Relationship between problematic Internet use, body mass index and psychiatric morbidities in Egyptian high school adolescent students

By

Shaimaa M. Arafa*, Asmaa M. Elaidy* Mohammed A. Hassan**

From

*Psychiatry department, Faculty of Medicine for Girls, ** Pediatric Department, Faculty of Medicine for boys, Al-azhar University, Egypt.

ABSTRACT

Background: Problematic internet use (PIU) is an emergent universal problem amongst students. The problem is growing in Egypt with the progressively mounting internet usage. Also, overweight of adolescents remains serious and alarming national and international health problem.

Objective: To study the prevalence and coincidence of PIU, obesity and psychiatric disorders amongst students in governmental Egyptian high schools.

Subjects and Methods: A cross sectional study was performed on randomly chosen 828 students from 2 governmental high schools in urban Gamalia town - Dakahlia governorate – Egypt. Students were classified into theoretical educational group and scientific educational group. the students in each group were requested to fill Young Internet Addiction Test (YIAT) and General Health Questionnaire (GHQ-12) to assess problematic internet use and presence of psychiatric morbidity. Prior to that, sociodemographic data, medical reports and anthropometric measurements of the students had been obtained.

Results: We noted that 12% (100 students) of the study candidates were obese, 24.3% (201 students) were overweight and 63.7% (527 students) represent normal and underweight adolescents. As well, it was found that 13.2 % (109 students) of the students were problematic internet users (PIUs). Prevalence of PIU was found higher among young ages, males and obese students. Also, students with higher father's educational degree, those who frequently use internet and those using internet for relieving loneliness, had a higher prevalence of PIU. Impaired relation with classmate friends with poor parents' satisfaction were also found in PIUs. The result also revealed that 31.9% of the total students suffering from distress and 6.1% having severe problem and psychological distress. Also, our results showed that the PIU and psychological distress had a highly significant positive correlation [r (p-value) = 0.975 (<0.001)]. Similarly, a highly significant positive correlation was observed between PIU and body mass index (BMI) [r (p-value) = 0.914 (<0.001)]. Furthermore, a highly significant positive correlation was found between psychological distress and BMI [r (p-value) = 0.881 (<0.001)].

Conclusion: Problematic internet use and obesity are common and -associate each other- among high school students in Egypt which may affect their psychological health.

Key words: Problematic Internet use; Body mass index; Psychiatric morbidities; Adolescent students.

INTRODUCTION

The internet usage has grown incredibly over the past two decades, to be converted into a substantial part of daily life **[1]**. However, the line between internet use and Problematic Internet Use (PIU) is noticeably being overstepped **[2,3]**. PIU can be broadly defined as one's inability to control his use of the internet which leads to negative consequences in daily life **[4]**.

PIU is associated with various risk factors, including socio-demographic variables (including gender, age, and family income), Internet use variables (including time spent online, using social and gaming applications), psychosocial factors (including impulsivity, neuroticism, and loneliness) and comorbid symptoms (including depression, anxiety and psychopathology in general) **[5]**.

On the other hand, adolescents' obesity has been assorted by World Health Organization (WHO) as an epidemic **[6]**. The rising prevalence of adolescents' obesity leads to emerging of obesity-related comorbid conditions such as diabetes and hypertension at an early age. Moreover, prevalence of psychosocial troubles which have been associated with adolescents' obesity including social isolation, anxiety, drug abuse, low self-confidence, depression and even suicide, start to increase **[7].**

Globally there are around 1.2 million obese and overweight adolescents, about 90% of them are living in developing countries **[8].** Egyptian national level of overweight and obesity was recorded to be 11.5% and 6.5% respectively in males, while in females it was recorded to be 15.2% and 7.7% **[9].** But many studies found higher figures among Egyptian children and adolescents **[10,11].** Recent mounting of the Adolescents' obesity guides the efforts to find unprecedented environmental risk factors like PIU. PIU can limit the physical activity, affect the duration, and patterns of sleep, and increase junk food consumption which, may eventually lead to adolescents' obesity and overweight **[7].**

People using the internet in Egypt are progressively increasing reaching more than 49 million users (48.6% of the population) in 2018 **[12],** in comparison to 29 million users (35.6% of the population) in 2012 **[13].** PIU dilemma were displayed in few researches in Egypt. One of these studies performed on high school students reported that 2.6% were problematic internet users **[14].** Another study performed on preparatory and high school students in private schools showing a different result with high percentage of PIUs (52.4%) **[15].**

This work aims to study the prevalence of problematic internet use, obesity and psychiatric disorders among a sample of students in governmental Egyptian high schools and determine correlation between them. Also, we will investigate association of PIU with socio-demographic characteristics, social relations, and pattern of internet usage.

SUBJECTS AND METHODS

Study design and time frame: -

This cross-sectional study was performed during the period started at 1st of October 2108 to the end of December 2018 in urban Gamalia town - Dakahlia governorate - Egypt.

Ethical considerations: -

1. Informed written consent was obtained from the students or their legal guardians.
2. An approval by the local ethical committee was obtained before the study.
3. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
4. All the data of the students and results of the study are confidential, and the students have the right to keep it.
5. The students have the right to withdraw from the study at any time.

Inclusion criteria: -

Any student that was registered in Dakahlia governorate high schools during 2018/2019 academic year and aged between 16 and 19 years, can be enrolled in the study.

Exclusion criteria

1. students with chronic medical disorders (e.g. hypertension, sleep apnea, bronchial asthma or heart diseases).
2. Those on hormonal therapy (e.g. corticosteroid or growth hormone replacement therapy).
3. Students with chromosomal abnormalities.
4. Students that have invalid or incomplete items of questionnaires.

