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Lifestyle Factors and Internet Addiction among School Children

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Abstract

Aim: The current study aimed to determine the association between Internet Addition [IA] and fatigue, sleep disturbance, depression, and life style factors among school children.

Subjects & Methods: A cross-sectional survey based on Public and Private intermediate and secondary School students in Doha- Qatar. A total of 1624 students 12-18 years of age were approached using multistage stratified random sampling and 1,188 students (73.3%) gave consent during October 2011 to December 2012. Data collection was based on a structure questionnaire including socio-demographic details, lifestyle and dietary habits Internet Addiction Test (IAT), Fatigue Scale, Epworth Sleepiness Scale [ESS] and Beck Depression Inventory (BDI) test. Univariate and multiple logistic regression analysis were performed.

Results: The overall prevalence of IA among school children was 19.8%. The proportion of IA was significantly more among males (56.4%) as compare to females (43.6%; p=0.035), school performance (p<0.001) and family income (p=0.032). Those with IA had significantly less number of sleep hours (6.16±0.80 vs. 6.58±1.29; p<0.001) as compared to normal. Those with IA had significantly high number of hours internet use (3.82±1.64 vs. 3.03±1.64; p<0.001) as compared to normal. A significantly larger proportion of IA than normal subjects reported having headaches (p=0.010), double vision (p=0.037), eye hurt (p=0.021), eye tired (p=0.005), dizziness (34.4% vs. 27.3%; p=0.002), and hearing problem (p=0.048). A significantly larger proportion of students with IA most frequently gratifying site (19.9% vs. 11.6%; p<0.001), browsed games (38.6% vs. 29.9%; p=0.010), chat sites (29.7% vs. 22%; p=0.013), email (54.2% vs. 63.1%; p=0.36), and research (61.0% vs. 69.2%; p=0.017). Those with IA had significantly high number fatigue disorders, because significantly high number of hours internet use (p<0.001) as compared to normal.

Conclusion: The current study confirmed the of evidence linking problematic internet use with negative fatigue, greater numbers of symptoms, anxiety, sleeping disturbances, depressive and lifestyle risk factors, among vulnerable young children.

Introduction

Recent advances in internet network and smartphones have made it possible for anyone to enjoy internet use and games regardless of time and physical location. The internet misuse among children's has become a widespread global major public health [1-5].

The phenomenon of internet addiction was first described in a number of papers by both Griffiths [1,2] and Young [3]. The topic immediately gained more general attention and has since become a highly researched popular area. Unfortunately, certain internet sites, especially those involving online socializing, can affect behaviour and lead to pathological thinking [2-6]. Problematic Internet use (PIU) is defined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [7]. Several studies have established that children and adolescents in particular are becoming addicted to playing internet games, in much the same way as adults become addicted to alcohol or drug or gambling [1-3, 8-9]. It has been observed that the case for IA is very evident; with increasingly sophisticated infrastructures developing throughout the world, it will certainly emerge as a more prominent issue. People, who have psychological and emotional issues such as depression, loneliness, social anxiety, impulsivity, and distraction, easily get addicted to technology like the internet [1-3]. In addition, the place where internet accesses, the duration of internet use, peer relationships and parenting are relevant. Internet as a tool addition is also associated with the physical and psychological problems such as dry eyes, carpal tunnel syndrome, repetitive motion injuries, wrist, neck, back and shoulder pain, migraine headaches and numbness and pain in the thumb, index and middle fingers [6].

Several studies have documented adverse effects of IA among school children such as irregular dietary habits [10-11], physical inactivity, lack of adequate sleep [3,12-13] and increased depression [5,6,14] loneliness, and social anxiety [15-16]. However, very a few have investigated the association of excessive internet use with fatigue, sleeping disorders, and psychiatric problems in this region. The aim of present study was to determine the relationship between IA and fatigue, sleep disturbance, depression, and life style factors among school children.

Methods

This is a cross-sectional study included students aged between 12 – 18 years, studying in the Intermediate and secondary levels in Qatar.

