Clinical Features, Psychiatric Comorbidity, and Health-Related Quality of Life in Persons Reporting Compulsive Computer Use Behavior

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Background: We sought to examine the demographic and clinical features and psychiatric comorbidity in persons reporting compulsive computer use.

Method: Sixteen men and 5 women were recruited by advertisement and word-of-mouth. All reported excessive computer use that interfered with social or occupational functioning or caused personal distress. The subjects completed structured and semistructured assessments, including a computer version of the Diagnostic Interview Schedule (DIS), the Minnesota Impulsive Disorders Interview, the Personality Diagnostic Questionnaire-Revised (PDQ-R), and a brief version of the Medical Outcome Study Short Form-36 (SF-36).

Results: The typical subject was a 32-year-old single white man with a mean yearly income of $27,000; problem computer use began at age 29 and consumed 27 hours each week. Eleven subjects (52%) reported school or academic problems resulting from their computer use, and 12 (57%) reported that family members had confronted them about it. Thirteen subjects (62%) had tried to cut back on their computer usage. Nine subjects (43%) reported missing work or school owing to their computer use. According to DIS results, 7 subjects (33%) had a lifetime mood disorder, 8 subjects (38%) had a substance use disorder, and 4 subjects (19%) had a lifetime anxiety disorder. According to the PDQ-R results, 11 subjects (52%) met criteria for at least one personality disorder, the most frequent being the borderline, antisocial, and narcissistic types. Impulse-control disorders were also common, particularly compulsive buying. On the SF-36, subjects showed impaired mental health functioning compared with a normative sample.

Conclusion: The results show that persons reporting compulsive computer use suffer substantial psychiatric comorbidity and show evidence of emotional distress. While the disorder appears to be increasing in prevalence, more work is needed to determine its relationship with other disorders and to determine its risk factors, family history, psychosocial complications, and natural history.

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Compulsive computer use has attracted increasing attention in the professional literature[1–9] and the popular media.[10,11] Although its prevalence is unknown, widespread computer availability and the increasing popularity of the Internet suggest that compulsive computer use is a growing problem. While there are no generally accepted definitions of the disorder, it has been described as a preoccupation with computer usage that is overly time-consuming, causes personal distress (mostly through one's sense of loss of control), and has the potential to cause interpersonal, occupational, financial, or legal consequences. Stein observes that while the terms *addiction* and *compulsion* used to describe the phenomenon are probably incorrect, the "intense attachment to computers seems to be a real one."[9(p890)] In many respects, compulsive computer use is probably best considered a disorder of impulse control, since many of its features are compatible with other disorders within the category such as pathological gambling. Both conditions, for example, are characterized by the failure to resist one's impulses to engage in a particular behavior despite serious personal consequences, and both are considered pleasurable and are seldom resisted.

There are scant data on compulsive computer use, but in one recent case series, Shapira et al.[1] described 14 subjects (8 men, 6 women) who presented to a psychiatric outpatient clinic for evaluation of "problematic use of the Internet." All had at least one lifetime Axis I disorder, including 11 subjects (79%) with bipolar disorder. In an unrelated study involving 93 households in Pittsburgh,[8] 169 subjects were followed up 12 to 24 months after signing up for the Internet. At follow-up, Kraut and colleagues[8] reported that greater use of the Internet correlated with increased depression and loneliness, decreased social activity, and poor communication within the household. These results suggested to the investigators that Internet use contributes to social isolation and reduces one's opportunities for serious social interactions, findings supported by at least one other researcher.[12]

Table 1. Demographic Characteristics of Compulsive Computer Use in 21 Subjects

Characteristic	N	%
Age distribution, y		
< 21	2	10
21 to 29	9	43
30 to 39	4	19
40 to 49	4	19
50 to 59	1	5
> 59	1	5
Highest education		
Attended high school	1	5
Some college	10	48
College degree	8	38
> College	2	10
Marital status		
Single	11	52
Married	8	38
Divorced	2	10
Occupation		
Student	9	43
Professional/technical	6	29
Sales	3	14
Laborer	2	10
Retired	1	5
Yearly income		
< $10,000	2	10
$10,000 to $20,000	3	14
$20,001 to $30,000	4	19
$30,001 to $40,000	5	24
> $40,000	3	14

In this article, we describe the results of interviews with 21 subjects who acknowledged compulsive computer use behavior. The subjects took part in both structured and semistructured interviews to assess the presence of Axis I and Axis II comorbidity, as well as to describe their computer usage and its effect on their functioning. To our knowledge, this article presents the first detailed psychiatric assessment of persons reporting compulsive computer use behavior who were not seeking treatment.