Sampling

Calculation of Sample size:

A total of 19200 students were registered in the secondary stage in Dakahlia governorate during 2018/2019 academic year. The sample size was calculated using Open Epi program version 3 and according to a previous study done El Menofya university students by **[16],** who mentioned that about 13% of the participants were problematic internet users. So, by adjusting the confidence interval to 95% and power of the test to 80% the total sample size needed to this study was found to be 534 students. Sample size was calculated according to the following formula **[17]:**

$$n = 2\left[\frac{\left(Z_{\propto/2} + Z_{\beta}\right) * \sigma}{\mu_1 - \mu_2}\right]^2$$

Where:

n = required sample size, Zα/2 = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

Zβ = 0.84 (The critical value that separates the lower 20% of the Z distribution from the upper 80%)

Sampling technique: a sample of 828 students were selected for our study, using a method of multistage clustering sampling, as follows:

first stage: The number of high schools in Dakahlia governorate in academic year 2018/2019 was 28 schools from which two schools was randomly chosen.

second stage: The total high school students' number in the two schools were 1616 students. They were classified into two groups, theoretical educational group (1043 students) and scientific educational group (573 students). The total sample was classified on both theoretical

and scientific groups with a ratio of (1.8/1). We use the same technique to distribute the sample on all school classes. 1120 papers were collected and after exclusion of 501 students according to the inclusion and exclusion criteria, the total sample of studied students was 828 (532 for the theoretical group and 296 for the scientific group).

Study tools

I. **Socio-demographic data report** including age, gender, type of educational group, residence and smoking. The data also included the marital status and educational level of the parents.

II. **Medical report** designed and filled out by the authors upon literature review included 30 item covering medical, medicinal and nutritional histories, physical examination information as well as the anthropometric measurements of the students.

III. **Pattern of internet usage report** including duration since starting using the internet, duration of daily internet usage, incidence of weekly internet use and the aim of internet use.

IV. **Social relations** including relationship with family members, parents and his/her friends in the class. Parents' satisfaction was also assessed.

V. **Validated Arabic version of Young Internet Addiction Test (YIAT)** to assess problematic Internet use **[18].** YIAT is a 20-item questionnaire which categorizes adolescents based on levels of problematic Internet use. Questions included in this questionnaire include assessment of students' daily life, life performance, social life and feelings. The questionnaire defines problematic Internet use mainly by social problems, withdrawal, time performance, time management, and reality substitute **[19].** Students in current study were requested to give their answers for each of the questionnaire items on a 5-point Likert scale (scored range from 1 to 5), where 1 representing "not at all" and 5 representing "always". Students were classified according to their total scores, ranging from 20 to 100, into: problematic internet users (with a total score 70-100), potential problematic internet users (with a total score 40-69) and normal internet users (with a total score less than 40).

VI. **General Health Questionnaire 12-Items version (GHQ-12)** that was considered to assess four specialized elements of distress: anxiety, depression, social distress and hypochondria. GHQ-12 was formerly shaped as a 60-item instrument and was shortened to 12 items which is the most widely used screening tool for widespread mental disorders. GHQ-12 has shown its ability to be used with efficacy, adequate reliability and validity to assess people's overall psychological well-being and to detect non-psychotic psychiatric problems **[20].** Students were requested to answer for each of the GHQ-12 questionnaire items on 3-point Likert scale (scored range from 1 to 3) with a total score ranging 0-36. Students in current study were classified according to their total scores into: Normal students (with total score below 15), students who suffering from distress (with total score between 15-20) and students who having severe psychological distress (with total score over 20) **[21].**

VII. **Anthropometric measurements & outcome definition.** Weight and height measurements were conducted while the students were barefoot and lightly clothed. Measurements were carried out using a portable weighing digital scale and wall-mounted stadiometer. The results were recorded to the nearest 0.5 kg and 1 cm respectively. Weight and height were measured using the same type of equipments and according to manual of anthropometric measures of Oxford University recommendations **[22].** Body Mass Index (BMI) was calculated for each student as weight (in kilograms) divided by height (in meters) squared (kg/m2). and compared with standard Egyptian growth charts 2002 **[23].** BMI at or above 85th and 95th percentiles are defined as overweight and obesity for adolescents, respectively **[24].**

Statistical analysis

Data in current study were collected, revised, coded, tabulated and analysed using the Statistical Package for Social Science (IBM SPSS) version 23. Quantitative data were existing as rang, standard deviations and mean. One Way ANOVA test was used to compare more than two groups. Meanwhile, qualitative variables were presented as percentages and numbers. Chi-square test was used to compare groups of qualitative variables. Pearson product moment was used to estimate correlation between variables. The confidence interval was set to 95% along with the margin of accepted error was set to 5%. So, the p-value was significant at the level of < 0.05.

RESULTS

Our results were demonstrated in the following tables and figures.

Table 1: Socio-demographic characters and BMI of the studied group

		Theoretical group		Scientific group		P-value
		No.=532	%	No.=296	%	
Gender	Male	244	45.9	149	50.3	0.217
	Female	288	54.1	147	49.7	
Residence	Rural	360	67.7	187	63.2	0.191
	Urban	172	32.3	109	36.8	
Smoking	Smokers	145	27.3	49	16.6	**0.001***
	Nonsmokers	387	72.7	247	83.4	
Marital status	Married	5	0.9	0	0.0	0.094
	Single	527	99.1	296	100	
Mother's education	Illiterate	40	7.5	18	6.1	**<0.001***
	<6 years	116	21.8	41	13.9	
	6-12 years	243	45.7	101	34.1	
	>12 years	133	25.0	136	45.9	
Father's education	Illiterate	47	8.8	11	3.7	**<0.001***
	<6 years	114	21.4	46	15.5	
	6-12 years	205	38.5	89	30.1	
	>12 years	166	31.2	150	50.7	
BMI	Underweight and normal	348	65.4	179	60.5	0.366
	Overweight	123	23.1	78	26.3	
	Obese	61	11.5	39	13.2	

Table 1 showed that there was highly significant statistical difference between the theoretical educational group and the scientific educational group as regards smoking, mother's education and father's education. Also, we noted that 12% of the study candidates (100 students) were obese, 24.3% (201 students) were overweight and 63.7% (527 students) represent normal and underweight adolescents.