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The study has been based on the Problematic Internet use (PIU) as described in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [7]. Twenty schools were selected among which ten were boys' and ten were girls' schools, located in 5 districts and schematic sampling procedure presented in Figure 1. We have computed the sample size based on 50% prevalence of students might have access to internet services and addict, assuming 3.2% bound on error estimation, and taking 99% confidence level, the required minimum sample size for this study was N= 1,624.

Figure 1: Sampling and inclusion procedure of schools and students.
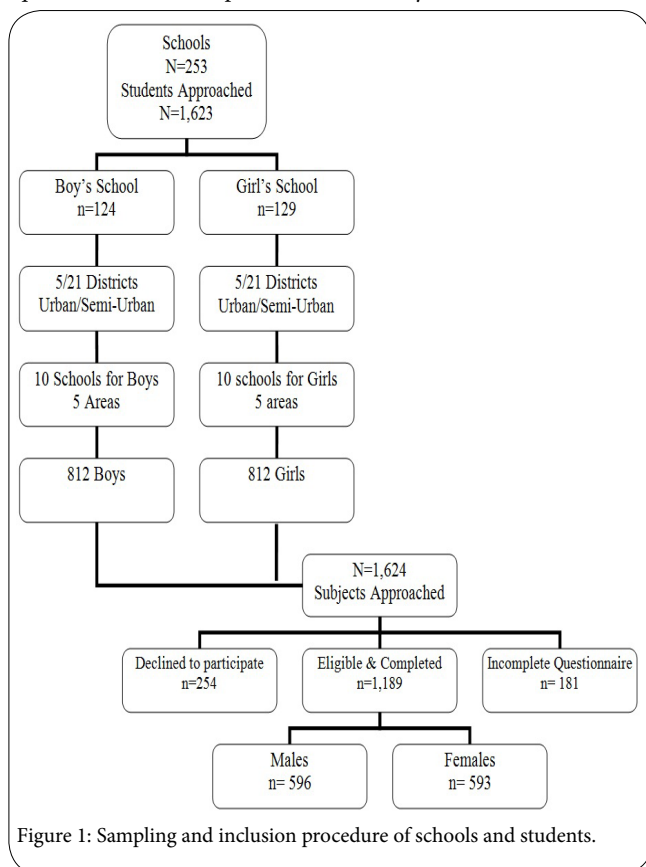
Assessment

The questionnaire based on five sections: The socio-demographic details of the student; the lifestyle habits, extra curricular activities and hobbies including physical activity and exercise; dietary habits; the internet use and included validated Young's Internet Addiction Test (IAT) [1-3,18] and finally, the fifth part consisted of the Beck Depression Inventory (BDI) [17], fatigue [18] and Epworth Sleepiness Scale [21]. Data collection took place from October 2011 to December 2012. A total of 1,624 students were approached and 1,188 students consented to participate in the study giving a response rate of 73.7%. Content validity, face validity and reliability of the questionnaire were tested using 79 students. These tests demonstrated a high level of validity and reliability (Cranach's Alpha = 0.85).

The Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI) is a long-standing, widely-used, self-evaluation depression scale with 21 questions composed, each with four possible responses [17]. Items 1 to 13 assess symptoms that are psychological in nature, while items 14 to 21 assess more physical symptoms. A score of 21 or above represents depression.

Fatigue measure and design of scale

The potential health risks fatigue has been associated with excessive internet usage [19] The Fatigue scale is composed of 14 statements that describe fatigue symptoms commonly seen in subjects [20]. A list of 14 questions were generated by various experts ın the field to reflect physical and mental fatigue. The Likert Scale baed on composition such as : 1=better than usual , 2=no more than usual, 3=worse than usual and 4= much worse than usual 4. The results revealed that the optimum cut-off is 75% with the area under the ROC curve. Internal consistency in the present study was explored for fatigue scale, Cronbach's alpha calculated for physical fatigue items (1-8) was 0.85; and for mental fatigue items (9-14) items was 0.82 respectively.

