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Internet Addiction among Egyptian Teens during COVID 19 Pandemic

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Citation: Fekrey Armaneous A, Atta H, Adel Elkhatib A, Fouad Kamal A, Fawzy Sallam S. Internet Addiction among Egyptian Teens during COVID 19 Pandemic. SciBase Crit Care Emerg Med. 2024; 2(3): 1011.

Abstract

Introduction: Teens' lifestyles have changed significantly during and after COVID-19 epidemic, and they have started engaging in risky health behaviours like using smartphones more frequently. Everyone is compelled to use their smartphone more frequently than usual to access daily necessities during the COVID 19 pandemic lockdown.

Aim of the study: We aimed to evaluate the problem of internet addiction and increasing use of smartphone among teen age Egyptian youth during COVID19 pandemic.

Methodology: Online surveys were sent to Egyptian teens (12 to 18 years old) in several governorates in June 2020, and they were completed by 154 youths over the course of one month. Different teenagers were required to respond to and share in this poll, and versions in both English and Arabic were used. At the outset of the questionnaire, the question about consent was viewed as mandatory. The extent of internet use was evaluated using Young's Internet Addiction Test. The survey was divided into 4 sections and created with the goals of understanding the modes (frequency, patterns, and goals) of internet use, the negative effects, linked parental behaviours, as well as the eventual occurrence and severity of addiction. The same data from the time before the epidemic was also looked into and analysed. Version 23 of IBM SPSS Statistics was used for the analysis. The p-value threshold for significance was established at 0.05.

Results: The mean age of the teens was 14.38±2.87 years and equal gender frequency (males of 50.6% and females of 49.4%. 79.9% of them live in urban environment, 18.8% suffered from family problems and 40.9% were in the secondary educational level. Increased physical inactivity of participants was noticed after COVID among participants (55.8%). 87.7% of them used smartphone for online access (87.7%). Half of subjects (50%) spent 1 to 3 hours online before COVID, while more than half of them (59.1%) spent more than 6 hours online after COVID, with a statistically significant difference. Mean IAT was 61.91±16.77 after COVID versus 45.26±12.45 before COVID. The prevalence of internet addiction was increased from 67.5% before COVID to 77.9% after COVID infection. Mild, moderate and severe IAT were 16.2%, 65.6% and 12.3% during COVID compared to 5.8%, 61.0% and 6.5% before COVID respectively. Increasing mother's and father's educational, increasing time spent online, decreasing duration of sleep and lower number of days of exercise for more than 30 minutes per week were associated with higher IAT score.

Conclusions and Recommendations: During the COVID-19 pandemic, internet addiction was extremely common among teenagers (77.9%). The amount of time spent online, the length of sleep, and the number of days that a person exercises for more than 30 minutes per week were all predictors of addiction.

Keywords: COVID 19 infection; Internet addiction; Teens.

Introduction

The adoption of numerous measures, including both pharmaceutical and non-pharmacological methods, to reduce the extensive Corona-virus-19 transmission in the world resulted from an improved understanding of the epidemiology of the pandemic [1]. Following that, many nations implemented countrywide lock-downs by closing all schools and offices [2-4].

Egypt went under lock-down on March 14, 2020 [5]. Lockdown made teenagers spend more time at home, which increased the amount of time spent on-line [6].

In January 2020, Egypt had 54.74 million internet users, up from 44.94 million in 2019 (+22%). When internet penetration reached 72.2% in the beginning of 2023, there were 80.75 million more people on-line. In January 2023, there were 46.25 million social media users in Egypt, or 41.4% of the entire population. Early in 2023, there were 105.1 million active mobile phone connections in Egypt, which represents 93.9% of the country's population [7].

The Corona-virus-19 disease (COVID-19) outbreak's after-effects have exacerbated the link between technology and addiction. The COVID-19 problem has impacted health and well-being, which has exacerbated smart phone addiction [8-13].

The use of smart phones has significantly altered daily routines and behaviour. Applications enable social interaction, email access, music/video/film enjoyment, game play, and scheduling management. According to [14], smart phones can broaden horizons, foster safety, reduce stress, preserve connections, and provide essential information. But improper smart phone use encourages unintentional time-wasting, and excessive use raises the possibility of smart phone addiction, which can have negative effects on one's physical and mental well-being and lead to dependence. It can also have an impact on routines, habits, social behaviours, family relationships, and interpersonal relationships [15].