Table 2: Problematic internet use prevalence based on multiple variables.

		Normal Internet use	Potential problematic internet use	Problematic internet use	P-value
		No. = 395	**No. = 324**	**No. = 109**	
Age (year)	Mean ± SD Range	17.1 ± 0.6 16 – 18	17.2 ± 0.8 16 -19	16.87±0.6 16 - 17	**<0.001**
Gender	Male Female	149 (37.7%) 246 (62.3%)	170 (52.5%) 154 (47.5%)	74 (67.9%) 35 (32.1%)	**<0.001**
Educational group	Theoretical Scientific	246 (62.3%) 149 (37.7%)	207 (63.9%) 117 (36.1%)	79 (72.5%) 30 (27.5%)	0.142
Smoking	Smokers Non smokers	87 (22.0%) 308 (78.0%)	78 (24.1%) 246 (75.9%)	30 (27.5%) 79 (72.5%)	0.469
Mother's education	Illiterate <6 years 6-12 years >12 years	31 (7.8%) 82 (20.8%) 168 (42.5%) 114 (28.9%)	22 (6.8%) 61 (18.8%) 135 (41.7%) 106 (32.7%)	5 (4.6%) 13 (11.9%) 42 (38.5%) 49 (45.0%)	0.062
Father's education	Illiterate <6 years 6-12 years >12 years	30 (7.6%) 89 (22.5%) 152 (38.5%) 124 (31.4%)	20 (6.2%) 55 (17.0%) 107 (33.0%) 142 (43.8%)	6 (5.5%) 15 (13.8%) 35 (32.1%) 53 (48.6%)	**0.006**
BMI	Underweight and normal Overweight Obese	312 (79.0%) 54 (13.7%) 29 (7.3%)	198 (61.1%) 104 (32.1%) 22 (6.8%)	17(15.6%) 43 (39.4%) 49 (45.0%)	**< 0.001**

Table 2 displayed that the prevalence of PIU was 13.2% (109 student), and it was significantly more prevalent amongst younger students ($p < 0.001$), male gender ($p < 0.001$), those with higher father's education ($p=0.006$), also among overweight and obese students ($p < 0.001$).

Table 3: Problematic internet use prevalence based on student's internet usage experience

	Normal Internet use	Potential problematic internet use	Problematic internet use	P-value
	No. = 395	No. = 324	No. = 109	
Duration since starting using internet				
1 year	50 (12.7%)	44 (13.6%)	14 (12.8%)	0.687
2-3 years	100 (25.3%)	83 (25.6%)	21 (19.3%)	
> 3 years	245 (62.0%)	197 (60.8%)	74 (67.9%)	
Duration of daily internet usage				
< 2 h	216 (54.7%)	120 (37.0%)	5 (4.6%)	<0.001
2 - 4 h	104 (26.3%)	106 (32.7%)	47 (43.1%)	
> 4 h	75 (19.0%)	98 (30.2%)	57 (52.3%)	
Frequency of internet use / week				
< 3 times	197 (49.9%)	111 (34.3%)	20 (18.3%)	<0.001
3-6 times	111 (28.1%)	139 (42.9%)	33 (30.3%)	
> 6 times	87 (22.0%)	74 (22.8%)	56 (51.4%)	
Most common purpose of internet use				
Relieving loneliness	123 (31.1%)	103 (31.8%)	61 (56.0%)	
Gaming	105 (26.6%)	72 (22.2%)	27 (24.8%)	<0.001
Research	139 (35.2%)	132 (40.7%	20 (18.3%)	
Others	28 (7.1%)	17 (5.2%)	1 (0.9%)	

Table 3 demonstrated that most of the candidates started to use the internet for more than 3 years. Moreover, this table showed that the prevalence of PIU was highly significant among candidates with more than 4 hours of daily internet use ($p<0.001$), more than 6 times of weekly internet use ($p< 0.001$) and among those using the internet for relieving loneliness ($p< 0.001$).

Table 4: Overweight and obesity prevalence based on student's internet usage experience

	Underweight and normal	Overweight	Obese	P-value
	No. = 527	**No. = 201**	**No. = 100**	
Duration since starting using internet				
1 year	56 (10.6%)	35 (17.4%)	17 (17%)	**0.0247**
2-3 years	125 (23.7%)	57 (28.4%)	22 (22%)	
> 3 years	346 (65.7%)	109 (54.2%)	61 (61%)	
Duration of daily internet usage				
< 2 h	301 (57.1%)	33 (16.4%)	7 (7%)	**<0.001**
2 - 4 h	143 (27.1%)	70 (34.8%)	44 (44%)	
> 4 h	83 (15.8%)	98 (48.8%)	49 (49%)	
Frequency of internet use / week				
< 3 times	233 (44.2%)	79 (39.3%)	16 (16%)	**<0.001**
3-6 times	139 (26.4%)	111 (55.2%)	33 (33%)	
> 6 times	155 (29.4%)	11 (5.5%)	51 (51%)	
Most common purpose of internet use				
Relieving loneliness	156 (29.6%)	70 (34.8%)	61 (61%)	
Gaming	145 (27.5%)	35 (17.4%)	24 (24%)	**<0.001**
Research	190 (36.1%)	89 (44.3%)	12 (12%)	
Others	36 (6.8%)	7 (3.5%)	3 (3%)	

Table 4 illustrated that the prevalence of obesity was significantly increased among candidates starting to use the internet for more than 3 years ($p=0.0247$), also with increased frequency and duration of internet use ($p< 0.001$), as well as among those using the internet for relieving loneliness ($p< 0.001$).