METHOD

Subjects were recruited through newspaper advertisements and word-of-mouth between June and August 1998. These advertisements invited persons with "compulsive computer use behavior" to participate in a research study. We required that individuals (1) acknowledge compulsive computer use behavior and (2) acknowledge experiencing an adverse consequence resulting from the behavior (either personal distress or social, occupational, financial, or legal consequences).

Twenty-one subjects were ultimately enrolled and interviewed. All gave written informed consent prior to study participation according to the regulations of the University of Iowa Institutional Review Board. Subjects received compensation ($10) for their time and participation.

A computer-interactive version of the National Institute of Mental Health Diagnostic Interview Schedule (DIS)[13] revised for compatibility with DSM-III-R was administered to assess major (Axis I) mental disorders. Subjects answered questions at a cathode ray tube terminal located within the Department of Psychiatry at the University of Iowa College of Medicine. Subjects were also given a version of the Minnesota Impulsive Disorders Interview (MIDI),[14] a semistructured interview used to assess the presence of trichotillomania, pyromania, intermittent explosive disorder, kleptomania, compulsive buying, compulsive sexual behavior, and compulsive exercise. Self-report questionnaires included the Personality Diagnostic Questionnaire-Revised (PDQ-R)[15] (used to assess Axis II disorders), the Beck Depression Inventory,[16] the Maudsley Obsessive-Compulsive Inventory,[17] and the Symptom Checklist 90-Revised.[18] The latter questionnaires were given to assess mood, obsessive-compulsive, and somatic symptoms. A brief version of the Medical Outcome Study Short Form-36 (SF-36)[19] was used to assess general functioning. It is similar to the parent version, but has fewer questions and generates fewer subscales. We also administered a questionnaire designed to gather information on computer use behavior (developed by the authors, available upon request).

RESULTS

The sociodemographic profile of the 21 persons reporting compulsive computer use is presented in Table 1. The mean ± SD age of subjects was 32 ± 13 years (range, 19–62 years), and 5 subjects (24%) were women. Eight (38%) of the subjects were married. Eleven subjects (52%) were single, and the remainder were divorced. The majority had attended or completed college, and most were students, professionals, or worked in sales. The mean ± SD reported yearly income was $27,000 ± $16,400 (range, $5,000–$60,000). Nineteen subjects were white, 1 was African American, and one was "other."

Table 2 presents the results of the computer use questionnaire. Subjects reported that they were introduced to computer use at a mean ± SD age of 17 ± 12 years (range, 5–53 years); their computer use became problematic at a mean ± SD age of 29 ± 13 years. Thus, the lag from initial use to problematic use was a mean ± SD of 11 ± 7 years (range, 0–25 years). Subjects reported spending a mean ± SD of 27 ± 12 hours (range, 7–60 hours) of "nonessential" computer use per week. Interestingly, none of the subjects had sought any type of treatment for their disorder.

Comorbid current (past 6 months) and lifetime psychiatric diagnoses are shown in Table 3. Nearly half of the subjects met criteria for a current disorder. The most common lifetime disorders included substance use disorders (38%), mood disorders (33%), and anxiety (19%) and psychotic disorders (14%). Nearly one quarter of the sample had a current depressive disorder (either major depression or dysthymia).

