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# Original<br/>ArticleSleep problems and internet addiction among<br/>children

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#### ABSTRACT

**Background:** internet addiction disorder (IAD) is a compulsive-impulsive spectrum disorder characterized by offline and online computers. Extreme usage, tolerance, withdrawal, and negative consequences are typical characteristics in all varieties. They all have the same societal consequences as impulse control and drug misuse problems, including yearning, loss of control, and withdrawal symptoms.

**Objective:** To assess the impact of internet addiction on sleep quality among a sample of school children between 6-12 years of age.

**Methodology:** This is an observational, descriptive, cross-sectional study involving 160 children between 6-12 years old who attended Al-Zahraa university hospital and children of health care providers at Al-Zahraa hospital between August 2021- January 2022.

**Results:** The findings revealed a statistically significant difference between the IAT total score, sleep and quality of life. The mean total IAT score was  $68.53\pm24.08$ ; 10.6% of children were normal, 5.6% were mild, 45.6% were moderate, and 38.1% were severe. Regarding sleep habits, 144~(90.0%) kids suffer from nighttime resistance and 48~(30.0%) kids suffer from Sleep delay, 79~(49.4%) kids suffer from a disturbance in sleep time, 97~(60.6%) kids suffer from sleep anxiousness, 135~(84.4%) kids suffer from evening awakens and sleep disorders, 144~(90.0%) kids suffer from Sleep disease, 138~(86.2%) kids suffer from Sleep apnea, and 141~(88.1%) kids suffer from Daytime sleepiness.

**Conclusion:** The study's findings revealed that the participants have sleep disturbance associated with excessive Internet use.

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Keywords: Internet addiction disorder, autism spectrum disorder, obsessive-compulsive disorder.

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#### INTRODUCTION

A review by Kuss et al. <sup>[1]</sup> reported that in the United States, the prevalence of internet addiction disorders (IAD) ranged from 0.3% to 0.7%, and in Italy, it was 0.8%. Still, the prevalence among Asian populations was substantially greater. Social phobia, attention deficit hyperactivity disorder, and major depressive disorder are the most frequent mental conditions linked to IAD <sup>[2]</sup>. IAD affects teenagers the most, with two crucial Italian research, focused on teenagers revealing a rate of IAD of roughly 5% <sup>[3]</sup>. Numerous factors are influence adolescents' and children's sleeping habits, including lifestyle, age, and contextual factors <sup>[4]</sup>.

Internet addiction, the first hypothesised channel, influences the relationship between sleep efficiency and depressive disorders. Sleep quality modulates the relationship between internet addiction and depressive symptoms in the next hypothesised pathway <sup>[5]</sup>. Pupils who are sleep deprived spend more time on social networking platforms <sup>[6]</sup>.

Students who use the internet for more extended periods are more likely to acquire depressed problems. Students who are addicted to the internet, additionally, are more likely to have trouble sleeping <sup>[7]</sup>. Symptoms of depression are more common among students who have sleep issues <sup>[5]</sup>. This study was conducted to detect the relationship between internet addiction and sleep problems among school children between 6-12 years of age.

#### PATIENTS AND METHODS

Our study is an observational, descriptive, crosssectional study involving 160 children between 6 and 12 years old. The Children Recruited from pediatric outpatient clinics and children of healthcare providers who fulfilled the study's scope between August 2021-January 2022.

#### **Inclusion criteria**

Child included male or female with I.Q between (85-115), living with their mother for at least six months, the mother should be between 20-50 years old.

#### **Exclusion criteria**

The children or mothers with history of psychiatric problems, children with any neurological or history of sleep problems and children without access to the internet.