Table 5: Problematic internet use prevalence based on student's social relation.

Internet usage experience	Normal Internet use	Potential problematic internet use	Problematic internet use	P-value
	No. = 395	No. = 324	No. = 109	
Relation with family members				
Not good	40 (10.1%)	37 (11.4%)	20 (18.3%)	0.219
Usual	77 (19.5%)	60 (18.5%)	18 (16.5%)	
Good	278 (70.4%)	227 (70.1%)	71 (65.1%)	
Relation with parents				
Not good	34 (8.6%)	35 (10.8%)	15 (13.8%)	0.312
Usual	75 (19.0%)	66 (20.4%)	26 (23.9%)	
Good	286 (72.4%)	223 (68.8%)	68 (62.4%)	
Parents satisfaction				
Not satisfied	39 (9.9%)	37 (11.4%)	19 (17.4%)	**0.017**
Usual	59 (14.9%)	62 (19.1%)	26 (23.9%)	
Satisfied	297 (75.2%)	225 (69.4%)	64 (58.7%)	
Relation with classmate friends				
Not good	44 (11.1%)	41 (12.7%)	22 (20.2%)	**0.018**
Usual	88 (22.3%)	73 (22.5%)	33 (30.3%)	
Good	263 (66.6%)	210 (64.8%)	54 (49.5%)	

There was also significant higher parents' satisfaction and better relationship with classmate friends among normal internet users and potential problematic internet users when compared to problematic internet users. However, relations with family members and parents were comparable among the three groups with no significant statistical differences (table 5).

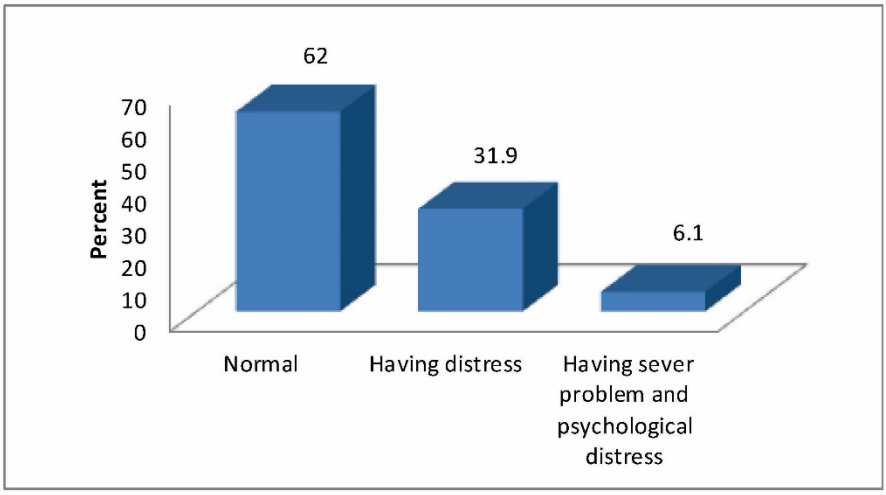

Figure (1): Classification of students according to their total GHQ-12 scores

Figure 1 demonstrated that the students were classified according to their total GHQ-scores into 3 groups: normal students (62% of students), students suffering from distress (31.9% of students) and those having severe problems with psychological distress (6.1% of students).

Table 6: Correlation between BMI, YIAT, GHQ-12 scores of the participants

Item	YIAT r (p-value)	GHQ-12 r (p-value)	BMI r (p-value)
YIAT	**1**	0.975 (<0.001)	0.914 (<0.001)
GHQ-12	0.975 (<0.001)	**1**	0.881 (<0.001)
BMI	0.914 (<0.001)	0.881 (<0.001)	**1**

r = correlation coefficient.

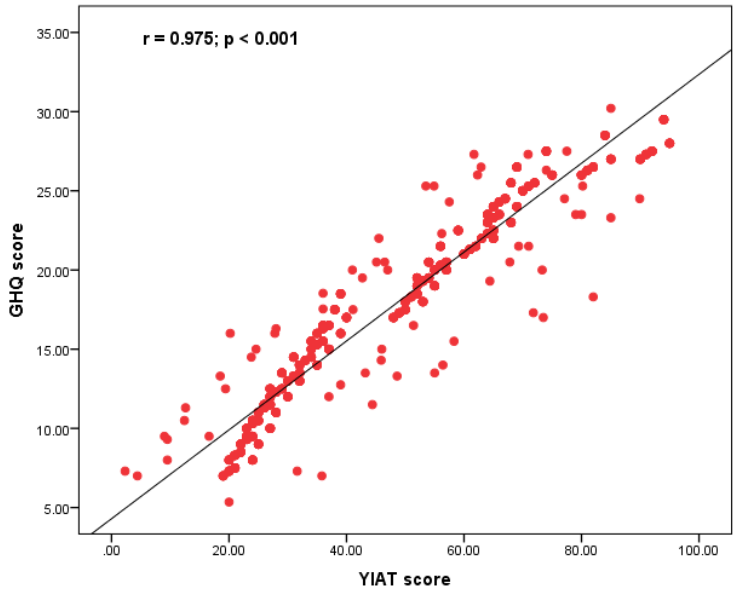

Figure (2). Scatter plot of YIAT scores against GHQ-12 scores

Table 6 showed the correlation between problematic internet use (YIAT score), psychological distress (GHQ-12 score), and BMI of the participants. Problematic internet use and psychological distress had a highly significant positive correlation [r (p-value) = 0.975 (<0.001)] (figure 2). Similarly, a highly significant positive correlation was observed between problematic internet use and body mass index [r (p-value) = 0.914 (<0.001)]. Furthermore, a highly significant positive correlation was found between psychological distress and BMI [r (p-value) = 0.881 (<0.001)].