Table 2. Clinical Characteristics of Compulsive Computer Use in 21 Subjects

Question	N	%
Computer use has		
Affected schooling	11	52
Caused financial problems	5	24
Made subject feel out of control	3	14
Caused work-related problems	2	10
Friends have confronted subject about computer use	9	43
Family members have confronted subject about computer use	12	57
Time is spent on the computer		
Surfing the Internet	17	81
Playing games	16	76
Using chat lines	8	38
Developing/inventing programs	6	29
Other	11	52
Subject would rather spend time on the computer than with friends/family	6	29
Subject has missed social/job-related activities because of computer use	9	43
Subject has lied to others about his/her computer use	8	38
Computer use produces certain emotions		
Excitement	11	52
Happiness	10	48
Power	4	19
Frustration	2	10
Wild mood	1	5
Sadness/depression	1	5
Anger	1	5
Irritability	1	5
Hurt	0	0
Other	2	10
Moods that cause subject to use the computer		
Sad/depressed	8	38
Frustrated	5	24
Irritable	3	14
Excited	2	10
Hurt	1	5
Wild	1	5
Happy	0	0
Powerful	0	0
Angry	0	0
Other (e.g., bored)	5	24
Rewarding aspects of using the computer		
Feeling distracted from concerns	11	52
Getting information	6	29
Feeling good/better	4	19
Feeling more social	4	19
Feeling important	3	14
Relieving anxiety	1	5
Other	3	14
Subject has tried to cut back on computer use	13	62
Subject was successful	11 (of 13)	85
Cutting back caused anxiety	4 (of 13)	31
Subject has sought treatment for computer use	0	0

Eight subjects (38%) had at least one disorder according to MIDI results. Compulsive buying was the most frequent condition found (N = 4, 19%). The other disorders included pathological gambling (N = 2, 10%), pyromania (N = 2, 10%), compulsive sexual behavior (N = 2, 10%), kleptomania (N = 1, 5%), intermittent explosive disorder (N = 1, 5%), and compulsive exercise (N = 1, 5%). No subject had trichotillomania. Other information obtained using the MIDI revealed that 3 subjects (14%) reported physical abuse and 2 subjects (10%), sexual abuse during childhood.

Table 3. Current and Lifetime Rates of Psychiatric Disorder Assessed Using the Diagnostic Interview Schedule Among 21 Subjects Reporting Compulsive Computer Use

	Current		Lifetime	
Diagnosis	N	%	N	%
Mood disorders				
Mania	1	5	2	10
Major depression/dysthymia	5	24	7	33
Any mood disorder	5	24	7	33
Anxiety disorders				
Panic disorder	1	5	2	10
Phobic disorder	3	14	3	14
Generalized anxiety disorder	3	14	3	14
Obsessive-compulsive disorder	0	0	2	10
Any anxiety disorder	4	19	4	19
Substance use disorder				
Alcohol abuse/dependence	3	14	7	33
Drug abuse/dependence	1	5	3	14
Any substance use disorder	3	14	8	38
Somatoform disorder	2	10	2	10
Eating disorder				
Anorexia nervosa	0	0	0	0
Bulimia nervosa	2	10	3	14
Any eating disorder	2	10	3	14
Psychosexual disorder	2	10	3	14
Psychotic disorder	2	10	3	14
Childhood conduct disorder	0	0	9	43
Antisocial personality disorder	1	5	3	14
Any comorbid disorder	6	29	10	48

Table 4. Scores on the Medical Outcome Study Short Form-36 in 21 Subjects With Compulsive Computer Use and in a U.S. Population Sample

	Compulsive Computer Use (N = 21)		US Population (N = 3474)[a]		Difference in Standard Deviation Units[b]
Dimension	Mean	SD	Mean	SD	
Physical functioning	88.1	20.5	84.2	23.3	0.16
Bodily pain	75.6	25.2	75.2	23.7	0.02
General health	74.0	18.0	72.0	20.3	0.10
Social functioning	84.2	19.4	83.3	22.7	0.04
Role (emotional)	78.9	29.1	81.3	33.0	–0.07
Mental health	65.6	13.0	74.4	18.1	–0.49

[a]Data from Ware.[19]
[b]Mean score for subjects with compulsive computer use minus mean score for the U.S. population divided by the SD of the U.S. population score.

