



## About the effectiveness of telehealth procedures in psychological treatments<sup>1</sup>

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**ABSTRACT.** Use of new technologies for psychological treatment is currently experiencing considerable growth. From an experimental point of view, the greatest developments have concerned use of virtual reality and online programs. The present study analyzes both types of resources, with a special focus on Internet-based psychological treatment programs. The development of virtual reality has mainly been aimed at treating phobias. This resource has shown similar effectiveness to traditional treatments and even greater clinical efficacy in some cases. Internet-based psychological treatment has had a broader development, although it has been particularly applied to anxiety and depression problems. Systematic reviews and meta-analyses have shown a great heterogeneity of studies; however, some programs have proven to be effective, particularly when compared to a group without treatment and when such programs involve contact with a therapist. These resources have several advantages when compared to traditional methods: they are more accessible, versatile, and affordable. However, a few methodological difficulties must still be overcome to ensure the clinical viability of these technological resources.

**KEYWORDS.** New technologies. Virtual reality. Internet- and computer-based treatments. Psychological treatment. Theoretical study.

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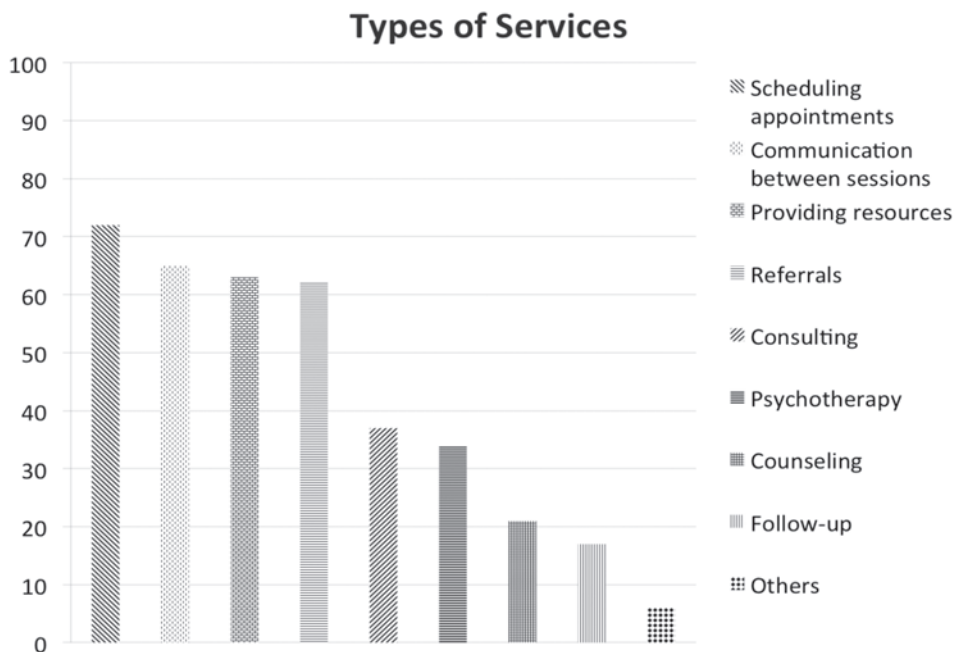
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**RESUMEN.** El uso de las nuevas tecnologías en el tratamiento psicológico tiene hoy día un desarrollo importante. Desde un punto de vista experimental, los mayores desarrollos los ha tenido el uso de la realidad virtual y los programas servidos vía internet. En el presente trabajo se analizan ambos recursos, haciendo especial hincapié en los programas de tratamiento psicológico por medio de internet. En el caso de la realidad virtual, su desarrollo se ha dirigido especialmente al tratamiento de las fobias, mostrando una eficacia comparable a los tratamientos tradicionales y, en algunos casos, una eficacia clínica superior. El tratamiento psicológico vía internet ha tenido un desarrollo más extenso, aunque con mayor aplicación a los problemas de ansiedad y depresión. De las revisiones sistemáticas y meta-análisis se concluye que, a pesar de la disparidad de estudios, algunos programas han mostrado su eficacia, especialmente cuando se contrastan con un grupo sin tratamiento y cuando se tiene algún tipo de contacto con un terapeuta. Este tipo de recursos han mostrado una serie de ventajas en relación con los métodos tradicionales en relación con una mayor accesibilidad, versatilidad y costes económicos. Sin embargo, todavía permanecen algunas dificultades metodológicas para garantizar la viabilidad clínica de estos recursos tecnológicos.