DISCUSSION

this study revealed that the prevalence of obesity and overweight among secondary stage school adolescents' students in Dakahlia governorate was 12% and 24.3% respectively. These results are slightly higher than that recorded by (Talat and El Shahat) **[10]** who revealed that the prevalence of obesity and overweight was 10.7% and 20% respectively among preparatory school adolescents in Sharkia Governorate. On the other hand, older study in 2011 by (El-Gilany & El-masry) **[25]** reported that 8.0% were obese and 17.7% were overweight, when analysed data belonging to 953 students Their ages ranged from 14 to 19 years. Our

higher rates could be explained by increasing consumption of fast food and snacks, also decreasing physical activities which runs parallel to the era of the internet, social media and smartphones.

Our study revealed that the prevalence of PIU was 13.2% among high school students. A higher prevalence of PIU was reported in the study performed in Turkey which showed a prevalence of 25.5% **[26],** also another study performed in Japan showed a PIU prevalence range of 17.7-19.9% **[27].**

However, the prevalence of PIU in this study is higher when compared to that revealed in the study performed in China which showed a prevalence of 8.1 % **[28],** the study performed in Spain which showed a prevalence of 5% **[29]** and the study performed in El-Minia Governorate which showed a prevalence of 2.6% **[14]**.

These differences in PIU prevalence can be attributed to a measurement bias incurred by a lack of international consistency regarding both the definition and assessment of PIU **[30]** , the difference in the time framework and the samples of conducting these studies added to the difference in the social and cultural background . The prevalence of PIU in current work was found to be significantly higher amongst younger students and this agrees with previous studies **[31,32]**.

This study revealed a highly statistically significant difference between normal, potential PIUs and PIUs as regard students' gender as male represent 67.9% of PIUs. This result comes in line with other studies performed on adolescents **[14,26,33,34].** This finding can be explained by the fact that males are more likely to play online games, engage in cybersex and gamble online **[14].** Another explanation of this gender difference is that girls have a higher ability in social field to make more successful friendships when compared to the boys **[35].**

As regard fathers' education, 48.6% of PIUs in this study had a highly learned father with a highly statistically significant difference between the normal internet users, potential PIUs and PIUs, but with no significant statistical differences as regards educational group, smoking and mother's education. Similar results regarding parents' education was published in an Iranian study **[36]** and this can be explained by tendency of highly learned father to get out their children into the world of up to date technology **[37].** On the other hand, and concerning smoking, a study that was performed in Japan revealed association between the prevalence of PIU and smoking **[38].** The difference between results concerning smoking might be explained by the fact that the relationship between PIU and smoking was proved to be a dose-response relationship **[38],** whereas the current study did not include the number of cigarettes per day in the collected data added to possible denial of smoking in this study as smoking in this age group is prohibited by law in Egypt .

In current study, it was found that the prevalence of PIU significantly higher with extra hours of daily internet usage and with higher frequency of weekly internet usage. These findings are supported by similar results reported from other studies **[26,31,39].** These findings go along with the fact that PIUs are inevitably making regular and intense use of the Internet, about both the frequency and duration of each Internet session **[40].** Therefore, restricting adolescents' time on-line might be an effective measure to prevent PIU.

The prevalence of PIU was also found to be higher with a statistical significance among those using internet for relieving loneliness. This agrees with findings of other studies **[34],** comes in line with the proven positive correlation between PIU and loneliness and adds to the debate to whether PIU in this case is a cause or an effect **[41].**

Our results illustrated that the prevalence of obesity was significantly increased among candidates starting to use the internet for more than 3 years ($p=0.0247$), also with increased frequency and duration of internet use ($p< 0.001$), as well as among those using the internet for relieving loneliness ($p < 0.001$). A significant positive correlation between BMI and weekly Internet use was found also by Canan et al., when they investigated 2,216 high school students

for the relationship between problematic internet use and BMI **[42].** On the other hand, Bozkurt et al., **[43]** found that spending time more than 21 hour per week on the Internet was significantly associated with increased BMI, but other Internet habits and goals were not associated with BMI ($p > 0.05$).

Significantly higher parents' satisfaction and better relationship with classmate friends was found among normal internet users and potential problematic internet users in comparison with PIUs. These findings agree with those published in other studies **[14,39].** Research results support this finding as it was confirmed that extensive use of the Internet amongst adolescents makes them feel alone, leading to problematic behaviors and poor relationships with family and friends **[44].** Moreover, high parent-adolescent conflict is a predictor of PIU in adolescents; where adolescents with a higher parent-conflict level did not obey their parents' supervision, including those rules put for Internet use **[45].**

According to the total GHQ-scores, 31.9% of students experienced distress while 6.1% of them had psychological distress and severe problems. Similar findings were reported by **[31,46,47].** explanation of these findings may be attributed to the fact that intrinsic characteristics that influence some of these disorders may be the same characteristics that cause people to develop PIU **[32].** However, further studies to reveal the causal relationship between psychiatric symptoms and PIU are needed.

The current study also revealed that the problematic internet use and psychological distress had a highly significant positive correlation [r (p-value) = 0.975 (<0.001)]. Problematic internet use was similarly found to be correlated and associated with psychological distress in other studies **[16,48,49].** This may be explained by the fact that PIUs change their lifestyle to save extra time to be spent on the internet on the expense of reduced social relationships with their friends and families **[50].** Moreover, it was established that the further the one becomes addicted to internet use, the further he/she becomes depressed **[51].**

Compatible with former studies, the present results affirmed a significant, independent and positive association between problematic internet use and body mass index [r (p-value) = 0.914 (<0.001)]. Moreover, the prevalence of being obese and overweight was higher among adolescents with problematic internet use compared to average users (p-value < 0.001) **[42,43,52,53,54,55].** PIU can limit the physical activity, affect the duration, and patterns of sleep, and increase junk food consumption which, may eventually lead to adolescents' obesity and overweight **[7,56].** Against the stream, the study of Meral stated that there was no significant correlation between obesity and problematic internet use **[57].**

CONCLUSION

PIU and obesity are common and correlated with each other among Egyptian high school students. possible risk factors identified in this study include young age, male gender, higher father's education and frequent internet usage. Those with PIU had an increased probability to report poor parents' satisfaction and classmate relationships, with a significant statistical correlation connecting problematic internet use and psychological distress.