On the basis of the PDQ-R, 11 subjects (52%) met criteria for at least one personality disorder, the most frequent being the borderline (N = 5, 24%), narcissistic (N = 4, 19%), and antisocial (N = 4, 19%) types. Histrionic, avoidant, passive-aggressive, and self-defeating personality disorders were each present in 14% (N = 3); schizoid, schizotypal, obsessive-compulsive, and dependent personality disorders were each present in 10% (N = 2). According to the DIS, the prevalence of lifetime antisocial personality disorder was 14%, but was 19% with the PDQ-R. Consensus of the 2 instruments yielded a prevalence for antisocial personality disorder of 10%.

Table 4 shows results from the SF-36, in which functional status is assessed in subjects. For this analysis, we

compared SF-36 results in our subjects to those in the U.S. general population[16] by calculating the difference in standard deviation units, a method used by Koran et al.[20] The average score for mental health in our subjects is below that in the U.S. population, although the scores on other scales are not.

Cases

The following vignettes illustrate the problems to which compulsive computer use may lead.

Case 1. Mr. A, a 47-year-old married computer consultant, reported spending nearly 12 "recreational" hours on the computer on weekdays and up to 18 hours daily on weekends. His time was spent answering and sending electronic mail (e-mail), using chat lines, and "surfing" the Internet. He reported having developed several romantic relationships and would exchange sexually explicit photographs with the women. He owned 3 personal computers and incurred significant debt purchasing computer paraphernalia. He had been arrested several times for computer hacking, had lost several jobs due to inappropriate computer usage at work, and admitted spending little time with his wife and 3 children. He admitted to a preference for an on-line social life and rarely socialized in other settings. He acknowledged feeling powerless over his computer usage.

Case 2. Mr. B, a 42-year-old divorced grocer, admitted a desire to be on-line all day. He acknowledged spending 30 "recreational" hours per week on the computer, most of it on chat lines. Following a divorce, he admitted using the Internet to make new friends and meet potential spouses. He had dated several women he met on-line. His parents had complained about the time he spent at the computer and expressed concern about his "addiction." He had made no attempt to curb his computer use. His spare time was reported to be spent teaching elderly persons to use the Internet.

DISCUSSION

Our clinical experience and the data provided by our subjects suggest that compulsive computer use may be widespread and is potentially important. Although figures are unavailable, many researchers sense that its frequency may be increasing. The impact of compulsive computer use is not readily apparent, however, since many of its consequences (e.g., social isolation, marital discord, and financial problems) remain out of the public's view.

The typical subject of our study was a 32-year-old man with a college degree and an average income of about $27,000, who had been compulsively using his computer for 3 years. Most subjects reported a strong interest in "surfing the Web," using chat lines, and playing popular computer games; subjects spent nearly 30 hours per week using the computer for "nonessential" purposes, which we defined as those not necessary to their work or well-being. Subjects admit that their computer use leads to feeling excited, happy, or powerful, but that it is sometimes used to assuage feelings of sadness, frustration, or boredom. Most admit that their computer use has caused problems with family and friends or with work or schooling. Their computer use is often used to distract them from other concerns, and while most have tried to cut back on their usage, nearly one third who cut back observed that cutting back made them feel anxious. None felt the disorder was sufficiently problematic to seek treatment.

The findings strongly suggest a connection between compulsive computer use and mental disorders, particularly mood, personality, and substance use disorders. Although our study did not include a comparison group, data from the Epidemiologic Catchment Area (ECA) survey[21] and the National Comorbidity Survey (NCS)[22] indicate that the frequency of Axis I and Axis II comorbidity among our subjects was greater than expected. Of course, the difference between our findings and those of the ECA and NCS could stem from the way the data were collected and the instruments were used: the self-administered DIS versus trained lay interviewers (in the ECA) and recruitment by word-of-mouth and advertising versus probability sampling techniques (in the ECA and NCS). Impulse-control disorders appear excessive in our sample as well, since nearly 40% of the sample had at least one such disorder. While normative data are unavailable, Christensen et al.[14] reported in a study of compulsive buying that only 1 (4%) of 24 "normal buyers" had an impulse-control disorder as defined by the MIDI, which suggests that the rate among our subjects is excessive.