#### **Study tools**

We subjected all the participants to the following

- 1. Psychiatric interview with the mother and child.
- 2. Children's sleep habits questionnaire (CSHQ) Arabic version <sup>[7]</sup> answered by the mother. A systematic interview was administered to parents to determine sleep disorders in school-aged (6 to 12 years). The questionnaire comprises 33 items that span eight different categories or factors <sup>[8]</sup>.
- **3.** Internet Addiction Test (IAT) by Dr Kimberly Young Arabic version <sup>[9]</sup> answered by the child. The IAT test categorizes addictive behavior into four groups by measuring the level of participation in online activities utilizing replies on a 5-degree Likert type scale. There are four types of addiction: none, mild indications of addiction, moderate indicators of addiction, and severe evidence of addiction <sup>[11]</sup>. Addiction Diagnostic Questionnaire. Children were found 'internet dependent' if they answered yes to five almost all of the topics, and at-risk for internet reliance if they responded yes to three to four queries <sup>[10]</sup>.
- 4. Kid-KINDLR children questionnaire (Quality of life (QOL) questionnaire) Arabic Version [10]. Answered by the child. The questionnaire consists of 24 Likert-scaled items associated with six dimensions physical well-being (4 items), Emotional well-being (4 items), self-esteem (4 items), Family (4 items), friends (4 items), everyday functioning (school) (4 items). The subscale score of quality of life questionnaire (mean) = sum of sub-scale items/number of sub-scale items. The sub-scale score of quality of life % = the mean of sub-scale transformed to a range from 0 to 100. The total score of QOL and total score of each sub-scale of the KINDLR questionnaire are scored so that a better score equates to a more excellent health-related standard of living <sup>[12]</sup>.

#### **Statistical Analysis**

Data were collected, revised, coded and entered into the Statistical Package for Social Science (IBM SPSS) version 20. The qualitative data were presented as numbers and percentages, while quantitative data were presented as mean, standard deviations and ranges when their distribution was parametric. The comparison between two groups with qualitative data was done using the Chi-square test, and/or Fisher exact test was used instead of the Chi-square test when the expected count in any cell was found less than 5. The comparison between two independent groups with quantitative data and parametric distribution was made using an independent t-test. The comparison between more than two independent groups with quantitative data and parametric distribution was done using the One Way ANOVA test. Spearman correlation coefficients were used to assess the correlation between two quantitative parameters in the same group. The confidence interval was set to 95%, and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: P > 0.05 =non-significant and P < 0.05 = significant.

#### **RESULTS**

Considering the distribution of the studied cases according to socio-demographic data number of children were 160 children. The mean  $\pm$  SD of children age was 8.92 $\pm$ 2.09 years. The study included 77 boys and 83 girls, considering the education of parents was 68 (42.5%) were less than secondary school, 56 (35.0%) were secondary school, and 36 (22.5%) were higher education. According to Personality traits, aggression was found in 116 cases (72.5%). Enuresis was found in 38 cases (23.8%). Temper tantrum was found in 38 cases (23.8%). Finally, Shyness wasn't found in any cases (table 1). The mean total IAT score was 68.53 $\pm$ 24.08, and there was 10.6% normal, 5.6% mild, 45.6% moderate and 38.1% severe (table 2).

The outcomes of the CSHQ demonstrate that sleep habits 144 (90.0%) kids suffer from nighttime resistance and 48 (30.0%) kids suffer from Sleep delay, 79 (49.4%) kids suffer from a disturbance in sleep time, 97 (60.6%) kids suffer from sleep anxiousness, 135 (84.4%) kids suffer from evening awakens and sleep disorders, 144 (90.0%) kids suffer from Sleep disease, 138 (86.2%) kids suffer from sleep apnea, and 141 (88.1%) kids suffer from daytime sleepiness (table 3).

Considering the quality of life questionnaire subtest (Kid-KINDLR questionnaire) among the studied cases, the mean  $\pm$  SD of physical well-being was  $3.15\pm1.09$ , physical well-being % was  $53.67\pm27.34$ , emotional well-being was  $3.11\pm1.13$ , emotional well-being % was  $52.85\pm28.19$ , self-esteem was  $3.27\pm1.04$ , self-esteem % was  $56.72\pm25.90$ , the family was  $3.20\pm1.09$ , the family was  $55.08\pm27.21$ , standard friends was  $3.16\pm1.10$ , friends % was  $54.06\pm27.44$ , everyday functioning was  $2.89\pm0.78$ , and everyday functioning % was  $18.66\pm4.06$ , and the total QOL score % was  $73.57\pm16.91$  (table 5).

There was a highly statistically significant difference found between three groups regarding Age (years), Education of parents and social stressors with Normal, Mild, Moderate and Severe IAT (table 6).