The Epworth Sleepiness Scale

The Epworth Sleepiness Scale [ESS] is a useful tool to identify symptoms of daytime sleepiness and it was introduced by Johns [21]. The validated ESS is based eight-item questionnaire that assesses the severity of daytime sleepiness in various situations. The numbers selected for the eight items in the ESS score from are range 0 to 24. The score ranging from 1 to 10 is normal and score from 11 to 24 is considered to be abnormal. Cronbach's alpha for the ESS was also obtained 0.88.

Statistical methods

Data was analyzed using SPSS version 22. Sum of scores were calculated for IAT, BDI, Fatigue and ESS. Student-t test was used to determine the significance of differences between mean values of two continuous variables. The Chi-square and Fisher's exact tests (two-tailed) were performed to test for differences in proportions of categorical variables between two or more groups. Unpaired student's t test was employed for comparison of two means. A multivariate linear regression model with stepwise elimination was constructed to identify the determinants of internet addiction for the potential confounders. The level $p<0.05$ was considered as the cut-off value for significance.

Results

The overall prevalence of IA among school children was 19.8%. Table 1 shows socio-demographic characteristics of the participants with IA and normal students. The proportion of IA was significantly more among males (56.4%) as compare to females (43.6%; p=0.035), school performance (p<0.001) and family income (p=0.032).

Table 2 shows the lifestyle habits, diet and co-morbid factors of the studied students. Those with IA had significantly less number of sleep hours (6.16±0.80 vs. 6.58±1.29; p<0.001) as compared to normal. Those with IA had significantly high number of hours internet use (3.82±1.64 vs. 3.03±1.64; p<0.001) as compared to normal. A significantly larger proportion of IA than normal subjects reported having headaches (p=0.010), double vision (p=0.037), eye hurt (p=0.021), eye tired (p=0.005), dizziness (34.4% vs. 27.3%; p=0.002), and hearing problem (p=0.048).

Table 3 gives comparison of fatigue disorders according to IA and normal students. Those with IA had significantly high number fatigue disorders, because significantly high number of hours internet use (p<0.001) as compared to normal.

	Variable	IA	Normal	*p-value
		N=236	N=953	
Nationality				
	Qatari	168(712)	676(70.9)	0.339
	Non-Qatari	68(28.8)	277(29.1)	
Sex				
	Male	133(56.4)	463(48.6)	0.035
	Female	103(43.6)	490(51.4)	
Age in Years				
	< 15 years	96 (40.7)	459(48.2)	0.041
	> 15 years	140(59.3)	494(51.8)	
Level of Education				
	Intermediate	143(60.6)	578(60.8)	0.763
	Secondary	93(39.4)	374(39.2)	
Rank of Student in School Exam				
	Very Good	65(27.5)	247(25.9)	0.001
	Good	77(32.6)	400(42.0)	
	Average	77(32.6)	282(29.6)	
	Poor	17(7.2)	34(2.5)	
Father's Education				
	Illiterate (no formal schooling)	9(5.5)	40(4.2)	0.616
	Primary	17(13.0)	98(10.3)	
	Intermediate	40(20.9)	157(16.5)	
	Secondary	70(28.1)	290(30.4)	
	University	100(32.4)	368(38..6)	
Father's Occupation				
	Not Working / retired	15(6.4)	54(5.7)	0.835
	Sedentary/ Professional	87(36.9)	372(39.0)	
	Manual/Clerk	18(7.6)	89(9.3)	
	Business man	64(27.1)	24(25.8)	
	Government Officer	52(22.0)	192(20.1)	
Mother's Education				
	Illiterate	32(13.6)	152(15.9)	0.070
	Primary	31(13.1)	183(19.2)	
	Intermediate	59(25.0)	214(22.5)	
	Secondary	72(30.5)	226(23.7)	
	University	42(17.8)	178(18.7)	
Mother's Occupation				
	House wife	88(35.6)	334(35.0)	0.576
	Sedentary/ Professional	48(20.8)	235(24.7)	
	Manual/Clerk	52(22.9)	190(20.6)	
	Business Woman	48(20.8)	188(19.7)	
Family Income				
	Low	161(25.9)	323(33.9)	0.032
	Medium	102(43.2)	396(41.6)	
	High	73(30.9)	234(24.6)	

