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Research Article

Internet Addiction and its Relationship with Attachment Styles Among Tunisian Medical Students

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Abstract

Internet addiction is a growing addictive behavior and a major public health problem worldwide. Several psychological factors can contribute to the problematic use of the Internet. This study aimed to determine the prevalence of Internet Addiction (IA) in a sample of university students and to examine the relationship between IA, self-esteem, and attachment styles.

The present study was a cross-sectional study, involving 135 students from the Faculty of Medicine of Monastir. The participants completed a questionnaire, which contained the socio-demographic data, the reasons for Internet use, the Young Cyberaddiction scale to seek IA, the Relationships-style-questionnaire-RSQ to assess attachment style, and the Rosenberg Self-Esteem Scale (RSES).

The mean age of the students was 21.5 ± 1.9 years old. They were 112 (83%) females. The prevalence of Internet addiction was 23.7%. The average connection time was 3.5 ± 1.8 hours/day. The most frequent online activities were chat (online discussion, forums ...) in 94.8% of cases followed by download activities (78.5%), scientific research (75.6%), online games (23.7%), and online shopping (13.3%). IA was associated with school failure, alcohol use, online gaming, and low self-esteem. The majority of the participants (84.4%) in this study reported an insecure attachment style. Logistic regression analysis showed a strong association between IA and fearful attachment style.

IA was frequent among students. Fearful attachment style was found to be a risk factor for IA. This study highlights the impact of relationships between child and their caregivers on the development of addiction.

More Information

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Introduction

The Internet has become an integral part of everyday life all over the world. Widespread access to the Internet has given people quick access to online information and has offered new opportunities for entertainment and social communication [1,2]. Although the Internet offers many advantages, excessive Internet use may increase the likelihood of problematic Internet use or Internet Addiction (IA).

IA can be defined as a disorder characterized by excessive Internet use, a need to spend more time online to satiate an intense desire for Internet use, withdrawal symptoms such as nervousness and aggressive behavior, and negative repercussions in social and family life [3-5].

Previous studies [2,6,7] have shown that students are more likely than the general population to use the Internet and to develop IA. A meta-analysis [2] that examined the prevalence of IA among medical students in different countries found that the prevalence of IA among 3651 medical students was 30.1%. Medical students would be more vulnerable to addiction given that they frequently use the Internet to search for medical information [2,7]. Additionally, Internet use may help cope with stressors and negative emotions [2]. On the other hand, excessive Internet use was associated with more depressive symptoms, a decline in social relationships, and low self-esteem [6,8-10].

Although it has not been formally codified in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders

(DSM5), Internet Addiction (IA) has become a worldwide issue.

Internet use and addiction are influenced by several factors, among which attachment style is interesting to study [5,11]. Attachment theory was originally developed by Bowlby [12], who defined attachment as the first and most important relationship that children have with their caregivers. He worked on the attachment of children to caregivers and extended the principles of parent-child attachment to close personal relationships in adulthood [13]. Bartholomew and Horowitz [14] proposed a four-item model based on secure, preoccupied, dismissing, and fearful attachment. Secure individuals are comfortable with themselves and their partners in their relationships [14]. They have high regard for the self and others in relationships. Preoccupied individuals need constant reassurance and affection from others but they attempt to control the relationship because they are anxious that their partner may reject them. A preoccupied person tends to be high in anxiety but low in avoidance [14]. Dismissing individuals have a positive perception of the self but more negative perceptions of others [14]. So that, they are more independent and do not prioritize close relationships. Fearful individuals are uncomfortable in close relationships because they are worried about being hurt by others [14]. They are anxious and, because they lack assertiveness, tend to avoid relationship issues [15].

By studying the relationship between attachment styles and IA, some studies have identified a negative relationship between IA and secure attachment. The results are inconclusive concerning the contribution of different attachment styles to this addiction.

From this perspective, we proposed through this work to evaluate the prevalence of IA in a Tunisian student population and to examine the relationship between attachment styles and IA.

Method

Study design

A cross-sectional, questionnaire-based study was conducted among 135 students of the faculty of medicine of Monastir, Tunisia. An anonymous self-questionnaire was distributed after a presentation of the main objectives of the study. The questionnaire consisted of (1) the sociodemographic data, (2) the reasons for Internet use, (3) the Young cyberaddiction scale (4) the Relationships-style-questionnaire-RSQ, and (5) the Rosenberg Self-Esteem Scale.