Relevant studies have examined whether internet addiction has significantly increased during the COVID-19 home quarantines, particularly among teenagers, without establishing a clear accurate prevalence [16,17,9-11,].

Aim of the study: We aimed to evaluate the problem of internet addiction and increasing use of smart phone among teen age Egyptian youth during COVID-19 pandemic.

Material and methods

Study design: Observational, cross-sectional on-line study design was used in this study.

Study participants: The study constituted adolescents attending secondary schools in different governorates in Egypt.

Eligibility criteria: (a) Teens (12 - 18 years), (b) Having internet account or smart phone cell, and (c) voluntary participation in the survey. Exclusion criteria: Subjects younger than 12 years of age, all adolescents who refused to consent, and those whose parents refused to consent were eliminated from the study. Additionally, those who were unable to engage in the study due to illness (both physical and mental) were not included.

Determination of sample size

Using Epi Info 7 software (center for disease control and prevention) Atlanta, Georgia) program for calculation of sample size and based on expected prevalence of internet addiction of 53.6% [18], 95% confidence level, and 5% confidence limits, the minimum sample size required is 150.

Tools

The COVID-19 pandemic-related social isolation limitations and lockdown in Egypt began on March 14, 2020, with a phased removal of lockdown measures beginning in July 2020. Complete lockdown included the closing of all recreational facilities, including schools, and promoted on-line learning and remote work from home. Consequently, data were gathered in June 2020, when children's and adolescents' freedom of movement was severely constrained and they were compelled to remain at home.

The 170 Egyptian participants in this study completed a self-report and anonymous questionnaire that was distributed via email and social media accounts (Twitter, Face book, and WhatsApp). Teenage smart phone users were included in the study if they met the other criteria. Google Forms was used to develop the questions. They were provided directly to teenagers via technological means (email, WhatsApp) along with a detailed explanation of the study's objectives. The governorates they came from included Cairo, Giza, Alexandria, Elbehira, Qaliubia, Dakahlia, Kafr El-Sheikh, Suez, Ismailia, Fayoum, Beni-Suef, Menia, Sohag, Assiut, and Menoufia. We had 154 participants overall after excluding 16 pupils from the study due to incomplete questionnaires.

Internet Addiction Test (IAT)

This questionnaire consists of 20 items regarding internet overuse. All items begin with the phrase "How often do you…", e.g., "How often do you try to cut down the amount of time you spend on-line and fail?" Respondents are requested to choose one of the following scores: 5 = always, 4 = often, 3 = frequently, 2 = occasionally, and 1 = rarely. The IAT has been used to measure the severity of internet addiction. The total score of IAT ranges from 20 to 100. In the present study, we classified the level of internet addiction according to the cut-off points previously reported by [19].

0 to 30 points are considered normal internet usage;

31 to 49 points indicate the presence of a mild internet addiction;

50 to 79 points reflect the presence of a moderate internet addiction;

80 to 100 points indicate a severe internet addiction.

Ethical considerations: The Institutional Review Board (IRB) of the National Research Centre in Giza, Egypt, gave its approval to this study. Additionally, each participant's informed consent was gained by a statement of agreement at the start of each questionnaire. All procedures were also carried out in accordance with the Declaration of Helsinki and all applicable rules and regulations. Teenagers were emailed a link to an on-line survey form that was labelled with the stud's goal. The on-line questionnaire's completion and submission was taken into account as the parent's written approval of his child's involvement in the study.

Statistical analysis

The statistical programme IBM SPSS (Statistical Package for the Social Sciences) version 23 (IBM SPSS Inc., Chicago, IL, USA)

was used to process the data. In order to control the findings, variables pertaining to the respondents' demographic traits, their family structure, and their parents' socioeconomic level were included in the analysis. Bivariate analysis (chi-square) was used to identify associations between variables, and multivariate analysis (binary logistic regression model) was used to identify predictors for all variables with a maximum p-value of 0.2. Using two-tailed tests, the level of statistical significance for each analysis was set at = 0.05.

Outcome measures

The prevalence of internet addiction among the participants served as the main outcome indicator. The participants' socio-economic and demographic characteristics that are linked to and predict internet addiction served as the secondary outcome measures.

