Journal of Obsessive-Compulsive and Related Disorders 8 (2016) 75–78

Contents lists available at ScienceDirect

Journal of Obsessive-Compulsive and Related Disorders

journal homepage: www.elsevier.com/locate/jocrd

Smartphone based Geo-Feedback in obsessive compulsive disorder as facilitatory intervention: A case report

Hanife Olbrich [b], Katarina Stengler [b,c], Sebastian Olbrich [a,*]

[a] University Hospital for Psychiatry, Psychotherapy and Psychosomatics, Lenggstrasse 31, 8032 Zurich, Switzerland
[b] Clinic for Psychiatry and Psychotherapy, University Hospital Leipzig, Germany
[c] LIFE - Leipzig Research Centre for Civilization Diseases, University Leipzig, Germany

ARTICLE INFO

Article history:
Received 22 May 2015
Received in revised form
6 October 2015
Accepted 5 January 2016
Available online 7 January 2016

Keywords:
OCD
Checking behavior
Global-positioning-system
GPS
Smartphone application

ABSTRACT

Checking behavior belongs to one of the core-cluster symptoms in patients suffering from OCD. These symptoms often hinder patients to participate in social interaction or to get to their therapist in time. A global-positioning-system (GPS) based smartphone application was developed to provide audio-feedback signals to the patient if too much time was needed to cover a predefined distance.

The application (app) was tested in a patient suffering from severe OCD with extensive outdoor checking behavior. Using the app, the patient managed to reach the therapist in time allowing him to initiate treatment with exposure and reaction prevention and a SSRI.

This is the first report of a smartphone based application using GPS signals to give feedback to an OCD-patient. The results (of this case) encourage the search for further fields of geo-positioning based smartphone applications in psychiatric disorders.

1. Theoretical and research basis for the treatment: checking behavior in OCD hinders therapeutic contacts

The treatment of choice for obsessive compulsive disorder (OCD) is cognitive behavioral therapy (CBT) including exposure and response prevention (ERP) (Franklin, Abramowitz, Kozak, Levitt & Foa, 2000). The key features of this therapy are the exposure to fear provoking stimuli and the avoidance of neutralizing or fear reducing compulsions and obsessions with the goal of habituation (Arch & Abramowitz, 2015). Although this technique can be learned by the patients by themselves, e.g. with guidance of books or internet-based support (Gellatly et al., 2014), a therapist driven CBT has been found to be more effective (Kaltenthaler et al., 2006). However, some OCD-patients suffering from severe symptomatology often face the problem of not even being able to reach the therapist due to disorder immanent reasons. One of them is extensive control and checking behavior, which is regarded as a main symptom cluster in OCD (McKay et al., 2004). The underlying fear of having missed something that might be dangerous or threatening is a common symptom and leads to time consuming control behavior. These symptoms may hinder the patients to simply walk on the street, often not allowing them to reach a certain destination in time. This again may lead to losing one's job or the cancellation of therapeutic contacts because of supposed "incompliance".

As mentioned, OCD-patients are often unable to even participate in everyday activities (Stengler-Wenzke, Kroll, Riedel-Heller, Matschinger & Angermeyer, 2007; Stengler et al., 2013) e.g. due to checking behavior. Since regular attendance is a requirement for a successful therapy, it seems reasonable that first of all a pragmatically approach should be made to reach basic goals such as going to the therapist. Assertive community treatment (ACT) might be one way to fill the gap (Boschen & Drummond, 2012), but the availability of ACT teams still is limited and does not cover all areas (Cuddeback, Morrissey & Meyer, 2006). Modern media-associated treatment has attracted attention to the handling of psychiatric conditions (Shore, 2013) including OCD (Herbst et al., 2012). Up to now the usage of smartphones in the treatment of psychiatric patients has been limited, e.g. providing information to the patient (Anthony, Nagel & Goss 2010). Although the possibilities of these devices are much greater, there are no reports of treating (OCD-) symptoms using individualized, sensor-based feedback from a smartphone application (app). Modern smartphone devices with the ability to locate the position of the user in the range of meters would allow to give an automatic feedback to a patient being engaged in intensive checking behavior on the street instead of moving. This might possibly lead to an end of the behavioral loop.

The following case report describes the use of smartphone-based feedback in a patient whose compulsions interfered with timely and consistent therapy attendance.

* Corresponding author.
E-mail address: Sebastian.Olbrich@puk.zh.ch (S. Olbrich).

http://dx.doi.org/10.1016/j.jocrd.2016.01.001
2211-3649/

2. Case introduction

Mr. F. presented the first time in the OCD-outpatient clinic of the University Hospital of Leipzig, Germany, in 2009 at the age of 27. He lived together with his partner in Leipzig since he had finished his studies of administration and insurance laws at the University of Halle, Germany, in 2007 and started to work in administration of the community center. He had almost no contact to his biological mother since he was raised by his father and stepmother. Mr. F. described a tight relationship to his biological brother, his stepbrother and stepsister.

The onset of OCD-symptoms with checking behavior was at the age of 18. At this time he finished a first CBT-module with remission of the symptoms. After a relapse at the age of 23, again with impairing checking behavior as the leading symptomatology, Mr F. had to pause his studies for one year and a second CBT including ERP treatment was necessary. However, Mr. F reported a complete remission of symptoms after this episode.