Recommendations

unique awareness should be paid to high school students who exhibit risk factors for PIU and obesity. Health education of high school students should be guided towards using the internet healthily and alternative physical activities that promote socialization and prevent obesity. An intervention programs addressing the problems of PIU and obesity in high school students should be implemented.

Acknowledgments: - We thank all the participants in the study.

Authors Contribution

Shaimaa M and Asmaa M were responsible for data collection and questionnaire design. While Mohammed A was responsible for medical report and anthropometric measurements. All authors designed the research, performed the statistical analyses and wrote the manuscript.

REFERENCES

1. Balhara Y, Doric A, Stevanovic D, Knez R, Singh S, Roy Chowdhury MR, Kafali HY, Sharma P, Vally Z, Vi Vu T, Arya S, Mahendru A, Ransing R, Erzin G, Le Thi Cam Hong Le H. Correlates of Problematic Internet Use among college and university students in eight countries: An international cross-sectional study. Asian J Psychiatr. 2019 Oct;45:113-120. doi: 10.1016/j.ajp.2019.09.004. Epub 2019 Sep 5.

2. Kuss D, and Lopez-Fernandez O. Internet addiction and problematic Internet use: A systematic review of clinical research. World J Psychiatry. 2016;6(1):143–176.

3. Anderson EL, Steen E, Stavropoulos V. Internet use and Problematic Internet Use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. International Journal of Adolescence and Youth. 2017 Oct 2;22(4):430-54.

4. Spada M. An overview of problematic Internet use. Addictive behaviors. 2014;39(1):3-6.

5. Kuss D, Griffiths D, Karila L, Billieux J. Internet addiction: A systematic review of epidemiological research for the last decade. Curr Pharm Des. 2014;20:4026–52.

6. Garcia-Continente X, Allué N, Pérez-Giménez A, Ariza C, Sánchez-Martínez F, López MJ, et al. Eating habits, sedentary behaviours and overweight and obesity among adolescents in Barcelona (Spain). An Pediatr. 2015; 83: 3-10.

7. Tabatabaee HR, Rezaianzadeh A, Jamshidi M. Mediators in the Relationship between Internet Addiction and Body Mass Index: A Path Model Approach Using Partial Least Square. J Res Health Sci. 2018 Aug 18;18(3):e00423.

8. Teshome T, Singh P, Moges D. Prevalence and associated factors of overweight and obesity among high school adolescents in urban communities of Hawassa, Southern Ethiopia. BMC Obes. 2013; 1: 23-36.

9. Shaheen FM, Hathout AM, Tawfik AM. National survey of obesity in Egypt. Final report, National Nutritional Institute, 2004 cited at: National Food & Nutritional Policy Strategy (2007–2017). Towards achievement of the Millenium Developments Goals (MDGs): National Nutritional Institute; 2007. p. 82.

10. Talat MA, El Shahat E. Prevalence of overweight and obesity among preparatory school adolescents in Urban Sharkia Governorate, Egypt. Egyptian Pediatric Association Gazette (2016) 64, 20–25.

11. Salem ME, Fateh Mahrous OA, El Shazly HM, Aziz Kasemy ZA, Mehesin SA. Epidemiology of obesity among primary school children (6–12 years), Menoufia Governorate. Menoufia Med J 2016;29:1000-4.

12. Internet World Stats: Usage and population statistics, Africa. Accessed on 26-10-2019 from: https://www.internetworldstats.com/africa.htm .

13. Internet World Stats: Usage and population statistics, Egypt: Internet usage and telecommunications report. Accessed on 26-10-2019 from: https://www.internetworldstats. com/af/eg.htm.

14. Kamal N, Mosallem F. Determinants of Problematic Internet Use Among El-Minia High School Students, Egypt. Int J Prev Med. 2013;4(12):1429–37.

15. Ismail T, Ali M. Problematic Internet Use through Smartphones among School Adolescents in Sohag City, Egypt. The Egyptian Journal of Community Medicine. 2018;37(1):25-34.

16. Desouky D, Ibrahem, R. Internet addiction and psychological morbidity among Menoufia University students, Egypt. American Journal of Public Health Research. 2015;3(5):192-8.

17. Dawson B, Trapp RG. Basic and clinical biostatistics. 4th ed. USA: McGraw-Hill; 2004.

18. Hawi N. Arabic validation of the Internet Addiction Test. Cyberpsychol Behav Soc Netw. 2013;16(3):200-204.

19. Dimitri A, Christakis M, Jelenchick L, Mon T, Chuan-Zhou M. Problematic internet usage in US college students: A pilot study. BMC Med. 2011; 9:77-82.

20. Sánchez-López M, Dresch V. The 12-Item General Health Questionnaire (GHQ-12): Reliability, external validity and factor structure in the Spanish population. Psicothema. 2008;20(4):839-43.

21. Goldberg D, Williams P. General health questionnaire (GHQ). Swindon, Wiltshire, UK: NFER Nelson. 2000.

22. Cameron H, Hovander H. Manual of anthropometric measures. 3rd ed. New York: Oxford Univ. Press; 1987. p. 169–72.

23. Gali I, Salah N, Hussien F, Erfan M, El-Ruby M, Mazen I, et al. Egyptian growth curves 2002 for infants, children and adolescents. In: Sartorio A, Buckler JMH, Marazzi N, editors. Crescere nel mondo. Ferring Publisher; 2008.