Results

Baseline and social characteristics of the respondents

The mean age (±SD) of students participating in this study was 14.38 (±2.872), males constituted about 50.6% of participants and 79.9% of them live in urban. Majority of students (68.8%) live in Cairo, Giza and Alexandria, while 11.7% were living abroad. About 18.8% of participants suffered from family problems. Nearly equal number of students were in international school and language private schools (34.4% each), while 40.9% of participants were in the secondary educational level. Majority of participants' mothers and fathers were graduate (55.8% and 57.8%, respectively), with 76.6% of them live in medium socioeconomic level and majority (92.2%) were living with two parents. 63.6% of students completed the form without any help from mothers, fathers or other members. Majority of participants used smart phone for online access (87.7%), 42.2% of them had laptops and 17.5% of them used tablets (Table 1).

Before and after COVID infection

Increased physical inactivity of participants were noticed after COVID among participants (55.8%), versus 22.1% of inactivity before COVID (p=0.009). Regarding hours of sleep, 66.2% of participants had 6 to 8 hours of sleep before COVID, while 53.2% of them had 8 to 12 hours of sleep after COVID, with a statistically significant difference. Only 12.3% of participants spent more than 6 hours with their family before COVID, versus 39.6% after COVID. Half of subjects (50%) spent 1 to 3 hours on-line before COVID, while more than half of them (59.1%) spent more than 6 hours on-line after COVID, with a statistically significant difference. As expected, real social activity had a statistically significant decrease after COVID. Most of students did not use the on-line learning at all before COVID (57.1%), while more on-line learning was used at the time of COVID, with 50.6% of students used the internet access for doing homework (Table 2).

There was a statistically highly significant increase in the time spent on-line for different purposes after COVID among students, as chat, social networking services, gaming, videos, etc. Other purposes included food channels, Tik-Tok, Instagram, courses, reading, children's sites, training, religious sites, drawing and watching series and movies (table 3).

There was a statistically highly significant increase in the frequency of use of various social networking services after COVID than before, especially, the Facebook, Zoom and Tik-Tok services. Other services used included Netflix, Viber, YouTube, Twitch and Pinterest (Table 4).

Table 1: Baseline and social characteristics of enrolled students (n=154).

Variables		No (%)
Age (years)	Mean±SD	14.38±2.87
	Range	(12 – 18)
Gender	Male	78 (50.6)
	Female	76 (49.4)
Residence	Urban	123 (79.9)
	Abroad	31 (20.1)
Languages	Arabic	105 (68.2)
	English	49 (31.8)
Educational level	Primary	31 (20.1)
	Preparatory	40 (26.0)
	Secondary	63 (40.9)
	Diploma	2 (1.3)
	University	18 (11.7)
Type of School	International School	53 (34.4)
	Language Private School	53 (34.4)
	Arabic Private School	19 (12.3)
	Language Experimental School	10 (6.5)
	Arabic Experimental School	3 (1.9)
	State School	16 (10.4)
Family Status	Normal	125 (81.2)
	Family conflicts	11 (7.1)
	Divorce	6 (3.9)
	Child's negative feeling to parents	8 (5.2)
	Parent's negative feeling to parent	8 (5.2)
	Single child family	6 (3.9)
Mother's Education	Primary or Preparatory	4 (2.6)
	Secondary or Diploma	17 (11.0)
	Graduate	86 (55.8)
	Postgraduate	47 (30.5)
Father's Education	Primary or Preparatory	1 (0.6)
	Secondary or Diploma	15 (9.7)
	Graduate	89 (57.8)
	Postgraduate	49 (31.8)
Socio-economic level	Low socioeconomic level	2 (1.3)
	Medium socioeconomic level	118 (76.6)
	High socioeconomic level	34 (22.1)
With whom does the student live?	Two parents	142 (92.2)
	Mother only	11 (7.1)
	Father only	1 (0.6)
Who completed the form?	Student	98 (63.6)
	Student with mother's help	35 (22.7)
	Student with father's help	11 (7.1)
	Others	10 (6.5)
You go online using	Smartphone	135 (87.7)
	Laptop	65 (42.2)
	Tablet	27 (17.5)
	PC	15 (9.7)
	Smartwatch	4 (2.6)

Table 2: Frequency distribution and percentage of number of hours student spend sleeping, with family, doing social activity or online.