Measures

Young's Diagnostic Questionnaire (YDQ): It is an 8-item questionnaire adapted from the diagnostic criteria of pathological gambling in the DSM-IV used to evaluate IA. We used its French version [16].

A person with a score of 5 or more measured by the YDQ during 6 months is classified as Internet dependent.

Relationships-Style-questionnaire (RSQ): The RSQ [17] is a valid instrument for the self-reported measurement of adult attachment styles. It allows discriminating between 1) Secure, 2) Insecure preoccupied, 3) Insecure dismissive, and 4) Insecure fearful.

Rosenberg Self-Esteem Scale (RSES): The Rosenberg Self-Esteem Scale [18] is a measure of global self-regard, consisting of 10 items that were measured on a 4-point scale. A total self-esteem score ranged from 10 to 40 with higher scores indicating higher self-esteem. A score lower than 25 suggests low self-esteem [19].

Statistical analyses

Data analysis was performed using SPSS version 20. Descriptive analysis was used to describe the demographic and Internet-use characteristics of the participants, the prevalence of IA, self-esteem, and different types of attachment styles.

The proportions were compared by the "chi2" test or by the exact "Fisher" test.

The Student test was used to compare two means of two independent samples. The significance level was set at 0.05.

After the univariate analysis, a logistic regression model was performed to identify the factors independently associated with Internet addiction. The variables included in the model were the significant ones at the statistical threshold of 0.25.

Ethics: All subjects were informed about the study and provided informed consent. All subjects were over 18 years of age.

Results

Socio-demographic characteristics

The mean age of the students was 21.5 ± 1.9 years old. They were 112 (83%) females (Table 1).

The majority of the students (98.5%) were single. Nearly half (57%) were enrolled in the second academic year and 11.1% had experienced a school failure. Almost half of the students (48.1%) lived with their families, 41% lived with pairs; 10.4% of the students were followed for chronic diseases; 3.7% reported having psychiatric antecedents.

Table 1: Age and sex of total sample and subsamples of not-addicted and addicted students.

	N	Addicted (n)	Non-addicted (n)	*p* - value
Mean age, (SD)	21.5 (1.9)	21.69 (1.95)	21.47 (1.94)	0.57
Sex				
Male (%)	23 (17%)	8 (5.9%)	15 (11.1%)	0.17
Female (%)	112 (83%)	24 (17.8%)	88 (65.2%)	

N, Number; SD, Standard Deviation.

Students reported smoking in 4.4% (n = 6), alcohol use in 4.4% (n = 6), and cannabis use in 1.5% (n = 2) of cases.

Internet use

The average connection time was 3.5 ± 1.8 hours/day. The main online activity has been chat (online discussion, forums ...) in 94.8% of cases followed by download activities (78.5%), scientific research (75.6%), online games (23.7%), and online shopping (13.3%).

All the students have used Facebook. Students have used Facebook to discuss with their friends (68.9%), to meet new friends (9.6%), to look at their friends' photos (48.9%), to follow the news (67.4%), to play on Facebook applications (14.1%), to listen to music (31.9%), and to work (15.6%).

Nearly a quarter of participants (24.4%) have developed romantic relationships through Facebook.

According to the Young Scale, 23.7% of the students were addicted to the Internet.

Attachment styles

Based on attachment theory, 50.4% of the respondents had a dismissive attachment style, 21.5% preoccupied style, 15.6% secure style, and 12.6% fearful style.

Self-esteem

The average RSES score of the study sample was 30.23 ± 5.2; 18.5% of the participants had low self-esteem.

Factors associated with internet addiction (Table 2)

Internet addiction was associated with school failure (p = 0.048) and alcohol use (p = 0.028). It was also associated with low self-esteem (p < 0.001).

The insecure attachment was associated with IA. Participants with IA had higher scores for fearful attachment (p = 0.04) and lower scores for secure attachment (p = 0.03).

Use of internet and attachment styles (Table 3)

By examining the relationship between the different styles of attachment and the activities practiced on the Internet, it appeared that the secure attachment style was associated with establishing romantic relationships (p < 0.001) and chatting (p = 0.02) on Facebook, and making online purchases (p = 0.03). Preoccupied attachment style was associated with checking friends' profiles and photo albums (p = 0.005) and with knowing new people through Facebook (p = 0.03); fearful attachment style was associated with knowing new people through Facebook (p = 0.038) and listening to music (p = 0.011). We found a negative association between fearful attachment style and chatting on Facebook (p = 0.03).

