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Nomophobia: Dependency on virtual environments or social phobia?

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ABSTRACT

Background: The increasing use of new technologies and virtual communication involving personal computers (PCs), tablets and mobile phones are causing changes in individuals' daily habits and behavior. We report the case of an individual with social phobia who developed a dependency on communication through virtual environments (i.e., nomophobia), and used a PC as a form of relating to the outside world to reduce stress and to avoid direct social relations. Nomophobia refers to the discomfort or anxiety caused by the non-availability of a mobile phone, PC or any another virtual communication device. Social phobia is described as an anxiety disorder of chronic evolution.
Objective: To study nomophobia as a manifest behavior that might serve as an indication of a possible anxiety disorder.
Methodology: The treatment consisted of the use of medication, cognitive-behavioral therapy (CBT) and the application of evaluation tools (interviews, scales, inventories and questionnaires).
Results: The individual responded satisfactorily to medication and CBT treatment, which reduced his time using the PC and increased his exposure to real-life situations.
Conclusion: Nomophobic behavior produces changes in daily habits and can reveal other aspects to be investigated, such as the presence of comorbid mental disorders.

1. Introduction

The psychological impact of the use of new technologies (Nicolaci-da-Costa, 2006) on individuals, groups and society at large is related to changes in behavior and habits, and should be further studied to better understand interactive effects with regard to learning, social cognition, personality and relationships.

When we use the term "information technology", we are referring to the diverse technologies that are used in exchanging experiences and information between an individual and the outside world through virtual environments. These technologies may include personal computers (PCs), tablets and mobile phones (MPs).

According to one of the leading analysts of the Internet's revolutionary impact, these technologies complement each other to generate the "space of flows" (Castel, 2000), which he describes as the characteristic space of today.

An analysis of individuals' communication (King, Valença, & Nardi, 2010) by means of these modern devices revealed certain acquired habits, including "good and bad" feelings, symptoms and emotions that call for additional investigation. Some of the "good" aspects of these habits are convenience, comfort and availability, while some of the "bad" aspects are pathological dependency, fear and anxiety as result of not being able to use modern devices.

In our ambulatory attendance (Laboratory of Panic and Respiration (LABPR), 1997), we have observed that patients with anxiety disorder complain, of nervousness, anxiety, anguish, perspiration and trembling, among other things, related to their need to have certain devices on hand (i.e., MP and PC). At certain moments,

Abbreviations: CBT, cognitive behavioral therapy; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders; IPUB, Institute of Psychiatry; LABPR, Laboratory of Panic and Respiration; MP, mobile phone; MPs, mobile phones; OCD, obsessive compulsive disorder; PC, personal computer; PCs, personal computers; PD, panic disorder; SPD, social phobia disorder; UFRJ, University Federal of Rio de Janeiro.

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these devices may make them feel safer and more confident, consequently reducing their nervousness. Patients reported only leaving home if they had their MPs at hand, and when they forgot their devices, they would feel the need to return home and retrieve them. They also reported that they have the devices "switched on" 24 h per day. Furthermore, patients used their MPs to store telephone numbers of doctors, hospitals, psychologists or other trusted confidants because they had concerns about falling ill in the street and wanted assurance that somebody could be quickly called for assistance.

Regarding PCs, we observed that some patients used the modern devices to interact with others socially. These individuals found this form of communication to be a means of avoiding live social interaction that would in all likelihood bring them much anxiety. Thus, they felt safer establishing contacts at a distance, and they considered it less threatening.

Nomophobia (2011) is considered a disorder of the modern world, and has only recently been used to describe the discomfort or anxiety caused by the non-availability of an MP, PC or any other virtual communication device in individuals who use them habitually. Nomophobic symptoms may also indicate the presence of a possible pre-existing mental disorder that should be investigated, diagnosed and treated (most often with medication and psychotherapy).

> "Nomophobics symptoms can arise in individuals with anxiety disorders such as primary cause and only serve as a signal to the doctor or psychologist investigates original cause. nomophobia symptoms are nonexistent in anxiety disorders even though individuals without being unable to stay connected to the internet. The nomophobia is recent and consequence of human interactivity with new technologies. So, haven't had time to be officially entered in the manual diagnostic and statistical of mental disorders (DSM)".