Variables		Before COVID		After COVID		P value
		No	%	No	%	
How many days/week do you exercise for more than 30 minutes?	None	34	22.1	86	55.8	0.009*
	1 day/week	15	9.7	19	12.3	
	2 days/week	27	17.5	16	10.4	
	3 days/week	41	26.6	23	14.9	
	4 days/week	10	6.5	3	1.9	
	5 days/week	27	17.5	7	4.5	
How many hours do you sleep per day?	Less than 4 hours	0	0.0	1	0.6	0.000*
	4-6 hours	15	9.7	11	7.1	
	6-8 hours	102	66.2	53	34.4	
	8-12 hours	35	22.7	82	53.2	
	More than 12 hours	2	1.3	7	4.5	
How many hours you spend with your family per day?	Less than 1 hour	38	24.7	16	10.4	0.000*
	1-3 hours	66	42.9	43	27.9	
	3-6 hours	31	20.1	34	22.1	
	More than 6 hours	19	12.3	61	39.6	
How many hours do you have real social activity?	Less than 1 hour	35	22.7	100	64.9	0.025*
	1-3 hours	54	35.1	29	18.8	
	3-6 hours	30	19.5	17	11.0	
	More than 6 hours	35	22.7	8	5.2	
How many hours do you spend time online	Less than 1 hour	19	12.3	6	3.9	0.000*
	1-3 hours	77	50.0	13	8.4	
	3-6 hours	39	25.3	44	28.6	
	More than 6 hours	19	12.3	91	59.1	
The online learning you used was in the form of	None	88	57.1	17	11.0	0.000*
	Interactive learning	22	14.3	58	37.3	
	Homework	46	29.9	78	50.6	
	Videos	22	14.3	77	50	
	Others	4	2.6	9	5.8	

Table 3: Frequency distribution and percentage of the time spent online for different purposes.

		Before COVID		After COVID		P value^
		No	%	No	%	
Chat	Never	10	6.5	3	1.9	0.000
	Rarely	30	19.5	20	13.0	
	Sometimes	51	33.1	27	17.5	
	Often	37	24.0	49	31.8	
	Always	26	16.9	55	35.7	
Social Networking Service	Never	14	9.1	9	5.8	0.001*
	Rarely	26	16.9	21	13.6	
	Sometimes	50	32.5	25	16.2	
	Often	30	19.5	38	24.7	
	Always	34	22.1	61	39.6	
Gaming	Never	15	9.7	14	9.1	0.000*
	Rarely	41	26.6	32	20.8	
	Sometimes	46	29.9	23	14.9	
	Often	28	18.2	43	27.9	

	Always	24	15.6	42	27.3	
Music	Never	13	8.4	14	9.1	0.000*
	Rarely	50	32.5	28	18.2	
	Sometimes	32	20.8	42	27.3	
	Often	28	18.2	29	18.8	
	Always	31	20.1	41	26.6	
Video	Never	3	1.9	4	2.6	0.000*
	Rarely	28	18.2	16	10.4	
	Sometimes	48	31.2	42	27.3	
	Often	46	29.9	38	24.7	
	Always	29	18.8	54	35.1	
Web searches	Never	8	5.2	12	7.8	0.000*
	Rarely	47	30.5	19	12.3	
	Sometimes	54	35.1	46	29.9	
	Often	25	16.2	49	31.8	
	Always	20	13.0	28	18.2	
News	Never	67	43.5	43	27.9	0.000*
	Rarely	52	33.8	33	21.4	
	Sometimes	18	11.7	37	24.0	
	Often	15	9.7	29	18.8	
	Always	2	1.3	12	7.8	
Sports sites	Never	61	39.6	67	43.5	0.000*
	Rarely	35	22.7	33	21.4	
	Sometimes	28	18.2	28	18.2	
	Often	17	11.0	13	8.4	
	Always	13	8.4	13	8.4	
TV channels	Never	47	30.5	42	27.3	0.000*
	Rarely	50	32.5	32	20.8	
	Sometimes	31	20.1	32	20.8	
	Often	10	6.5	29	18.8	
	Always	16	10.4	19	12.3	
Others	Never	77	50.0	76	49.4	0.000*
	Rarely	37	24.0	38	24.7	
	Sometimes	21	13.6	19	12.3	
	Often	9	5.8	8	5.2	
	Always	10	6.5	13	8.4	

^Chi-square test. *Significant.

Table 4: Frequency distribution and percentage of the time of usage of Social Networking Services.

