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ORIGINAL ARTICLE

Gaming Addiction and Related Psychological impact upon an Egyptian Adolescent Sample during the Coronavirus Disease Pandemic

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Background and Aim Digital addiction is increasingly recognized health threat particularly in children and adolescents. Restrictions related to Covid-19 pandemic exacerbated the risk of digital addition. The present study aimed to estimate the prevalence of online gaming addiction among Egyptian children before and during Covid-19 pandemic and its relation to psychological distress.

Subjects and Methods This cross-sectional survey was conducted on 1844 children from 19 schools. Children were assessed by Gaming Addiction Scale (GAS7) and DASS-21 (Depression, Anxiety and Stress Scale - Arabic version).

Results According to GAS7 results we could identify 525(28.5%) children as addicted gamers, 715(38.8%) as problematic gamers and 604(32.8%) as non-problematic gamers. addicted and problematic gamers are significantly older than non-problematic gamers. Also, addicted and problematic gamers comprised significantly higher frequency of males as compared to non-problematic gamers (60.2% versus 61.4% and 49.0% respectively, $p<0.001$). Comparison between GAS7 scores before and after Covid-19 pandemic showed significantly higher scores during the pandemic in all the studied subgroups. There was a relation between more GAS7 score and higher depression, anxiety and stress scores and more severity of the three conditions.

Conclusions The present study found that online gaming addition is prevalent among Egyptian school children and it was exacerbated by the Covid-19 pandemic.

Keywords Covid-19, Game addiction, School children.
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INTRODUCTION

Digital addiction is overwhelmingly recognized as one of the most detrimental global health risks affecting all ages (Meng *et al.,* 2022). Children and adolescents are particularly vulnerable to the hazardous effects of different varieties of digital addiction as demonstrated by several reports. For example, internet gaming disorder (IGD) was identified as a significant risk factor for psychological stress and insomnia in adolescents and their siblings (Wong *et al.,* 2020; Lin *et al.,* 2021). It was also shown that problematic use of smartphone and internet was linked to psychological distress in young adults (Chen *et al.,* 2020).

The recent coronavirus disease 2019 (COVID-19) pandemic has resulted in massive psychological burden that has affected almost all ages from different cultural and social backgrounds, including patients (Patil *et al.,* 2021), medical students (Sharma *et al.,* 2021), health care workers (Olashore *et al.,* 2021), and others (Rajabimajd *et al.,* 2021). With the constrains related to the COVID-19 pandemic, the situation for digital addiction has become even worse. Lockdowns and school suspensions resulted in unprecedented exacerbations of problematic smartphone use among school children (Fung *et al.,* 2021). Studies

conducted during the same period reported a significant association between IGD and psychological distress, which affected sleep quality in adolescents (Fazeli *et al.,* 2020). Moreover, the addictive pattern of internet-related behaviors was linked to psychological distress among lean and obese school children during COVID-19-related suspension (Chen *et al.,* 2022).

Previous works discussed digital addiction among Egyptian university students and its relation to psychological symptoms (Ali *et al.,* 2017; El-Sayed Desouky and Abu-Zaid, 2020; Okasha *et al.,* 2021; Salama, 2020), including some studies focusing on the problem during the COVID-19 pandemic (Shehata and Abdeldaim, 2021; Tahir *et al.,* 2021).

Unfortunately, however, no published studies assessed the prevalence of digital addition in Egyptian school children particularly in the context of the COVID-19 pandemic. In this work, we aimed to estimate the prevalence of online gaming among Egyptian children before and during COVID-19 pandemic and to assess its relation to psychological distress.

PATIENTS AND METHODS

Design and sample size calculation

This cross-sectional survey was conducted in the period from January 2021 through June 2021 at Cairo, Egypt. The study protocol was approved by the ethical committee of Ain Shams Faculty of Medicine, and an informed consent was obtained from the included children and their legal guardians. Consents were collected by emails, WhatsApp messages, or phone calls after appropriate explanation of the study purpose and instruments. The sample size of the study was calculated by G Power 3.1 (University of Kiel, Germany) using an α error probability of 5.0% and study power of 80.0%.

Recruitment and procedure

The study included 1844 children from 19 schools. Children were included if they had at least 1 year of regular online gaming before January 2020. Their ages at the time of taking survey ranged from 10 to 18 years, and they provided the required informed consents. Children with known neurological or mental disorders were excluded from the study. These children were identified by asking parents or school physicians. Based on these criteria, schools prepared a list of eligible children (n=2705).