**PALABRAS CLAVE.** Nuevas tecnologías. Realidad virtual. Terapias vía internet. Tratamiento psicológico. Estudio teórico.

The use of technological resources in psychological assessment and treatment has significantly increased in recent years. However, depending on each time period and technical development, available technologies have been used as a means to contribute to the therapeutic process. At different points in time, resources such as postal mail, traditional telephone, e-mail, chats, video conferences, mobile phones, and text messages have been used to help provide psychological support, advice, follow-up, and/or treatment (Carroll and Rounsaville, 2010; Norris, 2002).

According to the report issued by the American Psychological Association (APA) in 2008 (Michalski, Mulvey, and Kohout, 2010), 87% of psychologists in the USA used technological resources in their relationship with their clients. Traditional telephone was the resource most commonly used, followed by e-mail. More complex resources (*e.g.*, programmed intervention via the Internet or video conference) were scarcely used. This finding was corroborated by the purpose these resources were used for. Figure 1 graphically summarizes this use.



**FIGURE 1.** Purpose for which psychologists used technological resources Michalski *et al.* (2008).

As the table clearly shows, administrative use was predominant: scheduling appointments, adapting the timetable of sessions, requesting something from patients, providing references on issues discussed in previous sessions, or clarifying questions about the content of the sessions or administrative matters. Use as a therapeutic strategy was much scarcer, in keeping with a lower use of technological resources in the therapeutic process. Despite this low use in therapy, virtual reality (VR), augmented reality (AR) and telecare and health programs are the resources with the greatest experimental development. Their application to psychological treatment is reviewed below.

### Virtual reality and augmented reality

Virtual reality is reality created (modeled) from real scenarios. The creation of these scenarios provides several options and alternatives based on participants’ mobility in them. Virtual reality can be complemented by other sources of information (*e.g.*, auditory or tactile information). The feeling of presence depends largely on the technical definition and the software used. Stereoscopic display is one of the best ways to achieve this feeling of presence or reality of scenarios. VR can be presented in two basic ways: using a Head-Mounted Display (HMD) or the Cave Automatic Virtual Environment (CAVE).

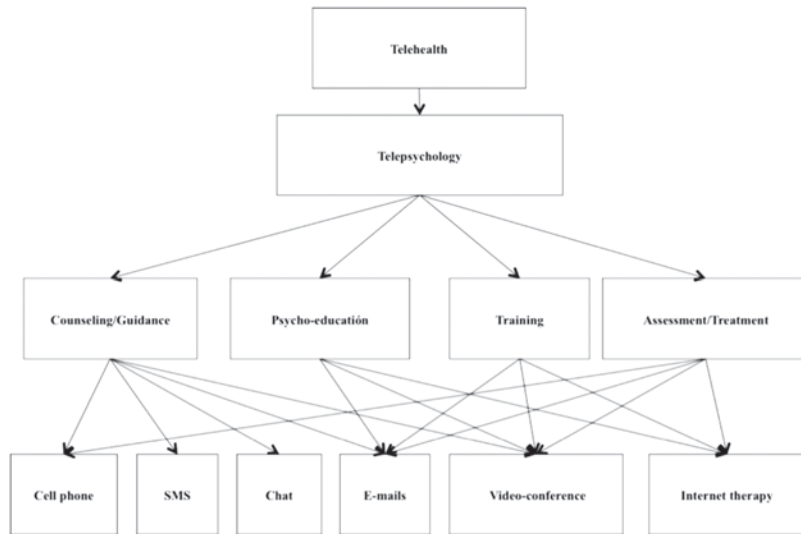
The HMD is a pair of glasses that is sometimes attached to a helmet and presents information for each visual field. The glasses are connected to a computer. In the CAVE system, by contrast, virtual environments are projected either on the walls of a cube, generating a 3D impression, or on a flat screen with 3D scenarios, in which case users must wear 3D glasses. Virtual reality technologies were used for the first time to treat psychological disorders in the Human-Computer Interaction Group of Clark Atlanta University (North and North, 1994); this is where the term 'Virtual Reality Exposure Therapy' (VRET) was coined after treating a case of fear of flying with this technique. The good results obtained led subsequent studies to broaden the area of application of VR, although it has been mostly used to treat phobias.