There was a statistically significant difference between the total score and sleep habits among the studied children. The total score of internet addiction was high in children who answered yes, regarding sleep latency with mean  $\pm$  SD of 75.81 $\pm$ 21.22, disturbance in sleep time with mean  $\pm$  SD of 75.41 $\pm$ 18.25, anxiety-related to sleep with mean  $\pm$  SD of 74.09 $\pm$ 17.77, night awakens and sleep interruption with mean  $\pm$  SD of 74.76 $\pm$ 17.84, sleep disorder with mean  $\pm$  SD of 74.56 $\pm$ 16.34, sleep apnea with mean  $\pm$  SD of 74.07 $\pm$ 16.94, bedtime resistance with mean  $\pm$  SD of 73.38 $\pm$ 17 and day time sleepiness with mean  $\pm$  SD of

 $73.55\pm19.12$  (table 7). The IAT was statistically negatively correlated with physical well-being %, emotional well-being (%), self-esteem %, family %, friends %, everyday functioning %, and total QOL score % (table 8).

Table (1): Distribution of the studied cases according	g to sociodemographic data and personality traits data
Table (1). Distribution of the studied cases according	g to sociouemographic uata and personanty traits uata

Item		n = 160		
A	Mean ± SD	8.92±2.09		
Age	Range	6 – 12		
Sex	Females	83 (51.9%)		
Sex	Males	77 (48.1%)		
	Less than secondary school	68 (42.5%)		
Parents Education	Secondary school	56 (35.0%)		
	High education	36 (22.5%)		
Personality traits				
Accuration	No	44 (27.5%)		
Aggression	Yes	116 (72.5%)		
Enuresis	No	122 (76.2%)		
Enuresis	Yes	38 (23.8%)		
Tomportontrum	No	122 (76.2%)		
Temper tantrum	Yes	38 (23.8%)		
Shyness	No	160 (100.0%)		
Suyness	Yes	0 (0.0%)		

 Table (2): Distribution of the studied cases according to internet addiction test (IAT)

Item		n = 160	
Mean ± SD		68.53±24.08	
Total score	Range	0 - 100	
IAT interpretation	Normal (0 - 30)	17 (10.6%)	
	Mild (31 -49)	9 (5.6%)	
	Moderate (50 - 79)	73 (45.6%)	
	Severe (80 - 100)	61 (38.1%)	
IAT: Internet addiction test			

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#### Table (3): Distribution of the studied cases according to children's sleep habits questionnaire (CSHQ)

Items	Studied Children (n = 160) n (%)	
Bedtime resistance	No	16 (10.0%)
beutine resistance	Yes	144 (90.0%)
Sleep latency	No	112 (70.0%)
Sheep latency	Yes	48 (30.0%)
Sleep time	No	81 (50.6%)
Sleep time	Yes	79 (49.4%)
	No	63 (39.4%)
Anxiety-related to sleep	Yes	97 (60.6%)
Night awakeness and sleep interruption	No	25 (15.6%)
Night awakeness and sleep interruption	Yes	135 (84.4%)
Clean diaman	No	16 (10.0%)
Sleep disorder	Yes	144 (90.0%)
	No	22 (13.8%)
Sleep apnea	Yes	138 (86.2%)
Day time sleepiness (sleep tendency during the day)	No	19 (11.9%)
	Yes	141 (88.1%)

Table (4): Distribution o	of the studied	cases accor	ding to quality	y of life	questionnaire	subtest	(Kid-KINDL <sup>R</sup>
questionnaire)							

Item	Range	Mean ± SD
Physical well-being	1 – 5	3.15±1.09
Physical well-being (%)	0 - 100	53.67±27.34
Emotional well-being	1 – 5	3.11±1.13
Emotional well-being (%)	0 - 100	52.85±28.19
Self-esteem	1 – 5	3.27±1.04
Self-esteem (%)	0 - 100	56.72±25.90
Family	1 – 5	3.20±1.09
Family (%)	0 - 100	55.08±27.21
Friends	1 – 5	3.16±1.10
Friends (%)	0 - 100	54.06±27.44
Every day functioning	1.25 – 5	2.89±0.78
Everyday functioning (%)	6.25 - 100	47.15±19.44