		Before COVID		After COVID		P value^
		No	%	No	%	
Facebook	Never	25	16.2	19	12.3	0.000*
	Rarely	28	18.2	20	13.0	
	Sometimes	39	25.3	28	18.2	
	Often	36	23.4	35	22.7	
	Always	26	16.9	52	33.8	
Twitter	Never	65	42.2	60	39.0	0.000*
	Rarely	43	27.9	38	24.7	
	Sometimes	33	21.4	35	22.7	
	Often	8	5.2	11	7.1	
	Always	5	3.2	10	6.5	

WhatsApp	Never	7	4.5	3	1.9	
	Rarely	10	6.5	5	3.2	
	Sometimes	40	26.0	34	22.1	0.000*
	Often	33	21.4	38	24.7	
	Always	64	41.6	74	48.1	
Telegram	Never	83	53.9	68	44.2	
	Rarely	41	26.6	45	29.2	
	Sometimes	20	13.0	23	14.9	0.000*
	Often	7	4.5	13	8.4	
	Always	3	1.9	5	3.2	
Snapchat	Never	53	34.4	49	31.8	
	Rarely	40	26.0	40	26.0	
	Sometimes	36	23.4	31	20.1	0.000*
	Often	11	7.1	8	5.2	
	Always	14	9.1	26	16.9	
Instagram	Never	37	24.0	32	20.8	
	Rarely	32	20.8	32	20.8	
	Sometimes	31	20.1	25	16.2	0.000*
	Often	19	12.3	21	13.6	
	Always	35	22.7	44	28.6	
Zoom	Never	93	60.4	32	20.8	
	Rarely	28	18.2	25	16.2	
	Sometimes	16	10.4	48	31.2	0.000*
	Often	10	6.5	25	16.2	
	Always	7	4.5	24	15.6	
Tik-Tok	Never	69	44.8	51	33.1	
	Rarely	31	20.1	25	16.2	
	Sometimes	29	18.8	32	20.8	0.000*
	Often	14	9.1	21	13.6	
	Always	11	7.1	25	16.2	
IMO	Never	100	64.9	84	54.5	
	Rarely	35	22.7	29	18.8	
	Sometimes	14	9.1	25	16.2	0.000*
	Often	2	1.3	10	6.5	
	Always	3	1.9	6	3.9	
Others	Never	103	66.9	87	56.5	
	Rarely	23	14.9	29	18.8	
	Sometimes	15	9.7	18	11.7	0.000*
	Often	7	4.5	7	4.5	
	Always	6	3.9	13	8.4	

Prevalence of internet addiction among the respondents

Total scoring of internet addiction test was higher among students after COVID (61.91±16.77) than before COVID (45.26±12.45), with a highly statistically significant difference (p<0.001). IAT score was mild, moderate and severe in 16.2%, 65.6% and 12.3% after COVID respectively compared to mild, moderate and severe in 26.6%, 61.0% and 5.8% before COVID respectively with significant differences between them before and after COVID (p<0.000). We consider moderate and severe addictions were the categories that significantly relevant, so the prevalence of internet addiction among enrolled teens was increased from 67.5% before COVID to 77.9% of 154 teens after COVID infection (table 5).

Scoring of IAT in relation to gender, residence and social characteristics

There was no statistically significant difference in IAT scoring before or after COVID regards to gender differences, residence, type of school, and educational level of teens, mother's and father's education, socio-economic level and partner whom does the child lives with them (p>0.05) (Table 6).

Table 5: Frequency distribution and percentage of internet addiction grades according to the scoring interpretation of IAT.

		Before COVID		After COVID		P value^
Total IAT score (Mean± SD)		45.26±12.45		61.91±16.77		0.000*
		No	%	No	%	
Scoring IAT interpretation	Normal internet usage	41	26.6	9	5.8	0.000*
	Mild internet addiction	9	5.8	25	16.2	
	Moderate internet addiction	94	61.0	101	65.6	
	Severe internet addiction	10	6.5	19	12.3	

^ Chi-square test. *Significant.

Table 6: Scoring of IAT in relation to gender, residence and social characteristics (expressed in Mean± SD).