Logistic regression analysis

To eliminate confounding factors and determine the variables independently associated with IA, we used a multivariate regression model. The variables included in the model were Internet addiction as the dependent variable and sex, smoking, alcohol use, time spent on the Internet, using the internet to know new people through Facebook, establishing a romantic relationship through Facebook, using the Internet to play online, self-esteem, school failure, secure attachment style score, preoccupied attachment style score and fearful attachment style score as covariates. The multivariate regression analysis (Table 4) showed an association between

Table 2: Internet use, substance use, and questionnaire scores among not-addicted and addicted students.

	Addicted	Non-addicted	p - value
Activities on Internet			
Communication	30 (93.8%)	98 (95.1%)	0.66
Download	24 (75%)	82 (79.6%)	0.57
Education	24 (75%)	78 (75.7%)	0.93
Shopping	5 (15.6%)	13 (12.6%)	0.67
Games	2 (6.2%)	17 (16.5%)	0.24
Discussion on Facebook	22 (68.8%)	71 (68.9%)	0.98
knowing new people on Facebook	25 (78.1%)	63 (61.2%)	0.08
following news on Facebook	20 (62.5%)	71 (68.9%)	0.49
Establishing romantic relationships	16 (50%)	17(16.5%)	<0.001
Time spent on the Internet			
>4 hours, n (%)	17 (53.1%)	31 (30.1%)	0.01
School failure	7 (21.9%)	8 (7.8%)	0.048
Substances use			
Tobacco, n (%)	3 (9.4%)	3 (2.9%)	0.14
Alcohol, n (%)	4 (12.5%)	2 (1.9%)	0.028
Cannabis, n (%)	1 (3.1%)	1 (1%)	0.41
Attachment styles			
Secure, mean (SD)	2.91 (0.67)	3.15 (0.53)	0.03
Preoccuped, mean (SD)	3.2 (0.79)	2.97 (0.79)	0.16
Dismissive, mean (SD)	3.76 (0.82)	3.67 (0.74)	0.53
Fearful, mean (SD)	3.40 (0.85)	3.06 (0.83)	0.04
RSES score, mean (SD)	26.50 (5.88)	31.39 (4.45)	<0.001

N: Number; SD: Standard Deviation; RSES: Rosenberg Self-Esteem Scale.

Table 3: Internet use among secure and insecure attachment style.

	Attachment styles		
	Insecure	Secure	p - value
Activities on Internet			
Communication	109 (95.6%)	19 (90.5%)	0.29
Download	90 (78.9%)	16 (76.2%)	0.77
Education	88 (77.2%)	14 (66.7%)	0.3
Shopping	12 (10.5%)	6 (28.6%)	0.03
Games	28 (24.6%)	4 (19%)	0.78
Discussion on Facebook	74 (64.9%)	19 (90.5%)	0.02
knowing new people on Facebook	11 (9.6%)	2 (9.5%)	1
following news on Facebook	81 (71.1%)	10 (47.6%)	0.04
Establishing romantic relationship	21 (18.4%)	12 (57.1%)	<0.001
RSES, mean (SD)	30.2 (5.34)	30.38 (4.71)	0.88

RSES: Rosenberg Self-Esteem Scale.

Table 4: Logistic regression results for IA.

Variables	Adjusted OR	95% CI	p - value
School failure	13.15	[10.55, 15.73]	0.001
Using the Internet to play	9.24	[1.36, 62.87]	0.023
Using the Internet to Establish a romantic relationship	0.067	[0.020, 0.223]	< 0.001
Secure attachment style score	0.21	[0.085, 0.558]	0.002
RSES score	0.83	[0.752, 0.920]	< 0.001

CI: Confidence Interval; OR: Odds Ratio; RSES: Rosenberg Self-Esteem Scale.

IA and school failure (odds ratio [OR] = 13.15; confidence interval [CI] = [10.55, 15.73]; $p = 0.001$), using the Internet to play ([OR] = 9.24; [CI] = [1.36, 62.87]; $p = 0.023$), establishing a romantic relationship through the Internet ([OR] = 0.067; [CI] = [0.020, 0.223]; $p < 0.001$), secure attachment style score ([OR] = 0.21; [CI] = [0.085, 0.558]; $p = 0.002$) and RSES score ([OR] = 0.83; [CI] = [0.752, 0.920]; $p < 0.001$).

Discussion

The present study sought to determine the prevalence of IA among a sample of Tunisian medical students and to investigate the association between Internet use and attachment styles.