Table (5): Distribution of the studied cases according to quality of life questionnaire (Kid-KINDL<sup>R</sup> questionnaire)

Item		n = 160
Total OOL seems	Mean ± SD	18.66±4.06
Total QOL score	Range	7.25 – 25
	Mean ± SD	73.57±16.91
Total QOL score (%)	Range	26.04 - 100
	QOL: Quality of life	

 Table (6): Comparison between normal, mild, moderate and severe IAT regarding socio-demographic data of the studied children

	Items	<b>Normal</b> (n = 17)	Mild (n = 9)	Moderate (n = 73)	Severe (n = 61)	Stat. test	P- value
Sex	Females	10(58.8%)	7 (77.8%)	39 (53.4%)	27 (44.3%)	4.23	0.237
	Males	7 (41.2%)	2 (22.2%)	34(46.6%)	34 (55.7%)	4.23	0.237
Education of both parents	Less than secondary school	0 (0.0%)	0 (0.0%)	68(93.2%)	0 (0.0%)	254.92	0.001*
	Secondary school	0 (0.0%)	0 (0.0%)	0 (0.0%)	56 (91.8%)	254.82	0.001*
	Higher education	17(100.0%)	9 (100.0%)	5 (6.8%)	5 (8.2%)		
Social	No social stressors	12 (70.6%)	2 (22.2%)	5 (6.8%)	7 (11.5%)		
stressors	<b>Divorce of parents</b>	0 (0.0%)	1 (11.1%)	16 (21.9%)	17 (27.9%)		
	Death of parents	1 (5.9%)	2 (22.2%)	3 (4.1%)	6 (9.8%)		
	Birth of new baby	0 (0.0%)	1 (11.1%)	23 (31.5%)	18 (29.5%)		
	Troubles between both parents	2 (11.8%)	3 (33.3%)	25 (34.2%)	12 (19.7%)	63.85*	0.001*
	moving to a new house	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.6%)		
	Moving to a new school	1 (5.9%)	0 (0.0%)	1 (1.4%)	0 (0.0%)		

•: One Way ANOVA; \*: Chi-square test; Sig: significant, \*: significant p-value.

#### Table (7): Relation between IAT total score and sleep habits among the studied children

Item		The total sco		Independent	D and have
		Mean ± SD	Range	t-test	P-value
D. 14'	No	24.81±33.55	0 - 100	4.532	0.001*
Bedtime resistance	Yes	73.38±17	27 - 100	4.332	
Sleen latener	No	65.4±24.64	0 - 100	2 000	0.003*
Sleep latency	Yes	75.81±21.22	8 - 100	3.008	0.005
Disturbance in clean time	No	61.81±27.12	0 – 95	3.102	0.002*
Disturbance in sleep time	Yes	75.41±18.25	32 - 100	5.102	
Anxiety-related to sleep	No	$59.95 \pm 29.58$	0 - 95	2.730	0.006*
	Yes	74.09±17.77	20 - 100		
Night awakens and sleep interruption	No	$34.88 \pm 25.8$	0 – 79	6.139	0.001*
Night awakens and sleep interruption	Yes	74.76±17.84	0 - 100		
Sleep disorder	No	$14.25 \pm 10.4$	0 - 29	6.498	0.001*
Sleep disorder	Yes	74.56±16.34	9 - 100		
Sloop oppos	No	33.73±32.36	0 - 100	5.106	0.001*
Sleep apnea	Yes	74.07±16.94	9 - 100	5.100	0.001
Day time sleepiness (sleep tendency	No	31.21±24.71	0 - 78	5.685	0.001*
during the day)	Yes	73.55±19.12	0 - 100	5.085	

IAT: Internet addiction test, \*: significant p value.

#### Table (8): Correlation between internet addiction test (IAT) total score with QOL scores

Item	The total score of IAT			
item	r	p-value		
Physical well-being (%)	-0.24	0.002*		
Emotional well-being (%)	-0.199	0.012*		
Self-esteem (%)	-0.163	0.039*		
Family (%)	-0.206	0.009*		
Friends (%)	-0.188	0.017*		
Everyday functioning (%)	-0.173	0.028*		
Total QOL score (%)	-0.228	0.004*		

R: Spearman correlation coefficients; QOL: Quality of life; IAT: Internet addiction test, \*: significant p value.