The meta-analyses and systematic reviews conducted (Botella, García-Palacios, Baños, and Quero, 2007; Bouchard, Côté, and Richard, 2007; Bush, 2008; Gregg and Tarrier, 2007; Gutiérrez, 2002; Krijn, Emmelkamp, Olafsson, and Biemond 2004; Parsons and Rizzo, 2008; Powers and Emmelkamp, 2008; Pull, 2005) have proven that use of VRET is highly effective (with high effect sizes) compared to treatment with effective traditional therapies, including *in vivo* exposure. This effectiveness is higher than that of antipsychotic drugs. VRET has also shown more clinical gain than traditional cognitive-behavioral therapy (Gonzalez-Lorenzo *et al.*, 2011). A review conducted by Meyerbröker and Emmelkamp (2010) broadened the scope of analysis beyond the effectiveness of VRET, analyzing the process-related implications of this kind of therapies. According to this review, patients treated with VRET experience certain cognitive changes that lead to an increase in their self-efficacy and the self-instructions they generate during exposure to phobic stimuli.

Augmented reality is an example of use of VR to treat phobias through exposure therapy. It combines real elements with virtual elements, which makes it possible to introduce phobic stimuli in patients' familiar environment. Virtual elements can be introduced in real time so patients can feel the elements they fear in their environment. Technical developments ensure the best possible fit between the real environment and the virtual stimuli. This is important for the credibility of the procedure. Use of AR has shown promising results, particularly with specific phobias (*e.g.*, Botella, Bretón-López, Quero, Baños, and García-Palacios, 2010).

### Telehealth

Telehealth resources (*i.e.*, telecare, telemedicine, telepsychology) are procedures in the professional-patient relationship that do not involve direct face-to-face contact between both. They include a range of possibilities from telephone calls to video conferencing. The therapist-patient relationship can be facilitated through advice or references provided by telephone, e-mail, or real-time interaction systems. On a secondary level, it is also possible to attach documents, audio files, or videos or to use podcasts that allow patients to download useful applications (*e.g.*, a relaxation system, guided self-instructions, a therapy program). Telehealth is currently widely used, particularly in medicine (Norris, 2002). Progress in telecommunications has enabled many diagnostic and therapeutic resources to have an online help desk. In broad terms, telehealth includes the services and resources shown in Figure 2.



**FIGURE 2.** Diagram of the services that can be provided via telehealth in applied psychology and the applications that can be used to provide them.

However, the term ‘telehealth’ is often limited to a specific area, which has had the greatest development: Internet-based psychological treatment programs (Internet- and computer-based treatments, ICTs; computer-assisted therapy, CAT; computer-mediated cognitive-behavioral treatment, cCBT). This specific development functions similarly to manual-based therapies or bibliotherapies, facilitating treatment of many psychological disorders and problems over the Internet. In this stricter sense, considering Figure 2 above, telehealth can be used to perform the following tasks, which are not mutually exclusive: psychological assessment, psycho-education, training programs, and psychological treatment. There are also other tasks: counseling, guidance, and provision of references. These aims are included in psycho-educational programs, training programs, or treatment programs, but can take an independent form. This independent service usually refers to counseling about specific issues, which does not require a specific assessment and/or treatment program.

Use of the Internet as a tool for psychological assessment has grown considerably. Some time ago, clinicians only used e-mail, which was useful to send patients inventories, questionnaires or rating scales that they were supposed to complete. Today there are websites that provide online psychological assessment – free of charge or not – (e.g., <http://www.psicologia-online.com/test/>), with immediate correction of tests and even a *diagnosis* issued in some cases. This procedure has clear advantages. However, the different validity of the tests used, the lack of control of the therapeutic relationship and the absence of a complex decision-making process when issuing a diagnosis can facilitate the appearance of Type I and Type II errors, with the resulting ethical consequences.

Psycho-education on mental disorders probably represents the greatest volume of web pages related to Internet computer-based treatment (ICT). A number of institutional websites (*e.g.*, NIMH guidelines, NICE guidelines, *guiasahud*, the guidelines of the Spanish national health system), associations, psychological centers, and associations of families and patients provide information about mental diseases over the Internet. Although this information is very diverse, it usually provides an explanation of the disease(s) (*i.e.*, symptoms, evaluation, course, available treatments). These websites sometimes include more detailed information on the causes, risk factors and determinants, conditions that promote the onset of the disorder, and conditions that make symptoms worse. They sometimes mention the therapeutic – medical and psychological – approach, without making any recommendations. Ultimately, these resources sometimes include the possibility of contacting a specific association or therapist.