In accordance with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (2000), social phobia disorder (SPD) is described as an anxiety disorder of chronic evolution. It is characterized by intense anxiety in social situations that involve interpersonal contact, performance or both, which can cause extreme anxiety or acute interference in an individual's daily life. The DSM-IV (2000) emphasizes that in order for an official diagnosis to be made; the disorder must cause significant interference in an important area of the individual's life (i.e., work, social life, academic activities or leisure).

In this study, aspects related to the comorbidities and differentiated diagnoses of a case of nomophobia will be discussed. We believe that individuals with SPD are using information technology to interact both socially and personally in an attempt to protect themselves, acquire more security and reduce conflicts and symptoms associated with anxiety.

The objective of the research was to study nomophobia (Nomophobia fear mobile phone contact, 2011) as a manifest behavior to investigate the presence of other major mental disorders, such as anxiety, for example. To participate in the study, the patient signed a "Term of Free and Clarified Consent" and was informed of all the procedures that would take place. The study was approved by the Research Ethics Committee of the Institute of Psychiatry of the Institute of Psychiatry of the Federal University of Rio de Janeiro (IPUB/UFRJ).

2. Case report

The patient, J.C., is a 30-year-old unmarried male who works as a lawyer and lives with his parents and two brothers. He informed the researcher of his shyness from infancy and that he experiences excessive perspiration in his feet and hands when he feels "anxiety". He chose to receive injections of botulinum toxin on his hands to reduce perspiration. In 2006, he also undertook surgery (sympathectomy) in an effort to resolve the problem.

He deliberately avoids deepening any friendships to avoid revealing his difficulties with these symptoms, which also extend to other situations, such as eating, writing or speaking in public as well as disliking being observed. In the latter situation, he feels muscular tension, is unable to smile or express himself adequately, feels shortness of breath, has the sensation that he is going to faint and has the desire to run away.

He believes that people do not like the things that he says, and he does not feel capable of posing or answering questions. He is afraid of saying something foolish and is therefore extremely constrained. He is further constrained around people whom he considers to be more intelligent or more successful than him, although he has a good level of education.

He also reported that at home, he does not stay in the living room. He eats in his room and remains isolated because he feels that his family does not understand him. He began to spend long periods of time using his PC. Online, he felt greater self-esteem and a sense of protection from real-life situations and encounters, which according to him were the most threatening. He started to look for relationships and friendships on the Internet. On this occasion, his nomophobia intensified due to the "necessity of avoidance" of personal contacts that brought anguish and anxiety and were extremely stressful.

While attending university, he met an attractive woman who seemed to have an interest in him. However, he preferred only to have contact by e-mail because of his shyness. Online, he would pay her compliments and write her tender words, which he did not have the courage to say personally. He thought that by communicating online, he could portray an image of self-assurance and naturalness. One day, he unexpectedly encountered the young woman at the university and became extremely tense. From then on, he avoided any personal contact with her. The young woman wrote him an email that noted his dual personality, saying that online he was one person, while he seemed to be someone else in person. He was devastated by her comments, which made a deep impression on him. He believes that in the virtual world, he can operate in a neutral and secure comfort zone.

He does not normally go out and avoids public places, preferring to stay "in the virtual world". He feels that people are observing him when he is in public and that these people are criticizing him, making comments about him, or teasing him. He often feels self-conscious and sad due to his condition. The sadness deepens when he observes others of the same age behaving in ways that are more social in public. He describes discomfort when he is far from a MP or disconnected from the internet; it seems that these devices are part of his life.

For the collection of patient data from the study were applied several assessment tools: M.I.N.I. (axis I DSM-IV-1994), Hamilton scale for depression (1980), the scale Liebowitz (1987) for social phobia disorder (SPD), the scale of anxiety of Zung (1971), the scale for panic and agoraphobia (Bandelow, 1995), the scale of severity of panic disorder, and the questionnaire WHOQOL-brief (1998) to assess quality of life.