In this study, the prevalence of IA was 23.7%. Different studies have reported different results for the prevalence of IA ranging from 3.2% to 30% (Table 5).

The differences in reported rates may be explained by the different tools used in the diagnosis of IA and by the fact that studies have been conducted in different populations and at different times [9]. According to Byun, et al. [23], this broad range of prevalence rates is due to the lack of a comprehensive standardized definition covering all ages, genres, and levels of education. The prevalence of IA in this student sample appears to be situated among the highest figures in the literature. Tunisia was the first Arab and African country to connect to the web, as early as 1991. Facebook experienced a real fashion effect since right after "the revolution", the number of users increased from 2 million in 2010 to 4.6 million in 2014 [24].

In this study, there was no difference between women and men in terms of the level of IA. Many studies have reported that, for social and cultural reasons, IA is more frequent among men than women [9]. The lack of a significant association in this study between gender and the level of IA may be related to a biased sample of predominantly females.

We found that school failure was associated with IA (odds ratio [OR] = 13.15; confidence interval [CI] = [10.55, 15.73]; $p = 0.001$). International studies have revealed that pathological Internet gamblers were more likely to have poorer academic results [22].

In this study, alcohol use was more often reported with students addicted to the Internet ($p = 0.028$). Shapira, et al. [25] found that 10% of subjects with IA had alcohol dependence. Several studies have reported an association between IA and substance abuse [6,25].

Table 5: Prevalence of IA among students.

The study	Number	Scale	Prevalence (%)
South Korea [20]	452	IAT (Internet Addiction Test)	30.8
United Kingdom [21]	2257	Internet Addiction-Screener (AICA-S)	3.2
Tunisia [6]	310	Young	26.8
China [22]	10158	IAT (Internet Addiction Test)	10.4
Our study	135	Young	23.7

The time spent on the Internet is an important factor in addiction in this study; the prevalence of IA was higher among students who used the Internet more than 4 hours daily ($p = 0.017$). It was demonstrated that the level of IA increases with the increasing duration of Internet use [9].

The most practiced online activities for the students in this study were online chat (forums, Facebook...) (94.8%) followed by download activities (78.5%), scientific research (75.6%), online gaming (23.7%), and online shopping (13.3%). Online gaming was a significant risk factor for IA. Online gaming was similar to substance-related addiction [26]. Engaging in online gaming was associated with openness to experience [26]; it led to spending large amounts of time online in search of a rewarding experience. According to Van Rooij, et al. [27], online gaming is the only Internet activity that combines a distinct reward structure, and social interactions in a virtual environment. Many studies [21,22,26,27] suggested that specific online activities such as online gaming and online social networking had high addictive potential. Kuss, et al. [21,26] indicated that frequent usage of social online applications especially Facebook and online forums was a strong risk factor for IA. All of the students in this study had a Facebook account. The use of Facebook in Tunisia increased and reached 42.1% of the Tunisian population in 2014 [24]. Tunisia ranked 47th place worldwide in terms of the number of Facebook accounts in February 2013 [28].

Establishing romantic relationships through the Internet seems to be a protective factor against IA. In this study, online romantic relationships were negatively associated with IA ($p < 0.001$) and insecure attachment style ($p < 0.001$). We suggested that students, which have established romantic relationships, were more comfortable with social interactions. Extraverts and agreeable people tend to be more satisfied in their close relationships [29]. Kuss, et al. [21] reported that agreeableness, extraversion, and emotional stability were negatively associated with IA.

Students addicted to the Internet had lower self-esteem scores ($p < 0.001$). Results of logistic regression revealed that self-esteem was a predictor of IA ([OR] = 0.83; [CI] = [0.752, 0.920]; $p < 0.001$). This result is corroborated by the literature [30,31]; it was found that self-esteem was a strong risk factor for IA and the amount of time spent online per week. Students with low self-esteem and who have coping difficulties in their lives away from home might find the Internet a means of escape [8,32].

Previous studies [33-35] showed that attachment style influences personality traits and different types of behaviors such as romantic love, friendships, social skills, and addictive behaviors. Research on addictive behaviors showed that insecure attachment is associated not only with alcohol addiction and other substance use but also with behavioral addictions such as IA [11].