As a therapeutic resource, there is no evidence for or against this type of ICT, although it is important to provide accurate information and clearly define the diagnostic procedure. Particularly vulnerable individuals may be victims (false positives) of poor information or lack of clarification about the complex diagnostic decision-making process. In addition, information on the course, seriousness and chronicity of a disease may also have a negative impact on the confidence and safety of patients.

Websites on specific techniques and procedures for behavioral training are also very frequent. They have been greatly helped by information exchange systems such as youtube.com. These websites and links contain a great diversity of training programs, including virtually all the systems that deactivate the stress response (*e.g.*, relaxation, meditation, breathing techniques). Resources related to more complex processes are scarcer. Yet, it is possible to find programs on the use of systematic desensitization, on how to use exposure to combat phobias, or even on how to use Socratic dialogue for cognitive restructuring. Such contents are delivered through all kinds of media (*e.g.*, audio, text, video, graphics).

The existence of this kind of training programs has undoubtedly facilitated therapeutic work a great deal. Today, therapists have easy access to resources that patients can use for training on their own, saving time that used to be devoted to these tasks in the therapist-patient relationship. However, the quality and approach of these resources is very diverse, which may confuse patients or even be detrimental for them. This is easily illustrated by observing the use of meditation in youtube.com.

As mentioned above, the use of telehealth has often been associated with psychological treatment delivered over the Web. It involves presenting one or several therapeutic programs for various diseases or clinical situations that can be self-administered by patients themselves. Initially, at an experimental stage, the program may not be delivered online and instead the patient may have to travel to a place where the program is recorded on a computer. These procedures are a way of ensuring access to the program, adherence to it and time spent on it. The next section provides a more detailed analysis of this use of telehealth.

### Internet computer-based therapy

Internet-based psychological treatments conceptually represent a new faster and more flexible way of delivering self-administered treatments or manual-based treatments, whose effectiveness has been empirically proven (Marrs, 1995; Wilson, 1996, 1997). In broad terms, manual-based treatments are structured treatment protocols that include psycho-education about the disorder itself but also a psychological assessment, the components of therapy, and the sequence of treatment (sometimes with different pathways). Such manuals refer to specific problems (*e.g.*, depression, eating disorders, obsessive-compulsive disorders) and have had a broad circulation. Mastery of your anxiety and panic, on control of agoraphobia and panic disorder (Barlow and Craske, 1989), was one of the first manuals published and is probably the one with the broadest circulation.

Although Internet-based programs have a very clear design, they are very diverse. According to the analyses conducted by Carroll and Rounsaville (2010), Nelson, Bui, and Velasquez (2011), and Titov (2007), these differences start with treatment duration, which varies from 10-15 minutes to over 10 weeks. The presentation is typically based on audio and text, but may also include images, video and animation. There are also differences in the delivery of the service: it ranges from an online interactive strategy to regulated access to a resource, sometimes in exchange for a fee. Both procedures may include feedback from a therapist, which may also be online or through e-mail. Access to program content and the assessment also varies from free access to all resources (with recommendations for use) to limited access depending on the characteristics (responses) of each patient. The most sophisticated system has *Boolean* decision trees, which lead the patient to program contents and tools linked to the responses given at each stage. The application may also provide immediate social reinforcement to support the patient's success and/or delayed support through e-mail. There are also differences regarding the availability of strategic messages adapted to each individual: some programs analyze each patient's health and risk behaviors and stage of change (motivation) to decide which route to follow in the implementation of the program, which may include excluding the patient. A few examples of programs with some empirical support are *beating the blues* ([www.beatingtheblues.com](http://www.beatingtheblues.com)), *MoodGYM* (<http://moodgym.anu.edu.au/welcome>), and *overcoming depression* (<http://www.overcomedepression.co.uk/>). The Spanish authorities have developed a program on fear of public speaking named *háblame* (talk to me) (<http://www.internetmeyuda.com/mhp/saludo.htm>). Our group is currently developing a program for the treatment of agoraphobia ([www.doctoragora.com/demo](http://www.doctoragora.com/demo)) based on a previous cognitive-behavioral program involving 11 sessions, with exposure to VR scenarios (Gonzalez-Lorenzo *et al.*, 2011; Peñate, Pitti, Bethencourt, de la Fuente, and Gracia, 2008).

