the IGA prevalence is 22.7% (Al Asqah *et al*, 2020), but a study in Faifa City of intermediate and secondary school students using the same assessment scale as in our research reported a lower prevalence 29.3% (Alhamoud *et al*, 2022). Other regional studies, such as those conducted in Albaha, Al-Qassim and Buraidah, revealed a wide range of prevalence, ranging from 11.5 to 32.1% (Kuss *et al*, 2017). These variations among the test populations may reflect differences in age, educational background, awareness of gaming-related risks, cultural norms, and access to recreational alternatives. The influence of the coronavirus disease 2019 (COVID-19) pandemic and the predominance of health science students in certain sample cohorts may also have affected the survey results.

Our findings did not reveal a statistically significant association between internet/video gaming addiction and academic performance. This agrees with the results of Drummond and Sauer (2014), who similarly found no measurable impact of video-gaming on the academic performance of adolescents based on standardized assessments in science, mathematics, and reading. On the other hand, Aljohaney (2015) reported that in

Jeddah, gaming behavior adversely affected academic achievement among medical students at King Abdulaziz University. Such dissimilarities suggest a complex interplay of moderating factors, such as individual differences in time management, self-regulation and the nature of games played. These variables may either buffer or intensify the academic consequences of excessive gaming.

A small proportion (7%) of our participants had a prior diagnosis of psychological disorders, with depression and anxiety being the most self-reported conditions. Among these individuals, a significant fraction (8%) also exhibited signs of IGA. Alrahili *et al* (2023) study of the psychological impact associated with excessive gaming among Saudi adolescents aged 12-16 years students revealed a notable prevalence of anxiety and depressive symptoms co-occurring with indicators of IGA. These patterns of behavior are consistent with the findings by von der Heiden *et al* (2019), which identified strong associations between problematic gaming and maladaptive coping mechanisms such as self-blame, disengagement and substance use. In that study, adaptive strategies like active coping and positive reframing help to mitigate the adverse effects of IGA. These outcomes underscore the necessity of incorporating systematic mental health assessments into intervention frameworks aimed at mitigating gaming-related behavioral disorders.

The majority (81.3%) of our test population consisted of non-smokers, and among those identified as gaming addicts, most did not report current smoking behavior. The association between smoking and gaming addiction is not statistically significant in our study. However, previous research suggested that among adolescents a positive association exists between the two types of behavior (Fisher, 1994).

Nearly one-third of the participants reported engagement in internet/video gaming as a

recreational. Other less common recreational activities included reading, traveling and sports. A multiple logistic regression model indicated internet gaming as an independent risk factor of IGA. The other recreational interests may reflect underlying coping strategies or lifestyle preferences that counter internet gaming.

Sociocultural factors play a critical role in the development of IGD, particularly among adolescents who face challenges in real-life social interactions (Yan *et al*, 2024). Online gaming often serves as a surrogate for interpersonal engagement, offering a sense of community and emotional refuge. Individuals with antisocial tendencies or those who experience social isolation are especially vulnerable. The cognitive and emotional consequences of excessive gaming include persistent preoccupation, impaired self-assessment and reduced perseverance and communication skills. Our multiple logistic regression model indicated prior mental illness as another independent factor associated with IGA.

Our analysis identified a range of internal factors such as personal motivation, psychological traits and gaming preferences, as well as external influences including peer pressure, family dynamics and societal expectations (Table 4). The interaction between these determinants often precipitates addictive behavior. For example, peer influence may amplify escapist tendencies in individuals predisposed to stress or anxiety. A study in Saudi Arabia by Alrahili *et al* (2023) reported that internet addiction negatively affects sleep quality, academic performance and interpersonal relationships.

Our study was not without limitations. Recruitment posed challenges due to students' tight academic schedules and low engagement with digital surveys. Survey fatigue from concurrent institutional studies may have reduced participation and introduced reply bias (Halper *et al*, 2025). Our study did not

differentiate between general and social anxiety disorders, risking misclassification. Our study was conducted on a specific population (health science college students), and the results cannot be generalized to college students in other study disciplines or even individuals 21-23 years of age (the majority of the study cohort). Future research should adopt hybrid recruitment approaches and validated diagnostic tools to advance data accuracy and contribution. Longitudinal studies are needed to explore causal links between internet gaming and mental health. Increasing sample diversity and inclusion of other internet game-related variables and personal traits will improve our understanding and expand the generality of the findings.