Apply also a questionnaire validated and reliable with 20-items "Internet Addiction Test (IAT-2011)" that measures the light, moderate and severe levels of internet addiction. The IAT has given us important data relating to the individual's behavior in relation to the routine of computer use, the daily time spent and interference in personal life, social and family.

The diagnosis of SPD and pathological dependency of the internet was conducted by a psychiatrist from the analysis of all assessment tools. The treatment for the SPD consisted in the use of

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medication and weekly sessions of cognitive behavioral therapy (CBT) accompanied by psychologist. CBT techniques helped the patient to gain confidence to expose social events personally feared earlier.

He sought treatment at the Laboratory of Panic and Respiration (LABPR) IPUB/UFRJ Laboratory of Panic and Respiration (LABPR), 1997 and was diagnosed in May 2008 with SPD (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000) by the team's psychiatrist in accordance with the criteria of DSM-IV (2000). All ethical procedures have been conducted and the volunteer signed the "informed consent" according to the Ethics Committee and the Research Institute of Psychiatry, Federal University of Rio de Janeiro.

3. Discussion

New technologies (Nicolaci-da-Costa, 2002) help to spread software that had previously been restricted to the PC. The diversity of such new technological devices and their easy accessibility mean that citizens can have this software readily available. Considering this reality, a PC can easily be substituted by a tablet or any MP device that is able to manage e-mails. Thus, we find it more relevant to focus our research on the usage of the virtual environment for communication (i.e., software usage) rather than on the PC proper. With regard to the patient used in our case study, he used the PC "to defend himself" from personal contact, but could also have used a tablet or a MP with the same intention.

Importantly, we must investigate the behavioral changes that result from the relationship of "man with the machine" (King et al., 2010). While the use of technology may provide innumerable benefits for users, such as comfort and convenience, it can also reinforce behavioral dysfunctions such as social avoidance. In this study, we observed that nomophobic behavior (King et al., 2010) and the dependency on communicating through a virtual environment resulted in a reduction in the patient's anguish with SP when making personal contact with others.

Yen et al. (2012) conducted a study of SPD in which social anxiety was compared among a sample of 2.348 college students who interacted both online and in real life. The results of this study confirm that the Internet has good potential as an alternative medium, providing a means to intervene in cases of social anxiety.

According to Joinson (2002) and Joinson, Reips, Buchanan, and Paine-Schofield (2011), the internet is transforming business, education, and perhaps even ourselves and there is a tendency for people to access information more commonly avoided in real life. Considers it important that discuss and understand the implications of the psychological processes of the personal conduct of the individual or other Web browsing behaviors.

Flynn, Taylor, and Pollard (1992) presented the findings of experiences with two cases. These findings suggest that MPs can be beneficial for many individuals whose therapeutic progress is impeded by factors such as a fear of driving alone. However, MPs may be counterproductive for certain patients. The potential benefits and disadvantages of using MPs are discussed.

The diagnostic criteria for SPD (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000) calls for the presence of an acute and persistent fear of one or more situations whereby a person finds him or herself exposed to strangers or to a possible evaluation by others. Social situations are avoided or experienced with discomfort. The individual fears having his or her anxiety symptoms revealed and worries about experiencing humiliation. Exposure (King, Valença, & Nardi, 2008) to feared social situations almost always provokes anxiety, which can sometimes take the form of a situational panic attack. The person is able to recognize this fear as extreme or irrational. In this study, we were able to verify that all of the patient's SPD symptoms were serving to intensify the nomophobic behaviors and kept the individual dependent the use of virtual environments to avoid social contact.

In October of 2009, the patient received medical treatment to SP, which included the use of tranylcypromine (20 mg per day) combined with clonazepam (0.5 mg per day). This medication was used in the case of the patient's exposure to an anxiogenic situation. The patient also participated in monthly psychiatric reevaluations and cognitive-behavioral therapy (CBT) (King et al., 2008).