The treatment program and access to a therapist are key issues. These resources are usually versatile: users can access the program at any time, spend as much or as little time as they wish to and use the tools they consider most useful. However, the sequence of treatment is programmed so that patients cannot skip from one session to the next. This is so because there is usually a treatment protocol, which requires patients to be familiar with and learn the content of the first sessions to access the

following ones. The relationship with the therapist is another key element. This relationship ranges from the absence of a relationship to the possibility of contacting a therapist at the patient's request by telephone, chat, or video conference. Intermediate levels in the therapist-patient relationship include the use of e-mail and the use of podcasts through therapists' websites or blogs.

As regards structure and contents, many resources are currently available to treat all kinds of diseases and clinical conditions (*e.g.*, anxiety, phobias, depression, anorexia, post-traumatic stress disorder, chronic pain, sexual dysfunctions). The origin of such programs is very diverse. Again, such materials include therapeutic programs based on empirically-derived psychological treatments but also programs based on pseudo-scientific approaches. Most of them are based on cognitive-behavioral techniques. They usually include an explanation of the program and its use and psycho-education on the disease. They may include an assessment and diagnostic decision-making stage, which is usually conducted by the program itself. Sometimes this assessment is key in allowing the patient to continue with the program, refusing people who do not meet the diagnostic criteria or for whom the problem is secondary to more relevant disorders. The program sequence continues with the therapeutic sessions, which may be supported by techniques and resources that patients can access returning to that session or by a link in the web page itself. Sometimes the therapist can request an assignment, which is also sent through the platform (self-registers, assessments). Finally, the program usually concludes with a new assessment – of the therapeutic process and the system itself – and the possibility of programmed follow-up.

### Effectiveness of ICTs

A few years ago, Frueh, Monnier, Elhai, Grubaugh, and Knapp (2004) questioned the effectiveness of telehealth programs. The main reason was that the increase in ICTs and other resources was not accompanied by randomized clinical trials proving their effectiveness. These authors questioned the lack of validation of these resources, not the viability of ICTs. The problem was that these resources were believed to have a certain external validity (efficiency) without having proven their internal validity. The fact that these resources were based on empirically validated programs did not guarantee their validity, since there were considerable differences between face-to-face and Internet-based programs, starting with the delivery of the therapy itself.

Today, some of the critiques made by Frueh *et al.* (2004) still remain. However, a number of meta-analyses and systematic reviews on the efficacy and efficiency of ICTs are currently available. Over the last 10 years, more than fifteen studies have dealt with this issue (Andersson and Cuijpers, 2009; Andrews, Cuijpers, Craske, McEvoy, and Titov, 2010; Antonacci, Bloch, Saeed, Yildirim, and Talley, 2008; Bee *et al.*, 2008; Bewick *et al.*, 2008; Cuijpers *et al.*, 2009; Garcia-Lizana and Munoz-Mayorga, 2010; Griffiths and Christensen, 2006; Griffiths, Farrer, and Christensen, 2010; Kaltenthaler *et al.*, 2006; Kaltenthaler, Parry, and Beverley, 2004; Kaltenthaler, Parry, Beverley, and Ferriter, 2008; Lustria, Cortese, Noar, and Glueckauf, 2009; Newman, Szkodny, Llera, and Przeworski, 2011; Portnoy, Scott-Sheldon, Johnson, and Carey, 2007; Reger and Gahm, 2009; Spek



*et al.*, 2007; Tumur, Kaltenthaler, Ferriter, Beverley, and Parry, 2006; Wade, 2010). According to these reviews and following the meta-review conducted by Foroushani, Schneider, and Assareh (2011), most programs have focused on very common disorders, particularly depressive disorders and anxiety. Contents have typically been based on second-generation therapies, that is, cognitive-behavioral therapies. Even though these reviews have been well conducted (Fernández-Ríos and Buéla-Casal, 2009), not all studies have used a system to randomly assign patients to the different conditions; in fact, programs have often been chosen by patients themselves, without any random assignment. The most usual contrast group employed is a group without treatment, with placebo treatment or on a waiting list. Fewer studies have compared ICT with face-to-face treatments.

An analysis of these reviews suggests that efficacy is higher a) In more comprehensive programs (*e.g.*, programs to treat depression, programs including cognitive restructuring, and behavioral activation programs have shown to be more effective). b) As regards severity, ICT has been found to be more effective at treating mild to moderate levels of the disorder. c) When patients show a desire to participate, that is, when they are motivated, effectiveness is higher than random assignment. Studies that begin with a motivational interview before including patients in the program are an special case. d) Studies that have controlled and matched treatment time comparing face-to-face treatment with ICT have shown comparable levels of effectiveness. In some cases such as treatment of agoraphobia, no significant differences have been found. e) Contact with a therapist seems to be key: there is greater effectiveness when the patient can have some contact with the therapist (*e.g.*, by phone, e-mail, video conference) and receive feedback and follow-up from the program. A special version of this contact is represented by programs that are not Web-based but in which patients attend a center where they are connected to a computer-based treatment program. In these cases, patients can receive direct advice from therapists. f) Programs to treat anxiety, phobias and depression have shown the best results.