In every school, eligible children were divided into classes, and all children in the same class were invited to complete the online survey at the start of their regular online education day. This process was supervised by an independent researcher who was not aware of the nature of the study. The supervisor guaranteed that all children and/or their legal guardians had adequate understanding of the study instruments, and the studied children provided their own response to them without substantial assistance that could violate the integrity of the survey. Children provided their response to the study gaming addiction instrument twice: the first time represented their current gaming behavior during COVID-19 pandemic and the second represented their gaming behavior before the pandemic.

Study instruments

Gaming Addiction Scale

Gaming Addiction Scale (GAS7) was used in its short seven-item version. Each item of GAS7 represents one of the seven DSM-standards for gaming addiction (salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems). The responses to the items were rated using a five-point Likert scale ranging from one (never) to five (very often) (Lemmens *et al.,* 2009). Children with a score of three or more on the seven items were classified as addicted gamers, those who scored 3 or more points on four to six items were classified as problem gamers, and those who scored 3 or more points on less than four items were classified as nonproblem gamers (Brunborg *et al.,* 2015). The Arabic version of GAS had appropriate internal consistency and reliable concurrent validity (Asaad *et al.,* 2019).

Depression, Anxiety, and Stress Scale – Arabic version

Mental health was measured by Depression, Anxiety and Stress Scale – Arabic version (DASS-21). The total scores of depression subscale were divided into normal (0–4), mild (5–6), moderate (7–10), major (11–13), and very severe (14–21). The total scores of anxiety were divided into normal (0–3), mild (4–5), moderate (6–7), major (8–10), and very severe (11–20). The total scores of stress were divided into normal (0–7), mild (8–9), moderate (10–12), major (13–16), and very severe (17–18) (Lovibond, 1995). DASS-21 – Arabic version has been demonstrated to be a good psychometric screening tool with good validity and reliability (Moussa *et al.,* 2017). Included children were asked to complete the scale directly after completing GAS7. The scale was extensively explained to the supervisors, parents, and children. No interference or assistance that can affect the integrity of child response was allowed.

Statistical Analysis

Data obtained from the present study were statistically analyzed using SPSS 26.0 (IBM, Chicago, Illinois, USA). Numerical variables were presented as mean and SE or SD and were compared using t test or one-way analysis of variance with post-hoc analysis as appropriate. Categorical data were presented as number and percent and were compared using Fisher's exact test or χ^2 test as appropriate. Correlation analysis was achieved using Pearson's correlation coefficient. P value less 0.05 was considered statistically significant.

RESULTS

According to the predefined eligibility criteria, the present study identified 2705 eligible children. However, there were only 2000 surveys owing to logistic, administrative, or personal causes. In the final analysis, surveys from 1844 were included. According to GAS7 results, we could identify 525(28.5%) children as addicted gamers, 715(38.8%) as problematic gamers, and 604(32.8%) as nonproblematic gamers (Table 1). Comparison between these subgroups regarding the baseline data showed that addicted and problematic gamers were significantly older than nonproblematic gamers. Moreover, there was a significantly higher frequency of males among addicted and problematic gamers as compared with nonproblematic gamers (60.2 vs. 61.4% and 49.0%, respectively, $P<0.001$) (Table 1). In addition, it was noted that addicted and problematic gamers included significantly lower frequency of primary school children when compared with nonproblematic gamers (6.7 vs. 8.3% and 16.7% respectively, $P<0.001$) (Table 1).

Comparison between GAS7 scores before and after the COVID-19 pandemic showed significantly higher scores during the pandemic in all of the studied subgroups (Table 2) as shown in fig. (1).

Comparison between the studied subgroups regarding DASS scores and severity during the pandemic showed a relation between more GAS7 score and higher depression, anxiety, and stress scores and more severity of the three conditions (Table 3) as shown in figs. (2,3 and 4). A significant correlation was found between GAS7 scores and depression score (r=0.53), anxiety score (r=0.82), and stress score (r=0.76).