In conclusion, Internet Gaming Addiction (IGA) presents a growing public health concern, particularly among youth and students. Our study indicated, among college students in the health sciences at Jazan University, Saudi Arabia, the independent association of psychological distress, notably depression and anxiety, and internet gaming as a recreational hobby. No significant links were found between IGD and sociodemographic characteristics or academic performance. The nuanced relationship between IGA and academic performance, along with its psychological and behavioral correlates, although not found among our study cohort, warrants closer attention from educators and mental health professionals at institutions of higher learning. Given the specific target and small number of the test population, these conclusions cannot be generalized to the college student body as a whole or even to other colleges or universities in the country. As sociocultural and psychological determinants play critical roles in shaping internet gaming behavior, coordinated efforts across all sectors of society are essential to identify each population-specific factor linked to IGA to mitigate the negative physical, behavioral and psychological consequences in Saudi Arabia and elsewhere.

ACKNOWLEDGEMENT

REFERENCES

Adair C. What are the pros and cons of video games?, n.d. [cited 2025 Aug 08]. Available from: URL: https://gamequitters.com/pros-and-cons-of-video-games/

Al Asqah MI, Al Orainey AI, Shukr MA, Al Oraini HM, Al Turki YA. The prevalence of internet gaming disorder among medical students at King Saud University, Riyadh, Saudi Arabia. A cross-sectional study. *Saudi Med J* 2020; 41(12): 1359-63.

Alfaifi AJ, Mahmoud SS, Elmahdy MH, Gosadi IM. Prevalence and factors associated with Internet gaming disorder among adolescents in Saudi Arabia: a cross-sectional study. *Medicine (Baltimore)* 2022; 101(26): e29789.

Alhamoud MA, Alkhalifah AA, Althunyan AK, Mustafa T, Alqahtani HA, Awad FAA. Internet gaming disorder: its prevalence and associated gaming behavior, anxiety, and depression among high school male students, Dammam, Saudi Arabia. *J Family Community Med* 2022; 29(2): 93-101.

Aljohaney A. Effect of video game usage on academic performance of medical students in King Abdulaziz University. *J King Abdulaziz Univ Med Sci* 2015; 22(1): 33-8.

Alrahili N, Alreefi M, Alkhonain IM, *et al*. The prevalence of video game addiction and its relation to anxiety, depression, and attention deficit hyperactivity disorder (ADHD) in children and adolescents in Saudi Arabia: a cross-sectional study.

Cureus 2023; 15(8): e42957.

Alsunni AA, Latif R. Internet gaming disorder and its correlates among university students, Saudi Arabia. *J Family Community Med* 2022; 29(3): 217-22.

Alzahrani AKD, Griffiths MD. Problematic gaming and students' academic performance: a systematic review, 2024 [cited 2025 Aug 08]. Available from: URL: https://link.springer.com/article/10.1007/s11469-024-01338-5

Anonymous. Screen time and digital technology use: how it affects child and teenage sleep, 2024 [cited 2025 Aug 08]. Available from: URL: https://raisingchildren.net.au/preschoolers/media-technology/screen-time-healthy-screen-use/screen-time-sleep

Bhandari P. Multistage sampling: Introductory guide and examples, 2023 [cited 2025 Aug 09]. Available from: URL: https://www.scribbr.com/methodology/multistage-sampling

Borrego-Ruiz A, Borrego JJ. Adolescent aggression: a narrative review on the potential impact of violent video games. *Psychol Int* 2025;

7(1): 12.

Chen L, Liu R, Zeng H, *et al*. Predicting the time spent playing computer and mobile games among medical undergraduate students using interpersonal relations and social cognitive theory: a cross-sectional survey in Chongqing, China. *Int J Environ Res Public Health* 2018; 15(8): 1664.

Chen S, Wei M, Wang X, Liao J, Li J, Liu Y. Competitive video game exposure increases aggression through impulsivity in Chinese adolescents: evidence from a multi-method study. *J Youth Adolesc* 2024; 53(8): 1861-74.

Daniel WW. Biostatistics: a foundation for analysis in the health sciences. 7th ed. New York: John Wiley & Sons; 1999.

De Pasquale C, Sciacca F, Martinelli V, Chiappedi M, Dinaro C, Hichy Z. Relationship of internet gaming disorder with psychopathology and social adaptation in Italian young adults. *Int J Environ Res Public Health* 2020; 17(21): 8201.

Drummond A, Sauer JD. Video-games do not negatively impact adolescent academic performance in science,

mathematics or reading. *PLoS One* 2014; 9(4): e87943.

Engelstätter B, Ward MR. Video games become more mainstream. *Entertain Comput* 2022; 42: 100494.

Fisher S. Identifying video game addiction in children and adolescents. *Addict Behav* 1994; 19(5): 545-53.