Variables		Before COVID score	F	P value	After COVID score	F	P value
Gender	Male	55.60±16.03	0.077	0.781	63.36±17.09	1.182	0.279
	Female	54.91±14.93			60.42±16.41		
Residence	Urban	55.76±15.24	0.629	0.429	62.38±16.10	0.484	0.488
	Abroad	53.29±16.37			60.03±19.36		
Type of school	International	54.38±15	1.216	0.305	59.83±15.9	1.148	0.338
	Language Private	56.57±16.264			63.43±17.711		
	Arabic Private	56.68±12.876			65.21±13.286		
	Language Experimental	59±13.258			66.4±16.426		
	Arabic experimental	36.33±4.509			45.67±7.572		
	State	53.38±18.323			60.06±20.43		
Educational level	Primary	51.84±17.365	1.157	0.332	58.42±19.802	0.957	0.433
	Preparatory	55.58±17.994			61.55±19.470		
	Secondary	55.29±13.907			61.98±14.968		
	Diploma	48.00±0.00			67.00±0.00		
	University	61.17±10.217			67.89±9.480		
Mother's education	Primary or Preparatory	46±20.607	1.264	0.288	52.5±23.923	1.335	0.265
	Secondary or Diploma	46.88±13.55			56.06±21.306		
	Graduate	55.23±14.028			62.52±15.596		
	Postgraduate	59.13±15.812			63.7±16.332		
Father's education	Primary or Preparatory	20±0	1.141	0.321	20±0	2.490	0.063
	Secondary or Diploma	49.40±16.987			58.2±19.622		
	Graduate	55.19±14.982			62.42±16.182		
	Postgraduate	57.90±14.894			62.98±16.182		
Socio-economic level	Low	43.50±33.234	0.974	0.380	45.0±35.355	1.952	0.146
	Medium	54.82±14.857			61.15±16.056		
	High	57.47±16.646			65.53±17.877		
With whom does the child live?	Two parents	54.60±15.326	1.877	0.157	61.38±17.063	0.979	0.378
	Mother only	63.91±15.915			68.73±12.001		
	Father only	54.00±0			62±0		

Independent T Test

Table 7: Linear regression analysis of IAT score in relation to other parameters.

Predictor	Unstandardized Coefficients		Standardized Coefficients	t	P value	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Age of student (years)	0.687	0.435	0.128	1.580	0.116	-0.172-	1.547
Gender	-0.695-	2.498	-0.023-	-0.278-	0.781	-5.631-	4.241
Residence	-1.233-	1.555	-0.064-	-0.793-	0.429	-4.305-	1.839
Type of School	-0.382-	0.803	-0.039-	-0.476-	0.635	-1.968-	1.204
Socio-economic level	3.362	2.849	0.095	1.180	0.240	-2.266-	8.991
Mother's Education	5.182	1.718	0.238	3.017	0.003*	1.788	8.576
Father's Education	4.689	1.943	0.192	2.414	0.017*	0.851	8.527
Duration of sleep	-5.423-	2.058	-0.209-	-2.634-	0.009*	-9.489-	-1.356-
Number of days per week of exercise more than 30 minutes	-2.253-	0.706	-0.251-	-3.193-	0.002*	-3.647-	-0.859-
Time spent online	5.062	1.695	0.232	3.002	0.003*	1.722	9.589
Educational level	1.881	1.055	0.143	1.782	0.077	-0.204-	3.966

Predictors of internet addiction among the respondents

By doing linear regression, taking IAT score as the dependent variable and other parameters were used as the independent variables, it was noticed that increasing mother's and father's educational, increasing time spent online, decreasing duration of sleep and lower number of days of exercise for more than 30 minutes per week were associated with higher IAT score (p<0.05) (Table 7).

Discussion

The idea of internet and smart phone addiction has become more important in light of the rising internet use caused by the decline in social connection during the COVID-19 shut-down [20]. As a result, action must be taken to stop or cure this addictive behaviour, with the first step being the development of a precise diagnostic criterion [15].

Importantly, all schools were closed in Egypt during the COVID-19 outbreak, and at one time, online classes were developed to keep all types of pupils occupied. Homes were compelled to install internet access. With a highly statistically significant difference (p=0.001), the overall internet addiction test score climbed from 45.26±2.45 before COVID to 61.9116.77 after COVID. Compared to mild, moderate, and severe IAT scores of 26.6%, 61.0%, and 5.8% before COVID, respectively, there were significant differences between them before and after COVID (p=0.000) in 16.2%, 65.6%, and 12.3% of patients, respectively. We consider moderate and severe addictions were the categories that significantly relevant, so the prevalence of internet addiction among enrolled teens was increased from 67.5% before COVID to 77.9% of 154 teens after COVID infection. Similar to current findings, [5] revealed that during the period of COVID-19 pandemic and according to IAT score, the majority (74.65%) was problematic users, and 10.69% were classified as severe internet addicts.