This study revealed that secure attachment style was a protective factor against developing signs of IA ([OR] = 0.21; [CI] = [0.085, 0.558]; p = 0.002). This finding was consistent with the results found in the literature [34,36]. Ghasempour and Mahmoodi-Aghdam [37] concluded that individuals with a secure attachment style are comfortable with interpersonal interactions, have higher self-esteem, act with more functional coping strategies to face obstacles, and therefore are less likely to turn to addictive behaviors. Insecure attachment is a predictor of IA [36]; addiction can be considered as an adaptive strategy to discharge psychic tension; The Internet, especially social networks, can satisfy the need for security and belonging of insecurely attached subjects [38]. Additionally, the Internet may provide them with distant relationships to communicate with others with less emotional stress in the faceless virtual space [22].

Research in the neurobiology of attachment supported the relationship between insecure attachment and addiction and proposed that oxytocin increases resilience against addiction and stress effects by facilitating the processing of social attachment. Low oxytocin levels could be a key predisposing factor for the emergence of IA [39].

The majority of the participants (84.4%) in this study reported an insecure attachment style. Insecure attachment style prevalence was higher than in the general population (49%) [40].

Several studies have tried to explain the role played by attachment styles in IA. However, the specific types of attachment associated with IA were different among the studies. Some authors reported that both avoidant and anxious attachment styles explain problematic Internet use [11,35], while others found that attachment anxiety was the only significant factor [34,41], and still others found that attachment avoidance was the only significant factor [42].

The majority of studies have examined the relationship between IA and attachment styles using a model in 3 styles of attachment: secure, anxious, and avoidant, but they did not discuss a category of people who might exhibit both high avoidance and high anxiety. This category was described by Bartholomew & Horowitz [14] and labeled fearful. The results of this study showed that fearful attachment style was significantly associated with IA (p = 0.04). Fearful subjects, who have negative views of both the self and others [14], may present the highest level of interpersonal difficulties and social avoidance because they see others are unreliable and will turn to virtual life and relations which do not require emotional investing. Furthermore, it was shown that social isolation, loneliness, and depression were associated with addiction to communication technologies such as the Internet [9,31,37,43]. It has been found a relationship between depressive symptoms and avoidant attachment style [37].

By exploring styles of attachment according to the different activities on the Internet, we found a negative association between fearful attachment and chatting on Facebook, while this style of attachment was associated with connecting on Facebook to find new friends. The fearful-avoidant attachment style may be one of the most complicated styles. It is characterized by high avoidance of relationships and fears of abandonment and proximity, with, on the other hand, a strong desire to be in a relationship. We noticed that students with this kind of attachment were the most likely to spend time on the Internet looking for making new friends through social networks but they would have less chance to interact with other individuals [10]. It is reasonable to assume that subjects with fearful attachments are uncomfortable with chat functions.

Because people with fearful attachments are both anxious and avoidant, Facebook may provide them the perfect opportunity to monitor their partner and perceived relational threats passively without having to interact with or confront him or her directly [15]. Due to their tendency to keep their distance from others, they are attracted to anonymity, less risk, and less responsibility characterizing Internet interactions [35].

In this study, we did not find an association between IA and preoccupied attachment style. However, this style of attachment was significantly associated with meeting online acquaintances. According to attachment theory, the preoccupied style involves low avoidance but high anxiety and is related to an individual's fear of rejection and abandonment in relationships [42]. Through social networking sites, they seek approval and reassurance from others [35]. People with a preoccupied attachment style might feel more control and closeness by using Facebook [15]. It was demonstrated that these subjects have less anxiety about rejection and abundance through Facebook and perceive themselves then more able to initiate virtual relationships [33].

Limitations

The findings should be interpreted under several limitations. First, the sample was small; second, the present study is limited to adolescents attending the Faculty of Medicine of Monastir; third, this sample was characterized by a strong female predominance; and finally, this study employed a cross-sectional rather than a longitudinal design and therefore has inherent limitations for determining causal relations.

Conclusion

The present research aimed to evaluate the prevalence of IA and to examine the relationship between attachment styles, and IA in students.

Our results demonstrated a high prevalence of IA and a high prevalence of insecure attachment styles in Tunisian students.

We found a negative association between IA and secure attachment. Specifically, subjects with secure attachment establish better relationships with others, are more confident, and are less to turn to addictive behaviors.

Findings showed that there was an association between fearful style and IA. Those subjects, who tend to avoid social interactions, spend more time on the Internet but they are not the most users of chat functions.

The presented results suggest the potentially high importance of attachment style and more precisely the influence of caregiver-child interactions in the emergence of addictive behaviors.

Compliance with ethical standards

We have no conflict of interest to declare. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

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