Personality disorders were found in over half of the subjects (52%) according to PDQ-R results. Using a prior version of this instrument, we found a prevalence of 12% for "any" personality disorder in a community sample, which again suggests that the rate found in compulsive computer users is excessive.[23] According to the PDQ-R results, "dramatic" cluster disorders were the most frequently observed, including narcissistic, borderline, and antisocial personality disorder. While it is not immediately clear why these particular personality types are the most frequent, perhaps compulsive computer users crave novelty and excitement (antisocial personality disorder), are self-absorbed (narcissistic personality disorder), are impulsive (borderline personality disorder), or use the computer to relieve boredom and loneliness (borderline personality disorder). Naturally, the differences observed in the measurement of antisocial personality disorder using the DIS (14%) and PDQ-R (19%) point to the limited validity in assessing personality disorders (i.e., no 2 methods have a high degree of agreement in the same subject) and the need for additional work in measuring Axis II disorders.[24]

The figures regarding psychiatric comorbidity in our study were less than those reported by Shapira et al.[1] While their subjects were similar in age to ours (mean age = 36 years) and spent a similar amount of time with recreational computer use (mean = 30 hours per week), those investigators reported exceedingly high rates of mood disorders in their subjects, especially bipolar disorder, but noted that all had sought psychiatric treatment. On the other hand, our subjects were recruited by word-of-mouth or by advertisement and were not seeking treatment. Our findings are also partially compatible with those of Kraut et al.,[8] which demonstrated a link between Internet usage and depression, loneliness, and social isolation.

The data on health-related quality-of-life variables are interesting because they suggest that compulsive computer users have a specific deficit in general mental health (perhaps reflecting their psychiatric comorbidity), but their functioning is otherwise unimpaired. This domain of the SF-36 mainly involves questions about anxiety and depression. We might have predicted that persons attracted to computer use would show a specific deficit in social functioning, on the basis of reports by Kraut et al.[8] and Shotton.[12] The figures for physical and sexual abuse are similar to what is reported in the community, suggesting that childhood abuse has no special relationship to compulsive computer use.[25]

Although its classification is uncertain and it is not listed in DSM-IV, compulsive computer use has been compared with addictive disorders, obsessive-compulsive disorder (OCD), and impulse-control disorders. Could it represent an addiction? Clearly, there are similarities between compulsive computer use and the addictions, namely unrestrained indulgence in a particular behavior despite negative consequences. But unlike true addictions, no external substance is ingested, nor do physiologic consequences result from its use or its cessation. Thus, while the term *addiction* may be useful descriptively, the disorder should not be confused with alcohol or drug use disorders.

Could compulsive computer use fall within an ever-widening spectrum of disorders hypothesized to be related to OCD?[26] There is little reason to believe that compulsive computer use has any special relationship with OCD, and, in fact, few subjects in this study had comorbid OCD. If the 2 disorders were closely related, one might expect a greater degree of overlap. Further, the types of cognitions and behaviors found in compulsive computer users differ from those reported in patients with OCD. With compulsive computer use, the preoccupations are generally described as pleasurable and irresistible. With OCD, obsessions and compulsions are intrusive, senseless, and ego-dystonic; they are usually resisted.

This study was an attempt to understand compulsive computer use behavior as well as its psychiatric comorbidity and effect on health-related quality of life. This study has several methodological limitations. First, subjects were recruited through advertisements that may have attracted people with high levels of emotional distress. Therefore, the study group may not be typical of individuals with compulsive computer use behavior, and our subjects may have had higher rates of impairment and distress than expected. Also, the number of subjects was relatively small, particularly the number of women. Therefore, caution should be exercised in generalizing our findings to other groups or settings.

CONCLUSION

Compulsive computer use is a subject of growing interest in professional and lay publications. While its appropriate classification and relationship with other disorders, including OCD, substance use disorders, or impulse-control disorders remains unclear, this study indicates that persons exhibiting compulsive computer use are likely to have a comorbid Axis I or Axis II disorder. More work is needed to establish its relationship with the availability of computers, particularly those linked to the Internet, and to determine whether its frequency is increasing along with the general increase in computer usage and Internet access. More work will help pin down its risk factors, psychiatric comorbidity, family history, psychosocial consequences, and natural history.

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