24. Klish WJ. Definition; epidemiology; and etiology of obesity in children and adolescents. Up-To-Date, Rose, BD (Ed), Up-To-Date, Waltham, MA 2007.

25. El-Gilany A, El-masry R. Overweight and Obesity among Adolescent School Students in Mansoura, Egypt. Childhood Obesity. 2011:7.215-222.

26. Ercag E. Analysis of the opinions of secondary school students about problematic internet use. IIOABJ. 2018;9(S3):71-79.

27. Kojima R, Sato M, Akiyama Y, Shinohara R, Mizorogi S, Suzuki K, Yokomichi H, Yamagata Z. Problematic Internet use and its associations with health-related

symptoms and lifestyle habits among rural Japanese adolescents. Psychiatry and clinical neurosciences. 2019;73(1):20-6.

28. Cao H, Sun Y, Wan Y, Hao J, Tao F. Problematic Internet use in Chinese adolescents and its relation to psychosomatic symptoms and life satisfaction. BMC Public Health. 2011;11:802.

29. Lopez-Fernandez O. Freixa-Blanxart , M. and Honrubia-Serrano , M.: The problematic internet entertainment use scale for adolescents : Prevalence of problem internet use in Spanish high school students . Cyberpsychology, Behavior and Social Networking. 2013;16:2.

30. Byun S, Ruffini C, Mills J, Douglas A, Niang M, et al. Internet addiction: Met synthesis of 1996-2006 quantitative research . Cyberpsychol Behav. 2009;12:203–7.

31. Vigna-Taglianti F, Brambilla R, Priotto B, Angelino R, Cuomo G, Diecidue R. Problematic internet use among high school students: Prevalence, associated factors and gender differences. Psychiatry research. 2017 Nov 1;257:163-71.

32. Vries H, Nakamae T, Fukui K, Denys D, Narumoto J. Problematic internet use and psychiatric co-morbidity in a population of Japanese adult psychiatric patients. BMC Psychiatry. 2018;18:9.

33. Ha JH, Yoo HJ, Cho IH, Chin B, Shin D, Kim JH. Psychiatric comorbidity assessed in Korean children and adolescents who screen positive for Internet addiction. The Journal of clinical psychiatry. 2006 May.

34. Balhara Y, Harshwardhan M, Kumar R, Singh S. Extent and pattern of problematic internet use among school students from Delhi: Findings from the cyber awareness programme. Asian Journal of Psychiatry. 2018;34:38-42.

35. Chien H, Cheng C. Tridimensional personality of adolescents with internet addiction and substance use experience. Can J psychiatry. 2006;51(14):884-94.

36. Ahmadi K. Internet addiction among Iranian adolescents: A nationwide study. Acta Med Iran. 2014;52(6):467-72.

37. Mazaheri M, Mohamed F, Karbasi M. Mobile phone usage patterns among students in Iran. Reef Resources Assessment and Management Technical Paper. 2014;40(1):313-9.

38. Morioka H, Itani O, Osaki Y, Higuchi S. Association between smoking and problematic Internet use among Japanese adolescents: Large-scale nationwide epidemiological study. Cyberpsychology, Behavior, and Social Networking. 2016;19(9):557-61.

39. Cherif L, Ayadi H, Khemekhem S, Moalla Y, Ghribi F. Risk factors for youth problematic internet use: A cross-sectional study. Adolescent Psychiatry. 2014;4(2):122-9.

40. Chak K, Leung L. Shyness and locus of control as predictors of Internet addiction and Internet use. CyberPsychology & Behavior. 2004; 7:559-70.

41. Odaci H, Kalkan M. Problematic Internet use, loneliness and dating anxiety among young adult university students. Computers & Education. 2010;55(3):1091-7.

42. Canan F, Yildirim O, Ustunel TY, Sinani G, Kaleli AH, Gunes C, Ataoglu A. The relationship between internet addiction and body mass index in Turkish adolescents. Cyberpsychol Behav Soc Netw. 2014 Jan;17(1):40-5. doi: 10.1089/cyber.2012.0733. Epub 2013 Aug 17.

43. Bozkurt H, Özer S, Şahin S, Sönmezgöz E. Internet use patterns and Internet addiction in children and adolescents with obesity. Pediatr Obes. 2018 May;13(5):301-306. doi: 10.1111/ijpo.12216. Epub 2017 Mar 28.

44. Wang H, Zhou X, Lu C, Wu J, Deng X, Hong L. Problematic Internet use in high school students in Guangdong Province, China. PloS one. 2011 May 6;6(5): e19660.

45. Yen, J.; Yen, C.; Chen, C.; Chen, S. and Ko, C.: Family factors of internet addiction and substance use experience in Taiwanese adolescents. Cyberpsychol Behav. 2007; 10:323–9.

46. Kratzer S, Hegerl U. Is "internet addiction" a disorder of its own? A study on subjects with excessive internet use. Psychiatrische Praxis. 2008;35(2):80–3.

47. Reda M, Rabie M, Mohsen N, Hassan A. Problematic Internet users and psychiatric morbidity in a sample of Egyptian adolescents. Psychology. 2012;3(8):626-31.

48. Alhajjar B. Problematic Internet use and psychological morbidity among nursing students in Gaza-Palastine. Am J Appl Psychol. 2014;3(4):99-103.

49. McNicol M, Thorsteinsson E. Internet addiction, psychological distress, and coping responses among adolescents and adults. Cyberpsychology, Behavior and Social Networking. 2017;20:5.