Similar to this, [21] found that internet addiction rose from 7.7% to 64.3% before and after the COVID-19 pandemic, respectively, in a study of adolescents in Nigeria. Internet addiction was recently discovered in 63.2% of respondents in a study by [22] (24.9% had mild, 59.6% had moderate, and 3.6% had severe).

The prevalence at the time was higher than what [23] found to be 23.5%, [24] found to be 37.4%, [25] found to be 43.69%, [26] found to be 44.9%, [27] found to be 53.3%, and [18]. However, their study did not distinguish between mild, moderate, and severe internet addiction. For instance, in Taiwan, the prevalence rate among adolescents increased from 17.4% to 24.4% during the pandemic [28].

Our study found a higher prevalence of internet addiction than some of the earlier studies. The timing of the many research and the populations examined may have contributed to this outcome. Additionally, during the mandatory lock down and after all schools were closed when our study was conducted in the middle of 2020, people and institutions were required to follow certain COVID-19 safety procedures, which included social separation. Since social media was being utilised at the time to kill boredom and people had not yet undone the lifestyle adjustments they had made during the lock down, it stands to reason that students' unrestrained internet use during the lock down had led to addiction. Naturally, this could be the cause of the study's findings regarding the prevalence of internet addiction. There is evidence that the lock down increased use of social media sites, particularly among young people, who became more dependent on it as it offered a convenient means of connecting with others and the outside world [29].

Similar to [30-32,5,24] and other studies, the current study found no statistically significant difference in IAT scoring before or after COVID regarding gender differences. According to previous research [33-36,23] females consistently scored on average much higher than males. However, other research [37,38,27,25] have discovered higher scores and a larger chance of addiction among the male population.

Although content watched and motivation/justification may vary, the current results showed similar symptoms in both males and females and equivalent degrees of smart phone addiction [15].

It was intriguing to see from our study that 42.2% of the enrolled youths had laptops, 17.5% used tablets, and 87.7% used smart phones to access the internet. This might be due to the fact that multiple on-line schools developed during the

pandemic and gave teens access to mobile devices. This was corroborated by the fact that during COVID lock down, roughly 50.6% of respondents mostly accessed the internet for assignments. However, a sizeable portion of them utilised the internet for social networking, particularly WhatsApp (72.8%) and Facebook (56.5%). This result is consistent with previous research that found teenagers spend a lot of time communicating on social media, particularly Facebook and WhatsApp [39,26]. The respondents' high internet usage was consistent with the evidence that internet usage among Egyptians had grown steadily from 41.79 million users in January 2020 to 59.66 million users in January 2021 (+18%) [7].

No statistically significant differences in IAT scores between enrolled teens before and after COVID were found in relation to residence, type of school, educational level, mother's and father's education, socioeconomic status, or partner with whom the child resides (p>0.05).

These results were compared to those from the [22] study, which showed that internet addiction was significantly correlated with the respondent's age (p=0.043), mother's education level (p=0.023), family size (p=0.021), place of residence (p=0.035), alcohol intake (p=0.017), smoking (p=0.015), substance use (p=0.001), and length of internet use. (p<0.001).

By using linear regression with the IAT score as the dependent variable and other parameters as the independent variables, it was discovered that higher IAT scores were correlated with higher levels of education for the parents, increased online time, shorter sleep duration, and fewer days of exercise lasting longer than 30 minutes per week (p 0.05).

A 2-hour cut-off time interval was employed in previous research conducted in Bangladesh and Hungary [40,41], according to those studies' findings. Additional research [42,39,43,27] has demonstrated that a lower number of exercise days is an independent risk factor for internet addiction.

According to [5], 55% of individuals who were classed as internet addicts were between the ages of 15 and 18; this shows that older age is substantially connected with internet addiction.

Internet addiction was recently found to be predicted by male gender, mid- and late teenage age groups of 14-19 years, as well as having used the internet for more than 6 months in a study by [22].

In [25], a multiple regression analysis was performed to predict the addiction score from gender, age, time spent using digital media, and the intensity of negative feelings during the COVID-19 epidemic. Higher levels of internet addiction were linked to factors such as female gender, advancing age, longer time spent using digital media, and higher negative emotion intensity during the COVID-19 pandemic.