CBT (King et al., 2008) is a brief therapy that includes structured sessions and specific objectives. Its practice is based on tasks; both the patient and the therapist have active roles. The intention is to correct catastrophic interpretations of events and to condition the patient's fears, bodily sensations and avoidance behaviors. It can be enacted concomitantly with medicinal treatment and employs the following resources as techniques: psycho education (King et al., 2008), cognitive reorganization (King et al., 2008), exercises to induce symptoms (King et al., 2008), interoceptive exposure (to one's own bodily sensations) (King et al., 2008), gradual in vivo exposure (King et al., 2008) (to the situations or places that cause stress), and breathing and relaxation exercises (King et al., 2008).

The patient's response to treatment was monitored, and when he showed significant improvement from SP symptoms, the dosage of tranylcypromine was increased to 40 mg/daily. Subsequently, the patient was able to face queues in public places, such as the bank, more calmly. He was also able to eat in public as well as to come in for clinical appointments without using a cap and speaking with more fluency. However, the patient decided to suspend his medication due to financial difficulties associated with in buying tranylcypromine. After 2 months of using only clonazepam (1.0 mg) in the case of exposure), fluoxetine was introduced at a daily dose that reached 40 mg in May 2011. This change in treatment led to partial remission of the anxiety symptoms associated with social interaction and performance. It is important to note that the medications were prescribed as direct treatment for the root cause of SPD and not for nomophobia.

3.1. Clinical characteristics

The patient in this study recognized his need to use virtual environments to relate to others and perceived his fear as exaggerated and irrational. He admitted that his fear sometimes manifested as signs of anxiety, which included blushing, tremor and perspiration. In some exposures to social situations, his anxiety could assume the form of a panic attack (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000).

He also revealed other fears that were related to ridicule, not wanting to seem foolish, being the center of attention and wanting to avoid committing errors. For these reasons, he preferred to make contact with the outside world through virtual communication.

3.2. Classification

In the case of the patient with SPD, the role of communication dependency on the internet is more closely related to using the devices to avoid direct personal relationships rather than a pathological dependence on the device. While the PC may have served as a protective shield, it also created conditions for relationships in general.

Patients with SPD may end up making an abusive use of the internet communication due to the own characteristics of the

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disease as the difficulty of exposing live in relationships or social contacts. The patients with social phobia disorder generally protect themselves from situations where they have to expose live, as: public speaking, presenting papers or participates in social groups. In view of this, may end up developing with the computer a pathological dependency (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000) which results in inappropriate behavior with consequences in personal and family life. Different from the individual with a dependency "natural" computer for leisure or work. The individual without anxiety disorder even if you use the computer for several hours in the day or for a long time, do not occur compromises in any aspect of life.

Our patient with SPD found that his excessive use of the PC was a comfortable way to attempt to establish the social and personal relations that he desired, which were impossible for him without the PC due to the known characteristics of his condition. Although it is not considered an incapacitating disorder, SPD (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000) is recognized as being capable of causing serious damage to different areas of life, such as work, academic activities, family relations, love relationships and social activity.

In a study of nomophobia by King et al. (2010), a similar case of communication dependency was identified. In this case, a MP was the intermediary, whereby a patient with panic disorder (PD) Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000 used the device to feel less anxious and less insecure because he was able to make direct contact with people that he trusted, such as doctors and psychologists.

According to the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000), comorbid disorders occur in 69% of patients with SPD. Comorbid disorders include depression, anxiety, eating and alcohol problems, anxiety disorders and sexual deviations, which are apart from an Axis II disorder (with exception to avoidance personality disorder) (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000). The data on comorbidities reveal the need to further study the psychological, cognitive and behavioral effects that occur due to the relationship of individuals with new technologies.

Technologies, in general, do not stop evolving and are continuously improving. In a short span of time, we have observed the modernization of all technological devices, and therefore, we are subject to the effects that they produce as a consequence of individuals' constant contact and use.

3.3. Differentiating diagnostic

The differentiating diagnostic must be well made. The presence of panic attacks (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000), for example, does not characterize PD, especially if it occurs in the context of interpersonal contact. It is necessary that both social and performance situations are well characterized. Thus, a diagnosis of SPD is avoided in patients with general anxiety disorder, body dysmorphic disorder, atypical depressions and even psychosis (Range, Falcone, & Sardinha, 2007).