50. Tsitsika A, Critselis E, Kormas G, Filippopoulou A, Tounissidou D, Freskou A, Spiliopoulou T, Louizou A, Konstantoulaki E, Kafetzis D. Internet use and misuse: a multivariate regression analysis of the predictive factors of internet use among Greek adolescents. European journal of pediatrics. 2009 Jun 1;168(6):655.

51. Li D, Zhang W, Li X, Zhen S, Wang Y. Stressful life events and problematic Internet use by adolescent females and males: A mediated moderation model. Comput Human Behav. 2010;26(5):1199-1207.

52. Gentile A, Servidio R, Caci B, et al. Social stigma and self-esteem as mediators of the relationship between Body Mass Index and Internet addiction disorder. An exploratory study. Curr Psychol (2018). https://doi.org/10.1007/s12144-018-0054-x.

53. Alpaslan AH, Koçak U, Avci K, Uzel Taş H. The association between internet addiction and disordered eating attitudes among Turkish high school students. Eat Weight Disord. 2015 Dec;20(4):441-8. doi: 10.1007/s40519-015-0197-9. Epub 2015 Jun 7.

54. Tsitsika AK, Andrie EK, Psaltopoulou T, Tzavara CK, Sergentanis TN, Ntanasis-Stathopoulos I, Bacopoulou F, Richardson C, Chrousos GP, Tsolia M. Association between problematic internet use, socio-demographic variables and obesity among European adolescents. Eur J Public Health. 2016 Aug;26(4):617-22. doi: 10.1093/eurpub/ckw028. Epub 2016 Apr 25.

55. Banerjee I, Arora V. A cross-sectional study on prevalence of obesity and Internet addiction disorder among medical students in a tertiary care establishment at Indore. Int J Med Sci Public Health 2018;7(5):408-412.

56. Li M, Deng Y, Ren Y, et al. Obesity status of middle school students in Xiangtan and its relationship with Internet addiction. Obesity 2014;22:482-7.

57. Meral G. Is digital addiction a reason for obesity? Annals of Medical Research. 2018;25(3)472-5.

الملخص العربي

شيماء محمد عرفه*- أسماء محمد العايدي* - محمد عبد المليك حسن**

* قسم الطب النفسي - كلية الطب - جامعة الأزهر (بنات-القاهرة)

** قسم طب الأطفال - كلية الطب - جامعة الأزهر (بنين-القاهرة)

العلاقة بين الاستخدام المعضل للإنترنت، ومؤشر كتلة الجسم والأمراض النفسية في طلاب المدارس الثانوية المصرية المراهقين

مقدمة: ان الاستخدام المعضل للإنترنت (PIU) هي مشكلة عالمية مستجدة بين الطلاب. وتتفاقم هذه المشكلة مع تزايد استخدام الإنترنت بشكل مضطرد. كما أن تفشي البدانة بين المراهقين لا تزال مشكلة صحية محلية وعالمية خطيرة ومفزعة.

الهدف: دراسة انتشار الاستخدام المعضل للإنترنت، وكذلك تزامنه مع الاضطرابات النفسية والبدانة بين طلاب المدارس الثانوية المصرية الحكومية.

الطرق: تم إجراء الدراسة على ٨٢٨ طالبا تم اختيارهم عشوائيا من عدد ٢ من المدارس الثانوية الحكومية في مدينة الجمالية - محافظة الدقهلية - مصر. وقد تم تصنيف الطلاب إلى مجموعة تعليمية ادبية ومجموعة تعليمية علمية. كما طُلب من الطلاب في كل مجموعة ملء اختبار إدمان الإنترنت الشباب (YIAT) والاستبيان الصحي العام (GHQ-12) للاعتلالات النفسية. وقبل ذلك، تم الحصول على بيانات اجتماعية ديموغرافية وتقارير طبية وقياسات أنثروبومترية للطلاب.

النتائج: لاحظنا أن ١٢٪ (١٠٠ طالب) من المرشحين للدراسة كانوا يعانون من السمنة المفرطة، و٢٤,٣٪ (٢٠١ طالب) يعانون من زيادة الوزن و٦٣,٧٪ (٥٢٧ طالباً) يمثلون الوزن الطبيعي او الناقص. كذلك، وجد أن ١٣,٢ ٪ (١٠٩ طالب) من الطلاب كان لديهم استخدام معضل للإنترنت (PIUs). وكان انتشار الاستخدام المعضل للإنترنت أعلى بين الشباب الأصغر سنا، والذكور والطلاب الذين يعانون من السمنة المفرطة. أيضا، كان الاستخدام المعضل للإنترنت اعلى بين الطلاب الذين يستخدمون الإنترنت بشكل متكرر وأولئك الذين يستخدمون الإنترنت لتخفيف الشعور بالوحدة. كما تبين ايضا ان ضعف العلاقة مع زملاء الدراسة وعدم التوافق مع الآباء من مؤشرات الاستخدام المعضل للإنترنت. كما كشفت النتيجة أن ٣١,٩٪ من إجمالي الطلاب يعانون من الضيق و٦,١٪ يعانون من مشاكل حادة وضغوط نفسية. كما أظهرت نتائجنا أن الاستخدام المعضل للإنترنت والضغوط النفسية كان لها ارتباط إيجابي كبير [r (p-value) = 0.975 (<0.001)]. وبالمثل، لوحظ وجود ارتباط إيجابي كبير بين الاستخدام المعضل للإنترنت ومؤشر كتلة الجسم
[r (p-value) = 0.914 (<0.001)] . وعلاوة على ذلك، وجد ارتباط إيجابي كبير بين الضغوط النفسية ومؤشر كتلة الجسم [r (p-value) = 0.881 (<0.001)].

الخلاصة: الاستخدام المعضل للإنترنت والسمنة مشاكل شائعة و-ترتبط مع بعضها البعض- بين طلاب المدارس الثانوية في مصرو قد تؤثر على صحتهم النفسية.