This result confirms earlier research by [44], which discovered that time spent on-line was a predictor of internet addiction as well. Although there is a strong correlation between time spent on-line and internet addiction, the cause and impact of this correlation cannot be determined by a cross-sectional study. However, this discovery might be useful for both preventing and treating internet addiction. In addition, [45] found that the amount of time spent on-line is a risk factor for developing an internet addiction, even going so far as to assert that just an hour more of on-line time is enough to raise problematic

behaviour or addiction. Demonstrated [46] in a longitudinal design that higher gaming time is a substantial predictor of a subsequent gaming disorder, independent of the pandemic and exclusive to gaming. On the other hand, [47] discovered no statistically significant link between the length of social media use and problematic social media use.

Due to the rising amount of time kids spend on-line and the much increased rates of reliance following lock down, these findings about digital media usage time become pertinent in the face of the pandemic [48]. related to the most advanced forms of digital media (food channels, Tik-Tok, Instagram, courses, reading, kids' websites, training websites, religious websites, drawing, viewing TV shows and movies, Facebook, Zoom, and Tik-Tok services. In the study presented here, [49] discovered a significant increase in screen media use and problematic media use among children in the United States during the COVID-19 pandemic. Other services used included Netflix, Viber, YouTube, Twitch, and Pinterest. During COVID-19, [50] observed an upsurge in smartphone usage. The likelihood of developing problematic patterns of use grows when young people spend more time playing games and using smartphones [51].

According to [52], throughout the epidemic, about 30% of individuals spent more than five hours each day on-line. The amount of time spent on-line has increased since the epidemic began. It was shown that there was a mildly favourable correlation between internet and smart phone addiction and depression and anxiety. Later, according to [23], daily smart phone usage time, the severity of anxiety symptoms, and the type of coping strategy used all predict smart phone addiction.

The duration of internet use and the frequency of internet/smart phone addictions among teenagers both rose throughout the COVID-19 period, according to a systematic study by [20]. However, studies on smart phone and internet addiction found no difference in gender. Additionally, it has been discovered that adolescent internet and smart phone addictions are linked to mental illnesses, particularly post-traumatic stress disorder, anxiety disorders, and depression. Internet and smart phone addiction can be viewed as a risk factor for teenagers during the COVID-19 period when these findings are taken into consideration collectively.

Limitations of study

The cross-sectional aspect of the research, which must be taken into account when interpreting and generalising the results, is one of the study's weaknesses.

The youngsters' inability to recall exactly how many hours they spent on-line may have introduced bias. Therefore, the potential for recollection bias may have an impact on our study.

Before participating in the study, individuals were not clinically evaluated to ascertain their mental and physical health; nevertheless, those who had a history of serious health issues were not permitted to take part.

This study's generalizability to broader time periods or lockdown-free situations is constrained because it was carried out during the COVID-19 epidemic.

Conclusions and recommendations

In Egypt, teens have a high frequency of internet addiction (77.9%), according to our study. The amount of time a youngster spent on-line, the education level of their parents, how

much they slept, how many days they exercised for more than 30 minutes each week, and how much time they spent on-line were all linked to internet addiction.

In order to aid in the early detection of internet addiction during pandemics like COVID-19, parents and guardians should closely monitor their children's use of the internet. They should keep in mind that factors like time spent on-line, sleep duration, and daily exercise may increase the likelihood that internet addiction will develop in a particular population of teenagers.

In order to reduce the danger of developing physical and mental illnesses, parents should think about how they can regulate and track their children's smart phone usage.

Future decisions about the planning of appropriate care for teenagers when the COVID-19 pandemic ends will be guided by the linked factors of the increased prevalence of internet addiction following the lock down of the pandemic.

Finally, as the average age of smart phone users continues to decline, future research should take into consideration evaluating the effects of internet addiction using a variety of methodologies that take into account both the physical and psychosocial effects of individual users.

Abbreviations: COVID-19: Corona-Virus-19 Disease; IAT: Internet Addiction Test; SPSS: Statistical Package For The Social Sciences; IRB: The Institutional Review Board.

Declarations

Ethics approval and consent to participate: The Institutional Review Board (IRB) of the National Research Centre in Giza, Egypt, gave its approval to this study. Additionally, each participant's informed consent was gained by a statement of agreement at the start of each questionnaire. All procedures were also carried out in accordance with the Declaration of Helsinki and all applicable rules and regulations. Teenagers were emailed a link to an on-line survey form that was labelled with the stud's goal. The on-line questionnaire's completion and submission was taken into account as the parent's written approval of his child's involvement in the study.

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Authors' contributions: Study design, data collection, data analysis, writing the Manuscript, all these part were a shred work between all authors with variable but finally equal amounts.

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