Table 1: Socio-demographics characteristic among Internet Addict and normal students (N=1,189).
IA= Internet Addiction, Problematic internet use,
Normal = None Addiction or Non-problematic internet use

Variables	IA N=236	Normal N=953	p-value * Significance
Age (Mean±SD)	15.16±2.06	14.88±2.10	0.064
Number of Bed Rooms at your House	5.88±2.69	5.90±2.83	0.672
Number of people are living at Home	5.84±1.97	5.74±1.87	0.350
Hours internet use	3.82±1.64	3.003±1.67	0.001
Sleeping no of hours	6.16±0.80	6.32±1.24	0.001
Medical-Co-morbid Factors**	**n (%)**	**n (%)**	
Headaches	93(39.4)	292(30.6)	0.010
Blurred Vision	52(22.0)	200(21.0)	0.724
Double Vision	29(12.3)	76(8.0)	0.037
Eyes Hurt	54(22.9)	157(16.5)	0.021
Eye Tire	57(24.2)	155(16.3)	0.005
Dizziness	66(28.0)	185(19.6)	0.004
Any Problem with Hearing	60(25.4)	187(19.8)	0.048
The Epworth Sleepiness Scale			
Normal	56(23.7)	262(27.5)	
Mild	50(21.2)	258(27.1)	0.030
Moderate	48(20.3)	186(19.5)	
Severe	82(34.7)	247(25.9)	
Physical activities			
Sport activities	66(28.1)	351(36.8)	0.017
Physical activity	77(32.6)	938(39.9)	0.040
Dieting information and Frequency of eating fast food*			
Daily	30(12.7)	81(8.5)	0.026
Weekly	58(24.6)	188(19.7)	
Monthly	68(28.8)	351(36.8)	
Occasionally	80(33.9)	333(34.9)	

Table 2: The characteritics of life style, dietary and co-morbid factors among Internet Addict and normal students (N=1,189).
Two sided p values based on student t test
*** Not adding to 100%*

Table 4 presents comparison of different internet activities among internet addicted and normal groups. A significantly larger proportion of students with IA most frequently gratifying site (19.9% vs. 11.6%; p<0.001), browsed games (38.6% vs. 29.9%; p=0.010), chat sites (29.7% vs. 22%; p=0.013), email (54.2% vs. 63.1%; p=0.36), and research (61.0% vs. 69.2%; p=0.017).

Table 5 shows the multiple linear regression analysis to determine the potential predictors as risk factors for internet addiction. The data revealed that the duration of internet use, BDI depression; fatigue physical symptoms, EES sleeping, games, headache, fatigue mental symptom, dizziness, eye tired and hearing problem were significantly associated and leading predictors for internet addiction.

Discussion

The current survey presents clearly that PIU is associated with depressive symptoms, sleeping disturbance, co-morbid factors and poor lifestyle habits. It is worth to note that Qatar has very high prevalence of PIU (19.8%) when compared to Greece (8%) [15], and Taiwan (13.8%) [22] in Australia (10.2%) [23] and in Tunisia (18%) [24]. Although it is difficult to compare the exact prevalence of IA due to the lack of a shared criterion, this study highlights the importance of consistently using a similar validated tool so that to help in comparison across different population.