#### **DISCUSSION**

Internet addiction (IA) is a brand-new addiction and mental health condition. The difficulty to inhibit/decrease internet usage is a symptom of IA. Rising internet use has been linked to sadness, mood swings, poor sleep quality, and adverse health outcomes such as obesity and low self-esteem. Overuse or a lack of self-control in internet usage causes impairment or distress. Increased internet use has been shown to degrade sleep quality, resulting in a lower quality of life<sup>[13]</sup>. Social life, overall health status, and environmental circumstances are all elements that influence sleep quality. Sleep report recommends 8.5-9.5 hours of sleep a night for children aged 10-17 and 7 to 9 hours for 18 and up. The impact of IA on sleep disturbances and insomnia has been documented in numerous studies <sup>[14]</sup>. The study goal was to see a link between internet addiction and sleep issues among children aged 6-12 years.

This study revealed no significant gender difference in total IAT rating and interpretation. This disagrees with Guo et al. <sup>[13]</sup> who found that in China, females had a 1.27 times higher chance of sleep problems. Kocas and Şaşmaz <sup>[15]</sup> explained that females are tasked with

house-related works more often than males, which lead to inferior quality of sleep. This doesn't apply to our study because our age group is younger than their age group, and in our age group, children usually behave the same way regardless of their gender.

Our research found a statistically significant variation between normal, mild, moderate, and severe IAT in parental knowledge. This is congruent by Mohamed and Bernouss<sup>[16]</sup> who suggested that students whose fathers have a better level of education are less likely to get hooked. This disagreed by Tan et al.<sup>[17]</sup> who showed that the level of parental learning impacted teenage internet usage. This could be explained by the effect of the parenting style on children's internet use; high engaging and supportive parenting behaviors were negatively linked to children internet addiction.

In terms of social stressors, our research found a statistically significant difference between normal, mild, moderate, and severe IAT. The unhappy circumstances at home could explain this that make children overwhelmed and anxious, so they tend to use the internet as relaxation and coping mechanisms. Our

patients varied from 10.6% normal, 5.6% mild, 45.6% moderate, and 38.1% severe. Accordingly, moderate instances are the most common. This is congruent with Ahmadi <sup>[18]</sup> as 74.1% of Iranian teenagers had moderate addiction, whereas 2% had severe addiction. Also, Kakkar et al. <sup>[19]</sup> found that over 33% and 2% of individuals, respectively, were classified as having a moderate to severe internet addiction. Our study found that 38.1% was severe cases; different age groups could explain this. Our study was on younger age who their mothers allow them to access the internet more frequently to control them until mothers finish their tasks.

The outcomes of the CSHQ demonstrate sleep habits 144 (90.0%) kids suffer from nighttime resistance and 48 (30.0%) kids suffer from sleep delay, 79 (49.4%) kids suffer from a disturbance in sleep time, 97 (60.6%) kids suffer from sleep anxiousness, 135 (84.4%) kids suffer from evening awakens and sleep disorders, 144 (90.0%) kids suffer from sleep disease, 138 (86.2%) kids suffer from sleep apnea, and 141 (88.1%) kids suffer from Daytime sleepiness. Additionally, we found a statistically significant difference between IAT total score and sleep habits among the studied children. This could be explained by the time and duration of internet use children, and adolescents' smartphone usage was enhanced at night time, and that is the reason to be stated for sleep disturbances. This matches Chen and Gau discovered that internet addicts have more sleep and sleep problems than non-addicts. In addition to Kocas and Şaşmaz<sup>[15]</sup> indicated that the difference between IAD and sleep difficulties was significant.

Our findings revealed a statistically significant negative link between total IAT score and physical well-being %, emotional well-being %, self-esteem %, family %, friends %, everyday functioning %, the real quality of life(QOL) score, and total QOL score %. This matches Usmani et al. <sup>[20]</sup> there was a correlation between IA and poor quality of life.

#### CONCLUSION

The occurrence of internet addiction, as well as its impact on sleeping patterns and quality of life, was revealed to be considered among the youngsters examined. Increasing awareness among parents about problematic internet usage and its hazards will lead to better sleep habits and quality of life.