As regards methodological aspects, it is difficult to compare studies because of the randomization of the sample, the disease treated, the contents and duration of therapy, access to a therapist, etc. Because of these differences, few studies have conducted a meta-analysis. However, the few meta-analyses available reported effect sizes that reached moderate levels. In addition, such studies do not always report highly relevant aspects such as dropout rates. Some studies report a zero dropout rate, while others report rates above 60%. About 10-30% of studies report the dropout rate. Actual adherence (*i.e.*, what patients do once they logs on to the program, the work they do and to what extent they follows its contents) is still a major methodological problem.

### **Conclusion: Advantages and disadvantages of ICT**

Data on the efficacy of ICT are often magnified because these treatments have certain advantages compared to face-to-face treatments. According to a number of authors (Carroll and Rounsaville, 2010; Foroushani *et al.*, 2011; Nelson *et al.*, 2011; Titov, 2007), these advantages can be summarized as follows.

A first advantage is social and has to do with the stigma of mental disorders. Although this stigma is less of a problem today, visiting a health care center for a mental disorder is a difficult situation for some people (and communities) and they wish to keep it private. ICT can be a good opportunity for these people. A second advantage is related to mobility issues. People with restricted mobility face clear difficulties attending a psychological service regularly; an Internet-based service can be a good alternative. The third advantage is also related to mobility: some people may have difficulties accessing mental health services because such services are not available in the geographical area where they live (isolated areas, islands, etc.). Again, Internet access can be a good option for these people. A fourth advantage has to do with the difficulties that are inherent to the symptoms of a disease, such as agoraphobia, which leads patients to stay at home. In these cases, a treatment program available for these people in their homes can be very useful. A last advantage has to do with practical issues: ICT are very flexible regarding access and time spent on them. Some people may have a difficult timetable and have limited time on certain occasions and lots of free time on others (e.g., weekends). In this case, programs that are accessible any time of the day any day of the week represent a clear advantage. An additional advantage that should not be neglected is economic: depending on the country and the resources available, not everybody has free access to a mental health service and not everybody can afford the cost of private treatment. Although few studies have dealt with financial costs, estimates based on QALY (Quality Adjusted Life Year) have calculated an average cost of 2500 Euros (2000 Pounds Sterling) (Kaltenthaler *et al.*, 2006). This is significantly lower than a traditional treatment.

Several disadvantages of ICT have also been identified. They are usually derived from the methodological difficulties discussed above, which can be summarized as follows: a) Not all programs follow a rigorous, empirically-derived procedure and patients may encounter good programs but also pseudo-scientific programs. b) Patient access is not always controlled. Some programs include a face-to-face evaluation that ensures that the program is fit for the patient but others do not include such controls. c) There is not always control over a psychological assessment and, if such assessment is available in the program, there is no information about the reliability of patients' responses. d) Something similar happens with therapeutic work. Some therapies require patients to perform a number of tasks or self-registers. Again, there is no control over this, which means that there is no real measure of adherence apart from information on people who drop out of the programs; some patients may complete the whole program but there is no information about their commitment. e) The role of the therapist has proven to be an important variable for the effectiveness of ICT. However, not all programs include mechanisms through which patients can contact a therapist and clarify questions. f) An important aspect is the evaluation of effectiveness. Some programs include post-treatment evaluation, but few studies include later face-to-face evaluations ensuring better reliability of information. g) Finally, programmed follow-up is not always available, so there is no information about the degree of consolidation of the possible gains.

In short, ICT is a powerful tool for Web-based treatment of a considerable number of psychological – and non-psychological – problems; these treatments sometimes

provide additional advantages that are essential for patients because they are their only practical possibility. It is therefore important to improve these resources in the future. It is very likely that key data will be obtained from trials such as the one led by Professor Simon Gilbody (University of York): «The Randomised Evaluation of the Effectiveness and Acceptability of Computerised Therapy (REEACT) Trial» on depression, scheduled to be concluded in 2013. Meanwhile, the prospects are promising.

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