14 – Item fatigue scale	IA N=236	Normal Students N=953	p Value
Physical symptoms			
1. Do you have problem with tiredness?	3.01±1.60	2.17±1.65	0.001
2. Do you need to rest more?	2.85±1.22	2.35±1.11	0.001
3. Do you feel sleepy or drowsy?	2.92±1.05	2.22±1.13	0.001
4 Do you have problems starting things?	2.82±1.05	2.44±1.24	0.001
5. Do you start things without difficulty but get weak as you go on?	2.70±1.10	2.48±1.18	0.001
6. Are you lacking in energy?	3.16±1.00	2.54±1.22	0.001
7. Do you have less strength in your muscle?	2.87±1.08	2.36±1.21	0.001
8. Do you feel weak?	2.96±1.07	2.65±1.24	0.001
Mental symptoms			
9. Do you have difficulty concentrating?	2.68±1.14	2.38±1.00	0.001
10. Do you have problems thinking clearly	2.92±1.05	2.50±1.16	0.001
11. Do you make lips of the tongue when speaking?	2.70±1.19	2.32±1.15	0.001
12. Do you fin it more difficult to find the correct word?	2.60±1.26	2.62±1.23	0.785
13. How is your memory?	2.73±1.16	2.36±1.15	0.001
14. Have you lot interest in the thing s you used to do	2.73±1.16	2.44±1.49	0.001

Table 3. The comparison of fatigue physical and mental symptoms according Internet Addiction and normal subjects (N=1,189).

Variables	IA N=236	Normal N=953	*p -value significance
IAT Score (Mean ± SD)	73.50±4.41	55.48±7.10	0.001
BDI Score(Mean ± SD)	27.25±6.80	20.79±6.78	0.001
Fatigue physical symptoms	23.38±2.44	19.23±3.13	0.001
Fatigue mental symptoms	16.19±2.88	14.62±3.22	0.001
Epworth Sleepiness Score	13.58±4.82	12.71±4.47	0.013
Internet activities**	n(%)	n(%)	
Gratifying Site	47(19.9)	111(11.6)	0.001
Games	91(38.6)	285(29.9)	0.010
Chat	70(29.7)	210(22.0)	0.013
Face book	47(19.9)	181(16.9)	0.274
Community	30(12.7)	125(13.1)	0.869
email	128(54.2)	588(61.7)	0.036
Research	144(61.0)	659(69.2)	0.017
Gambling	18(7.6)	54(5.7)	0.258
eBay shopping	26(11.0)	119(12.5)	0.537

Table 4. The means and standard deviations for internet problems (IAT), depression (BDI), fatigue, (HADS), sleep problems (EES) and internet activities according Internet Addict and normal students (N=1,189).
*Two sided p values based on Chi square for categorical and student t test for the quantitative variables.
**Multiple option and multivariable choice, percentages do not add to 100%.

Independent Variables	B	Standard Error	Beta	t test value	p-value significance
Internet use in hours	-0.027	0.006	-0.115	-.4.725	<0.001
BDI Score	-0.015	0.001	-0.277	-.11.323	<0.001
Fatigue physical symptoms	-0.040	0.003	-0.352	-.13.899	<0.001
Epworth Sleepiness Score	-0.008	0.002	-0.090	-.3.687	<0.001
Sleeping in hours	0.030	0.008	0.091	3.617	<0.001
Games playing	0.065	0.021	0.076	3.136	0.002
Headache	0.071	0.024	0.085	2.958	0.003
Fatigue mental symptoms	-0.009	0.003	-0.072	-.2.873	0.004
Dizziness	0.070	0.024	0.071	2.884	0.004
Eye tired	0.069	0.033	0.066	2.090	0.038
Hearing problem	0.056	0.028	0.057	2.000	0.049

Table 5: Multivariable stepwise regression analysis predictors for determinants of Internet Addiction affect (N= 1,189).

The Korean study [8] reported that IA is associated with lack of sleep, fatigue symptoms such as physical and mental and frequent consumption of fast food. This is with current and previous reported studies [1].