Table 1: Relation between game addition categories and the baseline characteristics:

	Addicted gamers *N*=525	Problematicgamers *N*=715	No-problematicgamers *N*=604	*p* value
Age (years)				
Mean±SE	14.1±1.9#	14.2±2.2#	13.5±2.2	<0.001
10-14 [*n*(%)]	308(58.7)#	427(59.7)#	413(68.4)	<0.001
15-18 [*n*(%)]	217(41.3)	288(40.3)	191(31.6)	
Gender [*n*(%)]				
Male	316(60.2)#	439(61.4)#	296(49.0)	<0.001
Female	209(39.8)	276(38.6)	308(51.0)	
Education [*n*(%)]				
Primary	35(6.7)#	59(8.3)#	101(16.7)	
Preparatory	286(54.5)	369(51.6)	299(49.5)	<0.001
Secondary	204(38.9)#	287(40.1)#	204(33.8)	

#Significant results versus non-problematic gamers.

Table 2: GAS7 scores in the different game addition categories before and during the pandemic:

	Addictedgamers *N*=525	Problematic gamers *N*=715	No-problematic gamers *N*=604	*p* value
GAS7 scores (mean±SD)				
Before pandemic	16.9±6.3#	16.2±5.0#	11.4±4.2	<0.001
During pandemic	26.3±4.3*#	22.3±3.2	13.9±3.2	<0.001
p value	<0.001	<0.001	<0.001	

GAS, Gaming Addiction Scale.*Significant results versus problematic gamers. #Significant results versus non-problematic gamers.

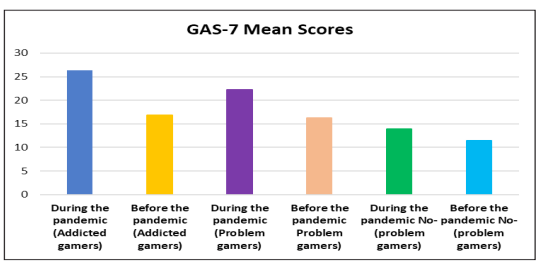

Figure 1: Gaming Addiction Scores among subsamples of addictive, problematic, and normal online gaming during and before COVID-19.

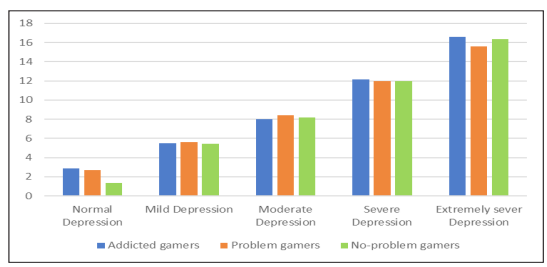

Figure 2: Game addition categories and Depression, scores, and severity during the pandemic.

Table 3: Relation between game addition categories and DASS scores and severity during the pandemic:

	Addictedgamers *N*=525	Problematic gamers *N*=715	No-problematic gamers *N*=604	*p* value
Depression scores (mean±SD)	11.8±3.1[#]	10.1±2.9 #	5.8 ± 1.7	<0.001
Depression severity [*n*(%)]				
Normal	27(5.1)[*#]	74(10.4)	272(45.0)	
Mild	33(6.3)[#]	64(9.0)[#]	88(14.6)	
Moderate	156(29.7)[#]	223(31.2)[#]	128(21.2)	<0.001
Severe	104(19.8)[*#]	205(28.7)[#]	63(10.4)	
Extremely severe	205(39.1)[*#]	149(20.8)[#]	53(8.8)	
Anxiety scores (mean±SD)	11.3±3.4[*#]	9.2±3.2[#]	4.7±2.0	<0.001
Anxiety severity [*n*(%)]				
Normal	23(4.4)[*#]	92(12.9)[#]	298(49.3)	
Mild	23(4.4)[*#]	60(8.4)	79(13.1)	
Moderate	107(20.4)[*]	89(12.5)	89(14.7)	<0.001
Severe	51(9.7)[*]	119(16.6)[#]	32(5.3)	
Extremely severe	321(61.1)[*#]	355(49.7)[#]	106(17.6)	
Stress scores (mean±SD)	11.4±2.7[*#]	10.2±3.5 #	6.1±1.4	<0.001
Stress severity [*n*(%)]				
Normal	137(26.1)[#]	184(25.7)[#]	390(64.6)	
Mild	51(9.7)[*]	121(16.9)[#]	63(10.4)	
Moderate	106(20.2)[*#]	211(29.5)[#]	71(11.8)	<0.001
Severe	160(30.5)[*#]	149(20.8)[#]	56(9.3)	
Extremely severe	71(13.5)[*#]	50(7.0)	24(4.0)	

[*]Significant results versus problematic gamers. [#]Significant results versus non-problematic gamers.