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### الملخص العربي

مشاكل النوم وإدمان الإنترنت بين الاطفال. اماني حسن علي حسن<sup>1</sup>، عائشة غانم عبد اللطيف<sup>1</sup>، رانيا احمد حامد<sup>1</sup> ا<sub>قسم</sub> الطب النفسي، بكلية طب بنات، القاهرة، جامعة الأزهر، جمهورية مصر العربية.

ملخص البحث

**الخلفية:** اضطراب إدمان الإنترنت (IAD) هو اضطراب طيفي اندفاعي قهري يتميز باستخدام اجهزه الكمبيوتر متصلة بالإنترنت وغير متصلة بالإنترنت. الاستخدام المفرط والتعود والانسحاب والعواقب السلبية هي خصائص نموذجية في جميع الأصناف. لديهم جميعًا نفس العواقب المجتمعية مثل مشاكل التحكم في الانفعالات وإساءة استخدام المخدرات ، بما في ذلك الشوق وفقدان السيطرة وأعراض الانسحاب.

**الهدف:** تقييم تأثير إدمان الإنترنت على جودة النوم بين عينة من أطفال المدارس الذين تتراوح أعمار هم بين 6-12 عامًا.

**الطرق:** هذه دراسة قائمة على الملاحظة ، وصفية ، مقطعية شملت 160 طفلاً تتراوح أعمار هم بين 6-12 عامًا الذين تواجدوا بمستشفى الزهراء الجامعي وأطفال مقدمي الرعاية الصحية في مستشفى الزهراء الجامعي بين أغسطس 2021 - يناير 2022.

النتائج: كشفت النتائج عن فروق ذات دلالة إحصائية بين مجموع درجات إستبيان إدمان الإنترنت والنوم ونوعية الحياة. كان متوسط مجموع نقاط إستبيان إدمان الإنترنت 24.08 ± 26.68، 10.6% من الأطفال طبيعيون، 6.5% معتدلون، 6.45% معتدلون ، 38.1% كانوا حادون. فيما يتعلق بعادات النوم، يعاني 144 (90.0%) من الأطفال عانون من تأخر النوم، 79 (60.6%) من الأطفال يعانون من تأخر النوم، 79 (49.4%) من الأطفال يعانون من الخلول من المقاومة الليلية و 48 (30.0%) من الأطفال يعانون من تأخر النوم، 79 (49.4%) من الأطفال يعانون من الخلول من المقاومة الليلية و 48 (30.0%) من الأطفال يعانون من تأخر النوم، 79 (49.4%) من الأطفال يعانون من الخلول من المقاومة الليلية و 48 (60.6%) من الأطفال يعانون من تأخر النوم، 79 (49.4%) من الأطفال يعانون من الظلق أثناء النوم، 79 (60.6%) الأطفال يعانون من القلق أثناء النوم، 138 (49.4%) من الأطفال من المقاومة اليلية و 48 (60.6%) الأطفال يعانون من الظلق أثناء النوم، 79 (49.4%) من الأطفال يعانون من الظلق أثناء النوم، 78 (49.4%) من الأطفال يعانون من الظلق أثناء النوم، 78 (49.4%) من الأطفال يعانون من الفلق أثناء النوم، 79 (40.6%) من الأطفال يعانون من القلق أثناء النوم، 138 (49.4%) من الأطفال يعانون من القلق أثناء النوم، 79 (49.6%) من الأطفال يعانون من القلق أثناء النوم، 148.4% (49.4%) من الأطفال من الاستيقاظ في المساء واضطرابات النوم، ويعاني 144 (49.5%) من أمراض النوم، ويعاني 138 (49.5%) من أمراض النوم، ويعاني 138 (49.5%) من الأطفال من الاستيقاظ في المساء واضطرابات النوم، ويعاني 141 (49.5%) من النوم، ويعاني 138.4%) من النوم.

ا**لاستنتاجات:** كشفت نتائج الدراسة أن المشاركين يعانون من اضطرابات النوم المرتبطة بالاستخدام المفرط. للإنترنت.

الكلمات المفتاحية: اضطراب إدمان الإنترنت، اضطراب طيف التوحد، اضطراب الوسواس القهري.

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