The study at hand, builds on the small but increasing body of literature linking IA to depression. The findings of the present study have confirmed the findings of the three main studies which have found correlations between IA and depression, namely an American study by Young and Rogers [3] in a sample of adults (N=259); a Korean study (N=452) [14] among adolescents and a UK study [4] among adults between 16-51 years in the UK (N=1319). In a similar fashion to the current study all of these previous studies used the Internet Addiction [19] to measure internet addiction and the Beck Depression Inventory (BDI) [17-18] to measure levels of depression, with the exception of the Korean study which used the Korean version of the Center for the Epidemiologic Study of Depression Scale (CED-S). The main weakness of the Korean study [14] was its small sample size; as for the UK study [5], its main weakness was its sampling technique of recruiting participants from online social networking sites, which may have resulted in a bias towards those who utilize such sites. The current study strengthened the findings relating IA to depression as it had a larger sample size and more rigorous sampling technique as consistent with the previous studies [9-14].

More recently a Chinese study (N=1041) [23] has found a causal link between IA and depression among adolescents. It was established that the risk of depression for those who used the Internet pathologically was about two and a half times more that of those who did not [23]. More recently, Tunisian study [24] reported that the prevalence of Internet Addiction was 18.05% and daily average time of Internet use was 4.5 ±2.84 hour compared to 1.02 hours ±1.56 among normal internet student users (P=0.001). This is confirmative with the present and earlier study studies [4-5,10-11].

The present study revealed that there was a correlation between time spent on the internet, and viewing gratifying sites, games, chat and facebook. This finding confirms what other global internet studies have documented [1-6, 22-26]. Essentially, these other studies have noted that adolescents have a tendency to spend prolonged time on the internet on gaming and socially interactive sites. In a Greek study [15] among adolescents (n=897) it was found that the main aim of overall internet use was social interaction; moreover, it found that the internet access to play games via internet cafes was an important predictor for high users. Similar findings were found in a Taiwanese study among adolescents (n=1708) [22] and a Dutch study among adolescents (n=4920) [25] which documented that online gaming and surfing with a social/entertainment motivation and gratification were positively correlated with IA. A possible explanation for the gaming addiction and social interactive sites was reported by Byun et al.[26]. The main reasons behind were such as socializing functions, real-time interactions using email, discussion forums, chat rooms and online games [3]. The current study results showed similar pattern.

Present study revealed that misuse or abuse of internet is very frequent among school students. Several studies reported some prevention techniques for children, their families and health professionals [24, 27]. Internet use should modify since Internet becomes a gold mine of information and communication. Furthermore, the fact that some students are not aware of these harmful consequences on their health, time management, social life, finance and academic achievement currently and in the future. Unfortunately, lack of Internet education in school curricula is a deficiency and needs to fulfill.

The study had several limitations. The study based on cross-sectional study design. The questionnaire was self-reported for depression and sleeping disturbances. Fatigue also relied on participants' self-reported levels of subjective. Finally, the primary symptoms of addictive behavior are to hide the amount of time spent in game, gratifying sites and chatting activities. Despite those limitations, we think the sample size is adequate and the results provide more information of prevalence of IA and associated risk factors.

Home messages

This study revealed the impact of excessive internet use as burden on disability and health care of students. The primary health care and school health physicians, who are the centre point of health care services, have a critical role in identifying and treating Internet addicted victims with physical and mental symptoms.

Highlight

► This study showed that Internet and game were significantly associated with fatigue, sleeping, depressive disorder and anxiety disorders.
► Severity of depression in the Internet and Game Addiction group was higher than that in the normal group.

Conclusion

In conclusion, the current study confirmed and added to the growing body of evidence an association of depression, fatigue, anxiety, symptoms, smoking addiction with IA in children whereas age, sex, school performance, socio-economic status have association as known before. The study highlights adverse effects of IA on children development, as a result of lost interest in communication with people, inadequate dietary habits, poor social relationships, sleep disturbance, psychological symptoms such as fatigue, anxiety and depression, could be relevant to predict IA students.

Competing Interests

The author(s) declare that they have no competing interests.

Author Contributions

AB organized study, collected data, performed statistical analysis and wrote the first draft of the article, and contributed to the interpretation of the data and writing the final draft of manuscript. HA and DB contributed to the interpretation of the data and writing the manuscript.

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