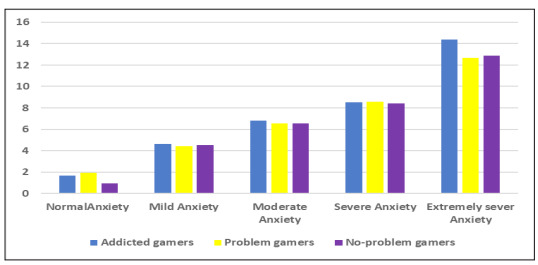

Figure 3: Game addition categories and Anxiety, scores, and severity during the pandemic.

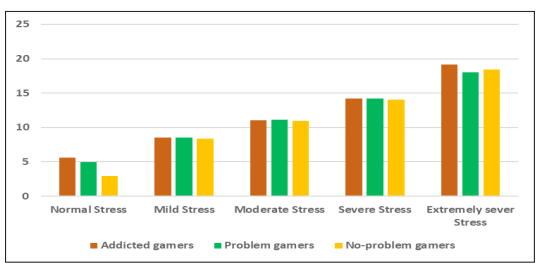

Figure 4: Game addition categories and Stress, scores, and severity during the pandemic.

DISCUSSION

Using GAS7, the present study could identify 525(28.5%) children as addicted gamers, 715(38.8%) as problematic gamers, and 604(32.8%) as nonproblematic gamers, reflecting a high prevalence of pathological gaming in the studied sample. As previously mentioned, no Egyptian studies assessed game addition in school children. However, one Egyptian study conducted on undergraduate university students diagnosed internet addiction in 47.5% (Salama, 2020), reflecting the relative burden of the problem in the community.

In our work, we could detect an association between game addition and older age of the included children. Moreover, male sex was related to game addition. Our findings are in line with the conclusions of Macur and Pontes (2021), who studied the profiles and associated risk factors of IGD in adolescence. In their work, male sex was one of four predictors of IGD. Likewise, the study by Andre *et al.,* (2021) showed extensive gaming in adolescents. Among the study participants, 30% of the male and 5% of the female respondents were categorized as extensive gamers.

In our study, GAS7 scores before and after the COVID-19 pandemic showed significantly higher scores during the pandemic in all of the studied subgroups. These findings are in line with prior scholarly assertions that the COVID-19 epidemic could lead to increased videogame participation (King *et al.,* 2020; Kiraly *et al.,* 2020). The expected rise in videogame participation can be seen as a mechanism that helps children and adolescents cope with the psychological burden associated with the epidemic (Ko and Yen, 2020; Liang *et al.,* 2020).

Adolescence is a critical period beginning with puberty and aiming for successful independence from parents (Casey and Caudle, 2013). Adolescents experience a growth process during which they begin to rebel against the powers of their parents, in order to develop an independent personality that proves its ability to face life's challenges, in addition to being a period characterized by emotional and behavioral difficulties, which makes it a fertile period for addiction (Steinberg, 2005; Peeters *et al.,* 2018), including online gaming addiction (Gentile *et al.,* 2011; Crews *et al.,* 2007).

In our study, we found a relation between more GAS7 score and higher depression, anxiety, and stress scores and more severity of the three conditions. This result is consistent with other studies and empirical research, which confirms that low quality of mental health can lead to gaming addiction (Maroney *et al.,* 2019; Wartberg *et al.,* 2019; Richard *et al.,* 2020).

In fact, the relation between gaming addition and poor mental health is bidirectional and can be best described as a vicious circle where both elements feed off each other. The effect of the COVID-19 pandemic is not less than substantial. Previous studies (Duan *et al.,* 2020; Huang and Zhao, 2020; Tull *et al.,* 2020) indicated that increasing burden of COVID-19 may lead to mental disorders.

CONCLUSION

Gaming addition is prevalent among Egyptian school children, and it was exacerbated by the COVID-19 pandemic. However, there are several limitations to consider in this study. First, the cross-sectional design does not allow follow-up of the condition over time. Second, the sample size calculation was restricted by some logistic and administrative factors, and the third limitation was the retrospective element of the study.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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