At the time he first presented in the outpatient clinic he had been declared unfit to work by his general practitioner after he had almost lost his job in the community center because of excessive checking behavior that started about six months earlier. He described that his complete day was driven by fears of him being responsible for catastrophes to happen in his environment, e.g. car accidents or domestic fires because he had overlooked something. Besides checking behavior before leaving his home, he described the most time consuming obsessions with thoughts of having missed a nail or a sharp object lying in the street that might lead to catastrophic traffic accidents or potentially could harm other pedestrians. To reduce upcoming fear he had to control every suspect object in the street, including leaves, cans and all kinds of small stones in case they could be a threat. He regarded himself as responsible to remove these small objects. Not being sure if they were a threat, he had to spend several minutes staring at each object making a decision whether to remove it or not. Sometimes he had to return after he had passed by an object because of his uncertainty if he had already checked it. This was in line with the association of checking behavior with reduced memory confidence (Radomsky, Dugas, Alcolado & Lavoie, 2014; Woods, Vevea, Chambless & Bayen, 2002). The checking behavior had increased over the past months before his first consultation, he now needed sometimes several hours for distances he used to make within 20–30 min, which is the time a healthy person would need for this way.

Routine diagnostic procedures were applied. Blood samples including electrolyte, thyroid-stimulating hormone, C-reactive protein, blood panel, liver enzymes, creatinine were taken. An electroencephalogram, an electrocardiogram, a cranial magnet resonance imaging and a neurological and clinical examination were conducted by senior physicians at the outpatients clinic. All showed no signs of an organic origin of the symptoms. There was no history of traumatic head injuries. The Yale Brown Obsessive Compulsive Scale (YBOCS) value at admission was 30 in total with 14 points for obsessions and 16 points for compulsions. Besides the mentioned checking symptoms, no other OCD-symptom clusters such as hording, washing, contamination or sexual obsessions did affect the patient's daily life. The Beck Depression Inventory II (Beck, Ward, Mendelson, Mock & Erbaugh, 1961) with 8 points and the Hamilton Depression Rating Scale -21 (Hamilton, 1960) with 7 points showed no signs of a current depression. Following psychopathology, the diagnosis of mixed OCD (F42.2) was confirmed by a senior psychiatrist according to the criteria of ICD-10. Mr. F. did not meet the criteria for another psychiatric disorder at that time and he was included in the therapeutic program of the OCD outpatient clinic.

The patient was accompanied regularly by his partner or his father so that he could attend the therapeutic sessions without excessive checking in the streets. Therapy included psycho-educational lessons and ERP sessions according to several national guidelines („AWMF: Detail“, 2015). The ERP sessions focused on the checking behavior in the streets. Under supervision of a therapist Mr. F. had for example to walk in the streets without stopping and returning to objects (that he had seen on the floor) while monitoring his inner tensions and anxiety until they ceased. Further, two consecutive trials with SSRIs including escitalopram and sertraline with dosages of 30 mg/d, 200 mg respectively, were started and continued each for >12 weeks. An augmentation with quetiapine (300 mg/die) was started. After six months, the patient's symptoms decreased and he was able to reach the clinic alone for another 6 months. In 2013 a relapse occurred and the patient again came to the outpatient clinic.

3. Assessment and treatment approaches: smartphone based Geo-Feedback application

The Geo-Feedback App was developed by Sebastian Olbrich in 2013 within four weeks using the MIT app inventor version 1 (http://appinventor.mit.edu/explore/) for Android 4.0 based Smartphone devices. The main goal of the app was to give a personalized feedback to the user if a certain time has passed without moving a predefined distance outdoors. As a first step, the user had to set the time span for the interval between possible alarms (10 s–5 min) and a desired distance (1–50 m; see also Fig. 1, right panel). Secondly, the type of alarm had to be chosen. The user was able to record small audio-samples e.g. commands with his voice or activate system ringtones or a vibration alarm. Thereafter the main function of the application (Fig. 1, left panel) could be started that continuously tracked the position of the smartphone. Using the global positioning signal (GPS) via its sensors the device calculated the distance covered for each time interval. If the distance traveled was less than the chosen one within the time interval, the application evoked the selected alarm signal. This provided (Fig. 1, middle panel) the user an external reminder, whether he was possibly engaged in checking behavior. Once started, the application also worked with a locked screen so the device could be stored in a pocket while moving. The app further counted the times a reminder had been given and included the possibility to send an email with the position and alarm information e.g. to the therapist after stopping the monitor screen.

4. Case conceptualization

Mr F. suffered from a chronically relapsing OCD with mixed obsessions and compulsions. The symptoms included mainly checking behavior preventing the patient from participating in normal life activities. Treatment following international guidelines with ERP therapy and SSRI treatment in combination with neuroleptic augmentation had proven to be effective in the patient during his past OCD-episodes.

5. Course of treatment

After the partial remission (the patient took part in social interactions but was not able to work again) following the first treatment at the outpatient clinic, the patient suffered from a serious relapse in 2013. This time, neither his partner nor his relatives were able to accompany him to the clinic regularly; Mr. F. himself was not able to leave his home without hours of checking behavior. At that time, Mr. F canceled two out of five appointments