Panic attacks can be a present symptom in SPD and should be duly differentiated from PD, although the comorbid occurrence of both is possible. With PD (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000), the greatest fear is related to a physical problem, such as having a heart attack, a stroke or a loss of control or losing mental control, while with SPD, there is a fear of blushing, trembling, perspiring and of being negatively criticized by people around you.

Spontaneous panic attacks occur in PD (CID-10, 1996), but not in SPD, where the presence of other people is a necessary condition for the panic attack to occur. Consider the example of agoraphobic anxiety; in a room full of people, what characterizes the anxiety is the fear of having a panic attack while in this situation. In contrast, with social anxiety, it is the fear of being observed and evaluated by people in the situation that causes fear. While the SPD patient feels more comfortable when alone, the agoraphobic prefers the company of other people, especially those close to them.

In body dysmorphic disorder (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000), the concern is centered on some real or imaginary physical defect (generally of minimum proportion). In this case, it is the appearance that is in question, while in SPD, it is one's performance or interpersonal contact in social situations that triggers the anxiety.

Avoidant personality disorder (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), 2000) presents a predominant pattern of social inhibition (shyness), feelings of inadequacy, extreme sensitivity to criticism or reprimands, and a tendency towards loneliness or isolation. People with avoidant personality disorders see themselves as socially inept and not attractive and avoid social contact for fear of being ridiculed, scorned or humiliated. The patient in this study did not feel unattractive or without skills, but rather, his detachment from social life was due to shyness.

Atypical depression (CID-10, 1996), characterized by the presence of accentuated anxiety and hypersensitivity to rejection (which are also present in SPD), can cause difficulties in making a differentiating diagnosis due to the overlapping of symptoms in these cases. However, one does not observe avoidance and social discomfort present in the latter situations.

Allison, Wahlde, Shockley, and Gabbard (2006) reported one boy's obsession with online gaming, which seemed to have overshadowed all other priorities in his life. The boy played games for 12–16 h per day. In this case, the patient was diagnosed with obsessive–compulsive disorder (OCD). Once again, the nomophobic behavior drew attention to the existence of a greater disorder, which worried his entire family.

In dysthymia (Cordas & Nardi, 1997), although the discomfort is the same, the avoidance of social situations can be present, which may manifest itself, above all, in periods of worsened depressive symptoms, whereas in SPD, the anxiety customarily remains at a constant level.

4. Conclusion

The objective of the study was reached, which was to call attention to behavioral changes that resulted from the individual's interactivity with new technologies. In our case study patient, we observed that communication dependency by means of virtual environments (nomophobia) could reveal a root cause disorder. In this case, it was SPD that produced the dysfunctional behaviors. His daily excessive use of the PC, his need to establish personal and social relationships through the internet and to escape from reality revealed the existence of a SPD that had previously been undiagnosed. Health professionals must be aware of behaviors such as nomophobia that can mask a root cause.

We observed that the patient with SPD in this study was spending an excessive amount of time on the PC to communicate as a means of escape from social and personal relations. This activity was performed in an attempt to increase his sense of personal security and to reduce conflicts and anxiety symptoms.

As the treatment evolved satisfactorily using CBT techniques of "in vivo" exposure, we had a clear perception that the individual was reducing his time spent on the PC.

Currently, the patient has resumed his studies, he is able to give opinions in social groups (previously it was impossible), he has made new friendships and at work, he has been capable of presenting proposals. These changes show that the condition was not

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about a behavioral dependency on online communication, but rather a means of escape that originated from the impossibility of facing reality.

5. Commentaries

In the patient with SPD, the role of communication using the PC was more closely related to from personal relationships than to a pathological dependency on the device itself. While the PC can serve as a protective shield, it also can create conditions for an individual to relate with the outside world. Current technology, such as PCs, tablets and MPs do exert influences and have a specific role in the lives of many individuals.

6. Relevance and originality

Our study contributes to the field by demonstrating the influence of new technologies on human behavior.

Consent

The patient signed the informed consent and was made aware of all procedures. The study was also approved by the Ethics Committee for Research of the Institute of Psychiatry (IPUB), Federal University of Rio de Janeiro (UFRJ).

Competing interests

None declared.

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