Halper LR, Szeyller E, Freggens MJ, Edmunds C, Regan EP. Data-driven approaches to reduce survey fatigue and enhance student engagement in surveys. *Intersection* 2025; 6(1): 51-79.

Hawi NS, Samaha M. Validation of the Arabic version of the Internet Gaming Disorder-20 test. *Cyberpsychol Behav Soc Netw* 2017; 20(4): 268-72.

King DL, Delfabbro PH, Griffiths MD. Clinical interventions for technology-based problems: excessive internet and video game use. *J Cogn Psychother* 2012; 26(1): 43-56.

King DL, Delfabbro PH. The cognitive psychopathology of Internet gaming disorder in adolescence. *J Abnorm Child Psychol* 2016; 44(8): 1635-45.

Király O, Griffiths MD, Demetrovics Z. Internet gaming disorder and the DSM-5: conceptualization, debates, and controversies. *Curr Addict Rep* 2015; 2(3): 254-62.

Kuss DJ, Griffiths MD, Pontes HM. Chaos and confusion in DSM-5 diagnosis of internet gaming disorder: issues, concerns, and recommendations for clarity in the field. *J Behav Addict* 2017; 6(2): 103-9.

Latpate R, Kshirsagar J, Gupta VK, Chandra G. Probability proportional to size sampling. In: Latpate R, Kshirsagar J, Gupta VK, Chandra G, editors. Advanced sampling methods. Singapore: Springer Nature; 2021. p. 85-98.

Li K, Niu G, Jin S, Shi X. Social exclusion and video game addiction among college students: the mediating roles of depression and maladaptive cognition. *Curr Psychol* 2024; 43: 31639-49.

Liao Z, Huang Q, Huang S, *et al*. Prevalence of internet gaming disorder and its association with personality traits and gaming characteristics among Chinese adolescent gamers. *Front Psychiatry*

2020; 11: 598585.

Männikkö N, Billieux J, Kääriäinen M. Problematic digital gaming behavior and its relation to the psychological, social, and physical health of Finnish adolescents and young adults. *J Behav Addict* 2015; 4(4): 281-8.

Piccininno D, Perrotta G. Video game addiction in young people (8–18 years old) after the COVID-19 pandemic: the grey area of addiction and the phenomenon of "Gaming Non-Pathological Abuse (GNPA)". *Epidemiologia* 2024; 5(3): 511-24.

Pontes HM, Griffiths MD. Measuring DSM-5 internet gaming disorder: development and validation of a short psychometric scale. *Comput Human Behav* 2015; 45: 137-43.

Pontes HM, Király O, Demetrovics Z, Griffiths MD. The conceptualisation and measurement of DSM-5 internet gaming disorder: the development of the IGD-20 test. *PLoS One* 2014; 9(10): e110137.

Roh HJ, Kim E, Lee KY, Choi JW, Bhang SY. Elucidating the impact of socioeconomic status on adolescent internet gaming disorder using the family affluence scale. *Int J Ment Health Addict* 2024; 23(5): 2478-95.

Severo RB, Soares JM, Affonso JP, *et al*. Prevalence and risk factors for internet gaming disorder. *Braz J Psychiatry* 2020; 42(5): 532-5.

Shao R, Wang Y. The relation of violent video games to adolescent aggression: an examination of moderated mediation effect. *Front Psychol* 2019; 10: 384.

Stevens MW, Dorstyn D, Delfabbro PH, King DL. The global prevalence of gaming disorder: a systematic review and meta-analysis. *Aust N Z J Psychiatry* 2021; 55(6): 553-68.

von der Heiden JM, Braun B, Müller KW, Egloff B. The association between video gaming and psychological functioning. *Front Psychol* 2019; 10: 1731.

Wittek CT, Finserås TR, Pallesen S, *et al*. Prevalence and predictors of video game addiction: a study based on a nationally representative sample of gamers. *Int J Ment Health Addict* 2016; 14(5): 672-86.

World Health Organization (WHO). Gaming disorder, n.d. [cited 2025 Aug 08]. Available from: URL: https://www.who.int/standards/

classifications/frequently-asked-questions/gaming-disorder

World Health Organization (WHO). ICD-11 for mortality and morbidity statistics: 6C51 Gaming disorder, 2025 [cited 2025 Aug 08]. Available from: URL: https://icd.who.int/browse/2025-01/mms/en#338347362

Yan Y, Chen J, Wang HM, Xu JJ, Gong S. The mediating effect of social connectedness between internet gaming disorder and somatic symptoms in adolescents: a large sample cross-sectional study. *BMC Psychiatry* 2024; 24(1): 651.